# 14TH INTERNATIONAL POLYCHAETE CONFERENCE

STIAS, Stellenbosch, Cape Town | South Africa

**3 – 7 July 2023**


# PROGRAMME & ABSTRACTS

@IPC2023 #IPC14Stellenbosch

Stellenbosch UNIVERSITY
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iziko museums of South Africa

# Content

## IPC 2023 Organising Committee

- **Prof. Carol Simon,** Stellenbosch University (Conference Chairperson)
- **Prof. Conrad Matthee,** Stellenbosch University (Scientific Programme Chairperson)
- **Dr Arturo Alvarez Aguilar,** Stellenbosch University
- **Dylan Clarke**, IZIKO South African Museum
- **Charlene Janion-Scheepers,** University of Cape Town
- **Dr Jyothi Kara,** Cape Peninsula University of Technology
- **Fiona Mackay,** Oceanographic Research Institute
- **Tammy Robinson**, Stellenbosch University

**Conference Organisers**

SAVETCON EVENT MANAGEMENT

Corné Englebrecht, CMP
47 Gemsbok Avenue, Monument Park,
Pretoria, South Africa
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## Contents



Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

Stellenbosch University (SU) is home to an academic community of 29 000 students (including 4 000 foreign students from 100 countries) as well as 3 000 permanent staff members (including 1 000 academics) on five campuses. The historical oak-lined university town amongst the Boland Mountains in the winelands of the Western Cape creates a unique campus atmosphere, which attracts local and foreign students alike.

On the main campus, paved walkways wind between campus buildings – some dating from previous centuries; others just a few years old. Architecture from various eras attests to the sound academic foundation and establishment of an institution of excellence.

This, together with the scenic beauty of the area, state-of-the-art, environmentally friendly facilities and technology, as well as visionary thinking about the creation of a sustainable 21st-century institution, makes for the unique character of Stellenbosch University.

# Welcome

Mholo, Sawubona, Dumelang, sanibona, hallo!

Welcome to IPC14!

On behalf of the Stellenbosch University, Iziko Museums, and our sponsors, I am honoured and delighted to extend our warmest South African welcome and gratitude that you are joining us. And with delegates from 26 countries, this will be a truly Rainbow conference in our Rainbow Nation, to match our Rainbow worm.

We are very proud to be hosting IPC14, exactly 40 years since the triennial series was inaugurated by Dr Pat Hutchings at the Australian Museum, Sydney. Since then, we have travelled to nearly every continent, and we are grateful to host the International Polychaete Conference in Africa for the first time. As such, IPC14 will be dedicated to Prof. John Day, whose contributions to polychaete taxonomy still make significant contributions to current taxonomic research. The organising committee of IPC14 invites you to enjoy this historical event in the heart of the South African winelands!

I am sure that you are as thrilled as we are to finally attend IPC14 and specially to attend in person, after all the upheaval wrought by the COVID19 pandemic. We trust that the IPC14 will provide an excellent opportunity to exchange research ideas and findings, to meet with old friends and colleagues and to forge new relationships. But unfortunately, we will also take some time to mourn the loss of colleagues and dear friends who are no longer with us.

We are very excited to announce that the IPC14 is co-hosting the XVI South African Society for Systematic Biology 2023 Conference (SASSB) from the 5th-7th of July, also at STIAS. The SASSB Conference is an important platform to network with fellow taxonomists, systematists and evolutionary biologists to discuss ideas, share research, and develop the disciplines within southern Africa. By joining the conferences, we hope to share the excitement of polychaetes with many people who would otherwise not be exposed to this fascinating taxon, while also introducing the international community to potential local collaborators.

May this be a professionally productive, personally pleasant, very successful and enjoyable conference and may your time with us be filled with Mzansi* magic. *(*Mzansi is a colloquial name for South Africa and is derived from the Xhosa word umzantsi meaning* "south".)

Enkosi kakhulu, ngibona kakhulu, ke a leboga, ngiyabonga, baie dankie & thank you!

Carol Simon
Conference Chair &
President, International Polychaetology Association

# Participant Information

### Registration Information
Each participant at IPC14 must register in person at the Registration Desk to collect a Conference kit and badge before attending any of the sessions or events.

### Registration Times
Sunday 02 July: 14:00 – 17:00
Monday 03 July: 08:00 – 09:00
Tuesday 04 July: 08:00 – 09:00
Thursday 06 July: 08:00 – 09:00
Friday 07 July: 08:00 – 09:00

### Badges
Identification badges are required for admission to all sessions, official functions and social events of the Conference. Participants who lose their badges must report to the Registration Desk, presenting proof of identity.

### Presenters, Chairs & Facilitators
All speakers are required to report to the Registration Area at least 90 minutes before their presentation to ensure that we have uploaded the correct presentation onto the presentation laptop in the auditorium.

### Poster Presentations
Posters will be available for viewing at the back of Auditorium Room 2 for the duration of the Conference. Posters may be setup from Sunday 14:00, or Monday morning from 07:00.

### Contact
Mrs Corné Engelbrecht | +27 (0) 82 925 9241
Mrs Melanie Pretorius | +27 (0) 82 410 1202

# On-site Conference Support

### Emergency Medical assistance and Paramedic Services
For assistance with any medical emergencies, please visit the Registration area. Medical procedures and medicine will be for the attendee's own account. For any medical emergencies, please contact +27 (0) 82 925 9241 during conference hours.

### Guide to logging onto the wireless network:
Username: Stias2
Password: Conference22!

### Meals and Snacks
Meals and beverages will be provided to attendees as indicated in the programme, during conference times. All additional meals will be for the attendees' own account.

### Safety and Security
In the interest of personal safety and security, attendees should only display their identity tags on the STIAS premises and within the restricted Conference areas.

Lost property can be handed in at the Registration Desk. Any losses should be reported to the Conference Secretariat. Although every effort will be made to retrieve lost personal belongings, the responsibility for securing his/her personal belongings remains that of each person attending the Conference.

### Accommodation and Transport
IMPORTANT: All accommodation and transport arrangements will be for your own account. It is quite safe to book an Uber while in Cape Town, details can be found here.

### Flights
Should you require any assistance with flights, please approach Corné Engelbrecht at the Registration Desk area.

### Dress Code
The suggested dress code for the conference is business casual, but please do bring something warm along as weather is quite cold and the rooms will be air-conditioned.

### Liability
Neither the Conference Secretariat nor any of its contracted service providers will be responsible for the safety of articles of any kind brought into the Conference facilities by attendees, whether registered or not, their agents, contractors, visitors and/or any other person/s whatsoever. The Conference attendee shall indemnify and not hold the organisers and associates of the organisers and their subcontractors liable in respect of any cost, claims, demands and expenses as a result of any damage, loss or injury to any person howsoever caused as a result of any act or default of the Conference Secretariat or a person representing the Conference Secretariat, its contractors or guests. In addition, the Conference attendee shall take all necessary precautions to prevent any loss or damage to his/her property with special regard to mobile phones, carry or handbags and computing equipment.

# Foreign Delegate Information

| | | |
|---|---|---|
| Sat 01 | 19°/9° | Sunny |
| Sun 02 | 19°/9° | Partly Cloudy |
| Mon 03 | 20°/9° | Partly Cloudy |
| Tue 04 | 19°/11° | Mostly Cloudy |
| Wed 05 | 15°/8° | Showers |
| Thu 06 | 14°/6° | Partly Cloudy |
| Fri 07 | 15°/7° | Partly Cloudy |
| Sat 08 | 15°/8° | Showers |

### Climate in Stellenbosch
The region has a Mediterranean climate with hot dry summers and cool wet winters. Stellenbosch lies at the foot of the Cape Fold mountain range, which provides soil favourable to viticulture.

The cool season lasts for 3.6 months, from May 27 to September 15, with an average daily high temperature below 66°F (19°C). The coldest month of the year in Stellenbosch is July, with an average low of 46°F (8°C) and high of 60°F (16°C).

Expected weather for the conference will be cold, with showers expected. For more accurate predictions, click here.

### Credit Cards
Most major credit cards are accepted at shopping centres, as well as traveller's cheques in major currencies.

### Currency
With a favourable exchange rate for many international currencies, you'll find South Africa an inexpensive destination and an easy one – our financial institutions are world-class, with no shortage of banks, bureaux de change and automatic tellers. South Africa's unit of currency is the Rand, which is divided into 100 cents. Notes come in denominations of R10, R20, R50, R100 and R200; coins come in denominations of 5c, 10c, 20c, 50c, R1, R2 and R5. There are two R5 coins in circulation, both of which are legal currency. All transactions are rounded down to the nearest 5c.

Exchange Rates on 28 June 2023 (these can fluctuate)
US$1 (one American Dollar) = ± R18.50
£1 (one British Pound) = ± R23.60
€1 (one Euro) = ± R20.30

### Drinking Water
Tap water at hotels, inns, lodges and in other public places is purified and safe to drink.

### Language
There are 11 official languages in South Africa: English, Afrikaans, isiZulu, isiXhosa, isiNdebele, Sepedi, Sesotho, siSwati, Xitsonga, Setswana and Tshivenda. English is widely spoken throughout South Africa, and English-speaking visitors will have no problems communicating while travelling in South Africa. All signposting is in English.

### Metric System
South Africa uses the metric system: weather forecasts are given in degrees Celsius (C); petrol, milk, and wine are sold by the litre; grocery items are sold in grams and kilograms; road speeds are posted in kilometres per hour.

### VAT
Value Added Tax (VAT), currently at 15%, is levied on the quoted prices of most goods offered for sale and on hospitality services. Refunds of VAT paid for goods (not services) may be claimed by foreign visitors at their port of departure, provided that the total claim (money spent) exceeds R250.00 and that goods are being taken with them out of South Africa (in which case, tax invoices and the actual goods must be presented as proof).

# While in Stellenbosch: Safety

*Like many major cities, Stellenbosch has both good and bad areas. It is advisable when walking in Stellenbosch, particularly at night, that you should be aware of people around you and that ideally you should not walk alone but in a group. Highly visible displays of wealth should be avoided, and it is not advisable to look like a 'typical tourist' with cameras and binoculars strung around your neck. Never leave any valuables unattended.*

In General
- Do not carry a camera openly in the city. Please take care when using your camera, as this will identify you as a tourist and could draw unnecessary attention.
- Avoid wearing jewellery and expensive watches.
- If you are accosted, remain calm and be cooperative.
- Be extra vigilant when drawing money from a bank machine (ATM) and never accept assistance when transacting at an ATM.

When on Foot
- Carry your handbag across your body.
- Do not carry large amounts of cash on you.
- Do not leave valuables exposed (e.g. on a seat or the floor or ground) while having a meal or drink.
- Do not let strangers get too close to you, especially people in groups.

On the Road
- Lock your car doors.
- Never leave anything worth stealing in view when driving or when your car is unattended.

- Preferably use the air-conditioning or cooling system in the car to avoid opening your windows.
- Be vigilant when stopped at a traffic light or Stop street.

Emergency Contacts

| | |
|---|---|
| • Corné Engelbrecht | +27(0)82 925 9241 |
| • Melanie Pretorius | +27 (0)82 410 1202 |
| • Prof. Carol Simon | +27 (0)73 876 1002 |
| • FM 24 Hour Ops Centre | 021 808 2333 |
| • Ambulance | 10177/999 |
| • Fire and Rescue services | 021 808 8888/021 887 1333 |
| • Hospital: Medi-Clinic | 021 861 2000 |
| • Campus Health Services | 021 808 3494/5 |
| • Police | 10111/021 809 5000 |

# Experience Stellenbosch

The City of Oaks is overflowing with exciting and unique things to do.

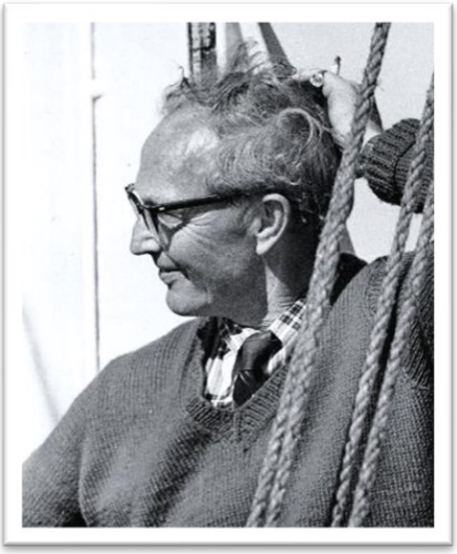
South Africa's second-oldest town is synonymous with wine, and certainly has a wealth of wineries well worth a visit. However, there's so much more to the City of Oaks. Rich in history and culture, and surrounded by majestic mountains and nature reserves, it offers must-try experiences whatever your interests or age.

The bon vivants among us will feel like they've died and gone to gourmand heaven, with a smorgasbord of eating, drinking and living it up to be done. Outdoor adventurers will be stoked with the extensive network of mountain and vineyard trails just waiting to be explored, while kids can join in the fun at play parks and pump tracks.

Wineries in Stellenbosch
Outdoor activities in Stellenbosch
Art, culture + foodie experiences in Stellenbosch
Kids activities in Stellenbosch

# In Memoria

The first IPC to be held in Africa is dedicated to John Day, the most influential South African polychaete taxonomists, and one of the most influential in the work. This year we pay tribute to him, and those who we lost over the last four years.



### The remarkable life of John Day, polychaet-ologist

Presenter: Jenny Day

The bare bones of John's story are as follows. He was born in 1909 in England and died in Knysna in 1988. As a young child he and his family moved to Mozambique, and later to East London, where he attended Grey College; he then studied Zoology and Chemistry at Rhodes University before registering for a PhD at Liverpool University, the only university offering PhD studies in the marine sciences. He received his PhD in 1933 and then taught at Durham University in Newcastle until being offered a research post in Cape Town under Prof Alan Stevenson. He and Stevenson surveyed the intertidal, sampling every 50 miles or so between Luderitz and southern Mozambique, over the course of the next few years. In 1939 (beginning of WW2) he joined the Royal Air Force in the UK. He served with distinction, being awarded the Distinguished Flying Cross with bar; losing a leg when the plane he was flying in was shot by German anti-aircraft fire; being involved in the development of radar; acting as liaison with American developers of radar; and leading a section of the Pathfinder Force. On discharge he took the Chair of Zoology at UCT, where he remained until he retired in 1975. John had been interested in living things since he fished as a child in the streams of Mozambique and later in the sea around East London. His interests later widened to encompass both marine biotas and marine ecosystems. Losing his leg in the war restricted his mobility, so he decided to work on estuaries, which he and his group studied for many years. It must have been the sheer numbers and diversity of polychaetes in estuaries, together with the frustration of not having any handy identification guides, that led him to study the group in detail. The first edition of his great work, the Polychaeta of South Africa, was published in 1967. His other major works are Estuarine Ecology with particular reference to southern Africa, published in 1981, and Guide to marine life on South African shores published in 1965. In both the talk and the paper I will fill in some of the gaps in this skeletal account and will also provide some details of John Day's extraordinary family.

MONDAY, 10:15

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## Paulo da Cunha Lana

*(20 April 1956 – 26 June 2022)*

Presenter: Wagner Magalhães

Authors: Maikon Di Domenico, Alexandra Rizzo, Ana Claudia dos Santos Brasil, Cinthya Simone Gomes Santos, Ricardo Castro Álvarez, Paulo Paiva

Professor Paulo da Cunha Lana, a renowned biologist, oceanographer, and ecologist, passed away in 2022, leaving behind a remarkable legacy in the field of Marine Sciences. Born in 1956, Paulo dedicated his life to scientific exploration, education, and mentoring, making significant contributions to various disciplines and inspiring numerous students throughout his career.

Paulo obtained his BSc degree in Biological Sciences (Zoology) from the State University of Rio de Janeiro in 1977. He continued his academic pursuits and earned an MSc in Biological Oceanography in 1981, followed by a PhD in Biological Oceanography from the Oceanographic Institute of the University of São Paulo in 1984. Paulo's extensive training allowed him to become a versatile scientist with diverse interests and expertise.

Throughout his career, Paulo focused on areas such as benthic ecology, mangrove and saltmarsh ecology, taxonomy, phylogeny, and the ecology of the marine worms we love so much. He was also actively involved in environmental impact assessment studies and coastal management. Starting in 1981, Paulo worked at the Centre for Marine Studies (CEM), which he helped establish at the Federal University of Paraná (UFPR) in Brazil. After retiring in 2020, he continued his scientific pursuits as a Senior Professor at CEM, associated with the Marine Ecology Laboratory.

Paulo's dedication to education and mentorship was evident in his accomplishments. He played a pivotal role in creating the PhD course in Environment and Development at the Federal University of Paraná, where he taught for over 15 years. His passion for teaching and mentorship led him to envision and contribute to the undergraduate course in Marine Sciences (now Oceanography) at UFPR, which had a socio-environmental focus from its inception in 2000.

As an advisor and mentor, Paulo influenced the lives and careers of more than 100 graduate students, including Masters, PhDs, and post-docs, as well as dozens of undergraduate students who pursued research under his guidance. His commitment to nurturing scientific curiosity and fostering socially committed knowledge was evident in the achievements of his mentees, many of whom have gone on to successful scientific and academic careers. Paulo's mentoring approach emphasized originality, creativity, and scientific risk-taking, inspiring his students to explore uncharted territories and ask innovative questions.

Beyond his scientific achievements, Paulo was deeply concerned about the state of Academia and Science in Brazil and globally. He voiced his concerns about productivist practices and behaviors, advocating for a shift away from incremental science towards more original and creative approaches. In his words, “I am horrified by the productivist practices and behaviors that plague international science and also the science that is practiced in Brazil”. Paulo challenged his students to think critically and valued their personal and intellectual growth over conventional measures of success.

Paulo Lana's contributions extended beyond the scientific realm. He recognized the importance of social sciences and actively participated in the creation of interdisciplinary programs. He strived to make science more accessible, seeking to inspire young minds from underprivileged backgrounds. His dedication to education and outreach extended to his own vulnerable and underserved community. There he initiated a program called "How to do science?" for elementary and high school students, igniting their curiosity and introducing them to the world of scientific inquiry.

Paulo Lana's impact as a mentor, advisor, and educator transcends numerical metrics and publication records. His true achievements lie in the individuals he mentored, the lives he influenced, and the knowledge he instigated. Paulo will be remembered as a passionate scientist, an inspiring educator, and a caring mentor whose guidance and unwavering commitment shaped the state of marine sciences and the lives of countless students, colleagues and friends.

Paulo was married to Noemi Perdigão (Retired professor of languages and literature), with whom he had three children: Julia Lana (33 years old, Sculptress), Pedro Perdigão (28, Lawyer), and Alice Lana (26, Lawyer). He drew from his family life to empathize with students seeking advice in balancing their professional and personal lives. This personal mentorship resulted in many of his alumni becoming close to his entire family. After he passed, his family kept close contact, supported his students, and was always proud of every tribute that kept his dreams and school alive. To paraphrase a favorite quotation among his undergrad students: "Teaching and science shouldn't be a steeplechase, but a happy party where everyone dances with everyone else. So, help others and ask for help from others to move forward, but always remembering and knowing that the initial conditions are very bad for many of us."

Paulo is survived by his family, students, colleagues, and a scientific community that continues to be inspired by his teachings and legacy. His absence will be deeply felt, but his contributions will continue to inspire generations of marine scientists to come.

TUESDAY, 10:15

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## Dr Gesa Hartmann-Schröder

*(1931-2022)*

*A silhouette of Gesa Hartmann-Schröder (1931 – 2022) from 1965. © Archive, LIB*

Presenter: Jenna M. Moore
Authors: Dieter Fiege[1], Brigitte Ebbe[2], Jenna M. Moore[3]

*[1] Senckenberg Research Institute and Natural History Museum Frankfurt, Senckenberganlage 25, 60325 Frankfurt am Main, Germany*
*[2] Senckenberg, German Centre for Marine Biodiversity Research, Martin–Luther-King-Platz 3, D-20146 Hamburg, Germany*
*[3] Museum of Nature Hamburg, Leibniz Institute for the Analysis of Biodiversity Change, Martin-Luther-King-Platz 3, 20146 Hamburg, Germany*

Dr Gesa Hartmann-Schröder, Curator of Polychaeta at the former Zoological Institute and Museum of the University of Hamburg, passed away on June 6, 2022, shortly before her 91st birthday. She had been active in polychaete research for more than 40 years and became one of the most prolific polychaetologists to date. She described 690 new polychaete taxa, including the families Micropthalmidae and Travisiidae, four subfamilies, 45 genera and 573 species. Besides numerous papers on the polychaete fauna of South America, Africa, Australia and the Southern Ocean, she produced two editions of "Polychaeta" in the series "Die Tierwelt Deutschlands", which continues to be a valued reference work for the fauna of northern European waters. Her scientific legacy includes also one of the world's most important collections of Polychaeta, today housed at the Museum of Nature, Hamburg at the Leibniz Institute for the Analysis of Biodiversity Change (formerly Zoological Institute and Museum of the University of Hamburg), as well as an enormous library and card catalogue comprising detailed information on all polychaete taxa known at the time. Gesa retired from her position in 1994 and spent the following years together with her husband, who died in 2010, in their hometown Goslar in the Harz mountains, where they were both active members of a local group of naturalists. Gesa Hartmann-Schröder was an outstanding taxonomist of Polychaeta, a warm-hearted teacher and mentor, and a friendly, helpful and generous colleague. She will be greatly missed.

TUESDAY, 10:15

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## María Nuria Méndez Ubach

*(1958-2022)*

Presenter: Viviane Solis-Weiss

On December 9, 2022, Dr. Nuria Méndez Ubach passed away at 64. She came from a family of refugees from the Spanish war, her mother María Ubach, and father Francisco Méndez. Nuria was born in the City of Mexico on October 14, 1958. She completed her undergraduate education at the Luis Vives Institute and her Bachelor of Biology at the Faculty of Sciences of the National Autonomous University of Mexico (1977-1983), Mexico's largest and most important university. She was awarded the "Gabino Barreda" Medal for her Master of Science studies (1986). Her doctorate dissertation was on benthos structure and organic pollution in the littoral of Barcelona. She held Doctor in Biology with the Apto Cum laude qualification in the Department of Ecology of the Faculty of Biology (1990-1994) at the University of Barcelona (Spain). She had a postdoctoral position (1998-1999) at the Institute of Aquaculture at the University of Stirling (Scotland) and the Department of Life Sciences and Chemistry at Roskilde University (Denmark). Her specialties were marine ecology, coastal pollution assessment, ecotoxicology, and reproductive aspects of polychaetes. Her most renowned works were on the *Capitella* species life cycle characterization.
She worked as an academic technician (1983-1989) at the Institute of Marine Sciences and Limnology, UNAM, in Mexico City. And later, as Associate Researcher (1996), and since 2005 she was Head (at the Mazatlán Academic Unit) of the same institute.

The main achievements are published scientific articles (52), presentation of papers in national (35) and international (55) congresses, book chapters (6), popular articles (5), the direction of postgraduate thesis (4), participation in review committees of national (12 manuscripts) and international (58 manuscripts) scientific journals, evaluation of research projects (11), head of research projects (4), participation in other research projects (32), participation in oceanographic campaigns (26). In 2016, she received the "Sor Juana Inés de la Cruz" medal for her outstanding work as a female academic at UNAM. She was part of the National System of Researchers from Mexico, level I (1997-2007 and 2017- to date), and level II (2008-2016), an association to recognize the people who produce scientific knowledge.

Apart from her academic work, Dr. Nuria Méndez was an enthusiastic theater actress, and those who were fortunate to interact with her will fondly remember her as an active world traveler. We never forget her long and animated talks (seasoned with Spain expressions), her direct and frank personality, and her easy smile, among a thousand other characteristics that distinguished her.

### Reference

Hendrickx ME, Salgado BJ, Yáñez-Rivera B & Cordero RM. 2023. María Nuria Méndez Ubach. Una vida entre poliquetos. In Memoriam. Geomare 5(1): 19-37. https://geomarerevista.wixsite.com/geomare/volumen-5

TUESDAY, 10:15


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NRF National Research Foundation | SAEON South African Environmental Observation Network

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# Programme Outline

## Sunday 2 July

| | |
|---|---|
| 14:00 – 17:00 | Conference registration opens, collection of conference pack (or from 08:00 on Monday morning)<br>Setting up of posters in Auditorium 2 (or from 07:00 on Monday morning) |

## Monday 3 July

| | |
|---|---|
| 08:00 – 08:45 | Registration Open \| Arrival coffee/tea \| Poster viewing and networking |
| 08:30 – 08:45 | Welcome and Opening |
| 08:45 – 09:30 | **Keynote: The under-appreciated roles of polychaetes as ecosystem engineers (Prof. George Branch)** |
| 09:30 – 10:15 | THEME: Ecology, Biodiversity & Biogeography |
| 10:15 – 10:30 | The remarkable life of John Day, polychaet-ologist |
| 10:30 – 11:00 | Mid-morning refreshments |
| 11:00 – 12:15 | THEME: Ecology, Biodiversity & Biogeography |
| 12:15 – 12:30 | Group Photo |
| 12:30 – 13:30 | Lunch |
| 13:30 – 15:00 | THEME: Pollution Studies\| Reproductive Biology |
| 15:00 – 15:30 | Mid-afternoon refreshments |
| 15:30 – 17:15 | THEME: Physiology and Ecology |
| 17:15 – 19:30 | Welcome Reception at STIAS (Dress code: come as you are!) |

## Tuesday 4 July

| | |
|---|---|
| 08:00 – 08:30 | Registration Open \| Arrival coffee/tea \| Poster viewing and networking |
| 08:30 – 09:15 | **Keynote: Wiggly Gold: commercial influence in accelerating annelid research in developing region (Dr Izwandy Idris)** |
| 09:15 – 10:15 | THEME: Economically important species |
| 10:15 – 10:45 | In Memoria |
| 10:45 – 11:15 | Mid-morning refreshments |
| 11:15 – 12:30 | THEME: Ecology |
| 12:30 – 13:30 | Lunch |
| 13:30 – 15:00 | THEME: Taxonomy and morphology |
| 15:00 – 15:30 | Mid-afternoon refreshments |
| 15:30 – 16:30 | THEME: Taxonomy and morphology |
| 16:30 | Close of Day 2 |

## Wednesday 5 July – Mid-week excursion (dress code: comfortable and warm)

| | |
|---|---|
| 08:00 | Delegates arrive at STIAS – PLEASE ENSURE YOU TAKE YOUR CONFERENCE NAME BADGE AS THIS IS REQUIRED FOR ENTRY AT THE MUSEUM |
| 09:00 | Depart from STIAS (all delegates to have their bus-tokens on hand)<br>Please arrive on time. Buses leave promptly at 09:00 |
| 10:00 | Arrive at Iziko Museums<br>Coaches to park in designated area<br>Enter into the Iziko South African Museum (ISAM) main visitor reception area for information session |
| 10:30 | Delegates free to access:<br>- Iziko South African Museum (fossils, animals & man-made artifacts)<br>- South African national Gallery (major museum for African & European art)<br>- Iziko Slave Lodge (various exhibits in a historic building) |

| | |
|---|---|
| 12:30 | Lunch @ 5th Floor of ISAM |
| 15:00 | Buses depart back to STIAS (all delegates to have their bus-tokens on hand) |
| 16:00 | Arrive at STIAS |

## Thursday 7 July

| | |
|---|---|
| 08:00 – 08:30 | Registration Open \| Arrival coffee/tea \| Poster viewing and networking |
| 08:30 – 09:15 | **Keynote: The use of phylogenetic trees to reveal environment history** |
| 09:15 – 10:30 | THEME: Taxonomy and morphology \| Systematics and Phylogenetics |
| 10:30 – 11:00 | Mid-morning refreshments |
| 11:00 – 12:30 | THEME: Systematics and phylogenetics |
| 12:30 – 13:30 | Lunch \| International Polychaetology Association Advisory Council meeting |
| 13:30 – 15:40 | THEME: Invasive species |
| 16:00 – 19:00 | Dedicated Poster Session with Wine Tasting from Delheim |

## Friday 8 July

| | |
|---|---|
| 08:00 – 08:30 | Registration Open \| Arrival coffee/tea \| Poster viewing and networking |
| 08:30 – 09:15 | Keynote: Building up STEAM: Innovative approaches to engage undergraduate students in investigations of morphology |
| 09:30 – 10:30 | THEME: Education \| Developmental Morphology |
| 10:30 – 11:-00 | Mid-morning refreshments |
| 11:00 – 12:30 | THEME: Developmental Morphology |
| 12:30 – 13:30 | Lunch |
| 13:30 – 14:45 | International Polychaetology Association meeting & next conference bids |
| 14:45 – 15:15 | Close of Conference & Prize Giving |

## OFFICIAL CONFERENCE DINNER

Dress code: Business Casual (and something warm)

| | |
|---|---|
| 17:00 | Buses depart from STIAS to GOLD Restaurant |
| 18:30 | IPC 14 Conference Dinner |
| 22:00 | First bus leaves back to STIAS |
| 24:00 | Last bus leaves back to STIAS |

# SAAMBR

THE SOUTH AFRICAN ASSOCIATION FOR MARINE BIOLOGICAL RESEARCH

The South African Association for Marine Biological Research (RF) NPC (SAAMBR) was founded in 1951, for the express purpose of undertaking applied marine biological research, funded by a public aquarium. Over its 72-year history, SAAMBR's mission evolved towards a marine conservation focus, and the organisation now consists of three operating divisions. uShaka Sea World is the largest aquarium complex in Africa, inspiring young and old to care for our magnificent marine animals and oceans. uShaka Sea World Education teaches children and adults alike about our oceans and encourages responsible environmental behaviour. The Oceanographic Research Institute (ORI) is SAAMBR's research division, undertaking applied research that contributes towards the sustainable use of marine and coastal resources in the Western Indian Ocean.

ORI is the only independent, non-government entity recognised as a national marine research institute by government in South Africa, and mainly focusses on paid for applied research, but where a critical need has been identified, ORI will often fund its own fundamental research. ORI has six major research thrusts (portfolios) each led by an expert in the field, ranging from the biology, ecology and management of coastal, estuarine, inshore and offshore living resources to coastal zone management and aquaculture.

ORI's activities and collaboration extend well beyond South Africa's borders, to all African and island states within the Western Indian Ocean region, and the rest of the world. ORI fulfils a capacity building & training role at the post graduate level through its affiliation with the University of KwaZulu–Natal, and other South African universities. ORI facilities include one of the most comprehensive marine science libraries in South Africa, ICT systems, fisheries databases, marine aquarium research facilities, laboratories ranging from wet sample processing, microscopy to genetic analysis, and a highly competent field team, including small craft operations and underwater (SCUBA) capabilities.

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# PROGRAMME OF PRESENTATIONS

## Monday 3 July – Day 1

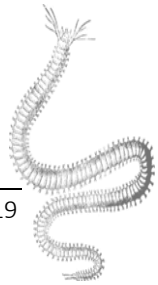
| Time | Abstract # | Topic and Speaker |
|---|---|---|
| **Ecology, Biodiversity & Biogeography \| Chair: Carol Simon** | | |
| 08:30 | **Official Welcome and Opening**<br>*Carol Simon, University of Stellenbosch* | |
| 08:45 | **Opening Keynote: The under-appreciated roles of polychaetes as ecosystem engineers**<br>*George M. Branch, Department of Biological Sciences and Marine Biology Research Institute, University of Cape Town* | |
| 09:30 | 099 | Polychaete fauna associated with mussel and oyster aggregations in the Mediterranean Sea<br>*Barbara Mikac, University of Bologna* |
| 09:45 | 024 | Polychaete communities in the nearshore zone of False Bay, South Africa<br>*Bomikazi Tshingana, University of Cape Town* |
| 10h00 | 126 | Functional similarities of marine polychaetes from South Africa's northeast mid-shelf are driven by sediment characteristics<br>*Sikhumbuzo M. Maduna, Oceanographic Research Institute (SAAMBR)* |
| 10h15 | The remarkable life of John Day, polychaet-ologist<br>*Jenny Day, Freshwater Research Centre* | |
| 10h30 | Mid-morning refreshments | |
| **Ecology, Biodiversity & Biogeography \| Chair: Dylan Clarke** | | |
| 11:00 | 159 | Polychaetes distributed across oceans - examples of widely distributed species from abyssal depths<br>*Karin Meißner, Senckenberg Museum* |
| 11:15 | 095 | Wide-spread dispersal in a deep-sea brooding polychaete: the role of natural history collections in assessing the distribution in quill worms (Onuphidae, Annelida)<br>*Nataliya Budaeva, University Museum of Bergen, University of Bergen* |
| 11:30 | 120 | Diversity and distribution patterns of polychaete fauna on the continental shelf of Southern Namibia<br>*Amoré Malan, Anchor Environmental Consultants* |
| 11:45 | 055 | Well-connected worms: genetic connectivity of annelids in Australia's eastern abyss<br>*Laetitia M. Gunton, Portsmouth University* |
| 12:00 | 148 | Long-term impacts of large-scale herring death on benthic fauna in a shallow silled fjord in Iceland<br>*Valtýr Sigurðsson, Biopol and Northwest Icelandic Nature Center* |
| 12:15 | Group Photo | |
| 12:30 | Lunch | |
| **Pollution Studies \| Chair: Fiona MacKay** | | |
| 13:30 | 030 | Drivers of polychaete distribution within the Berg River Estuary, South Africa<br>*Carol A. Simon, Stellenbosch University* |
| 13:45 | 006 | The role of polychaetes in the interaction of macrofauna with microplastics at the benthic zone: A case study of Tokyo bay<br>*Said M. Hashim, Tokyo University of Marine Science and Technology* |
| 14:00 | 003 | Assessment of the relationship between benthic macroinvertebrate community structure and the quality of water in selected Ghanaian estuaries<br>*Dorothy Khasisi Lukhabi, University of Cape Coast* |
| **Reproductive Biology \| Chair: Fiona MacKay** | | |
| 14:15 | 096 | Epitoky in *Alitta succinea* (Annelida: Nereididae): using click chemistry sequencing to characterize gene expression<br>*Mary Colleen Hannon, Texas A&M University at Galveston* |

| | | |
|---|---|---|
| 14:30 | 140 | Population structure and reproductive biology of *Sipunculus nudus* (Annelida: Sipunculidae) in Todos-Os-Santos Bay, Bahia, Brazil: Preliminary Results<br>*Wagner Magalhães, Federal University of Bahia* |
| **Time** | **Abstract #** | **Topic and Speaker** |
| 14:45 | 109 | The reproductive strategies of *Diopatra aciculata* (Annelida) in the Knysna Estuary<br>*Stephanie Schoeman, Stellenbosch University* |
| 15:00 | Mid-afternoon refreshments | |
| **Reproductive Biology \| Sarah Faulwetter** | | |
| 15:30 | 105 | Reproduction and possible feeding habits of branching syllids Ramisyllis spp. (Annelida, Syllidae)<br>*Maria Teresa Aguado Molina, Georg August University* |
| 15:45 | 002 | Secondary planktotrophic larvae and hermaphroditism, a trend in sessile marine invertebrates? A discussion using the examples of Serpulinae and other invertebrates<br>*R. Paul Wolf* |
| **Physiology and ecology \| Sarah Faulwetter** | | |
| 16:00 | 078 | Biogeography of polychaetes in South African Bays<br>*Jessica Dawson, Anchor Environmental Consultants (Pty) Ltd.* |
| 16:15 | 032 | Polychaeta distribution in *Ecklonia radiata* holdfast along the southeast coast of South Africa<br>*Naledi Nkohla, Walter Sisulu University* |
| 16:30 | 124 | Polychaetes characterise an atypical muddy shelf region of the east coast of South Africa<br>*Stacey Jordaan, Oceanographic Research Institute* |
| 16:45 | 139 | South African subtropical polychaetes: community patterns and biodiversity hotspots shaped by ocean and coastal processes, past and present<br>Fiona Mackay, Oceanographic Research Institute |
| 17:00 | 019 | Sands and gravels of the outer continental shelf off the Cap de Creus (NW Mediterranean) with *Lanice conchilega*<br>*Rafael Sardá, Consejo Superior de Investigaciones Científicas (CSIC ) / ESADE* |
| 17:15 | End of Day 1 | |
| 17:15 | Welcome Reception | |

## Tuesday 4 July – Day 2

| Time | Abstract # | Topic and Speaker |
|---|---|---|
| **Economically important species \| Chair: Pat Hutchings** | | |
| 08:30 | **Keynote: Wiggly Gold: commercial influence in accelerating annelid research in developing region**<br>*Dr Izwandy Idris, Universiti Malaysia Terengganu* | |
| 09:15 | 026 | The management of blood worms, *Marphysa* spp. with particular reference to Australia, South Africa and Europe<br>*Pat Hutchings, Australian Museum* |
| 09:30 | 015 | Suitability of Polychaete worms (*Marphysa mossambica*) as protein and lipid ingredients for the culture of Tiger prawn (*Penaeus monodon*) in hapa nets in tidal ponds of Mtwapa creek<br>*Brendan Mutua Muli, Pwani University* |
| 09:45 | 009 | Performance of eunicid polychaetes commonly exploited by artisanal fishers under different culture and diet regimes between 2015 and 2017 (*Marphysa mossambica*)<br>*Thaddeus S. Ombati, Egerton University* |
| 10:00 | 014 | Polychaete fishing as a pathway to women's wellbeing<br>*Alice Prieto-Carolino, University of the Philippines Visayas* |
| 10:15 | In memoriam<br>• Gesa Hartmann-Schröder *(Jenna Moore)*<br>• María Nuria Méndez Ubach *(Vivian Solis-Weiss)*<br>• Paulo da Cunha Lana *(Wagner Magalhães)* | |
| 10:45 | Mid-morning refreshments | |

| Economically important species \| Physiology and Ecology \| Chair: Izwandy Idris | | |
|---|---|---|
| 11:15 | 036 | Variability in euryhalinity of two Ponto-Caspian invasive annelid species<br>*Serena Mucciolo, University of Lodz* |
| 11:30 | 137 | Expanding our understanding of the diet and trophic role of the cryptogenic estuarine moonshine worm (*Diopatra aciculata*) in warm temperate estuaries of South Africa<br>*Hendré van Rensburg, University of Stellenbosch* |
| **Time** | **Abstract #** | **Topic and Speaker** |
| 11:45 | 021 | Identifying G protein-coupled receptors (GPCR) involved with mating behaviour in *Platynereis dumerilii* to shed light on the impact of ocean acidification on chemical communication<br>*Victoria Carla Moris, University of Hull* |
| 12:00 | 123 | Which sea cucumbers do worms like? Host choice of the ectoparasitic polynoid *Gastrolepidia clavigera* Schmarda 1861<br>*Takahiro Sugiyama, Kyoto University* |
| 12:15 | Lunch | |
| Taxonomy and Morphology \| Chair: Elena Kupriyanova | | |
| 13:30 | 111 | Intertidal polychaetes of Kuwait – an update since 2016<br>*Manal Al-Kandari, Environment and Life Sciences Research Center, Kuwait Institute for Scientific Research (recording)* |
| 13:45 | 116 | New records and species of polychaetes from an anchialine cave of Mallorca (Balearic Islands)<br>*Maria Capa, University of the Balearic Islands* |
| 14:00 | 044 | The polychaete legacy of Marian Pettibone: a look ahead<br>*Victor M. Conde-Vela, National Museum of Natural History, Smithsonian Institution* |
| 14:15 | 011 | Taxonomy of European Cirratulidae – latest progress and future prospects<br>*Maël Grosse, University of Oslo, Natural History Museum* |
| 14:30 | 071 | Fine morphology of jaw apparatus of *Scoletoma fragilis* (Lumbrineridae, Annelida)<br>*Anna Koroleva, Lomonosov Moscow State University* |
| 14:45 | 084 | Developing taxonomy – DNA sequencing and morphology in the description of new species of Lumbrineridae (Annelida: Eunicida) from the North Atlantic<br>*Eivind Oug, Norwegian Institute for Water Research, Region South* |
| 15:00 | Mid-afternoon refreshments | |
| Taxonomy and Morphology \| Jyothi Kara | | |
| 15:30 | 079 | Chaetopteridae of Macaronesia and the Atlantic coasts of Africa<br>*Jenna M. Moore, Museum of Nature Hamburg, Leibniz Institute for the Analysis of Biodiversity Change* |
| 15:45 | 056 | Reconciling morphology and molecules to explore diversity of gossamer worms (Polychaeta, Tomopteridae)<br>*Karen J. Osborn, Smithsonian National Museum of Natural History* |
| 16:00 | 156 | 200 Years of holopelagic Annelida taxonomy: new methods - new complexities<br>*Vitaly L. Syomin, Shirshov Institute of Oceanology of Russian Academy of Sciences* |
| 16:15 | 005 | Unraveling the slime worm ball: An overview of *Myxicola* species from the coasts of North America<br>*Nancy K. Prentiss, University of Maine at Farmington* |
| 16:30 | 113 | Integrative taxonomy of *Eunice* cf. *aphroditois* (Annelida: Eunicidae) from Japan: comparative analysis of juvenile and adult forms and phylogenetic placement within the family<br>*Chiharu Shinomiya, Kyoto University* |
| 16:45 | End of Day 2 \| Free Evening | |



# Thursday 6 July – Day 4

| Time | Abstract # | Topic and Speaker |
|---|---|---|
| 08:00 | - | SASSB Registration opens - arrival coffee and tea |
| **Taxonomy and morphology \| Systematics and Phylogenetics \| Chair: Conrad Matthee** | | |
| 08:30 | Keynote: The use of phylogenetic trees to reveal environment history<br>*Tony Verboom, University of Cape Town* | |
| 09:15 | 072 | What is Myzostomids parenchyma?<br>*Glafira Kolbasova, Moscow State University* |
| 09:30 | 131 | Current knowledge of the family Capitellidae (Annelida) in Brazil: what has been done and next steps<br>*Author: Camila F. Silva, Oceanographic Institute of the University of São Paulo*<br>*Presented by: Wagner Magalhães, Federal University of Bahia* |
| **Time** | **Abstract #** | **Topic and Speaker** |
| 09:45 | 069 | Clarifying the identity of beach dwelling polychaetes of the genus *Scolelepis* (Annelida: Spionidae) from the Atlantic coast of North America, previously confused with the European species *Scolelepis squamata* (O.F. Müller, 1806)<br>*Jason D. Williams, Hofstra University* |
| 10:00 | 035 | Revisiting the evolution of annelid larval forms<br>*Greg Rouse, Scripps Oceanography, University of California San Diego* |
| 10:15 | 103 | Species diversity of the pelagic polychaete family Tomopteridae in the eastern Indian and Pacific Oceans<br>*Kanako Amei, Atmosphere and Ocean Research Institute, the University of Tokyo* |
| 10:30 | Mid-morning refreshments | |
| **Systematics and Phylogenetics \| Chair: Torsten Struck** | | |
| 11:00 | 074 | Dating the annelid tree of life<br>*Torsten H. Struck, University of Oslo* |
| 11:15 | 107 | An update on the phylogeny of scale worms (Aphroditiformia, Polychaeta)<br>*Yu Wang, Hainan University (recording)* |
| 11:30 | 118 | The *Syllis prolifera* species complex: a morphological and molecular approach<br>*Irene del Olmo, Universidad Autónoma de Madrid* |
| 11:45 | 119 | Integrative taxonomy to study syllid annelids of Bermuda with reorganization of the genus Megasyllis<br>*Paula Moreno Martín, Universidad Autónoma of Madrid* |
| 12:00 | 085 | Phylogeny of Orbiniidae (Annelida) based on genome skimming<br>*Miguel A. Meca, University Museum of Bergen* |
| 12:15 | 066 | Orbiniidae (Annelida, Sedentaria) - does morphology match molecular data?<br>*Anna Zhadan, M.V.Lomonosov Moscow State University, Biological Faculty* |
| 12:30 | Lunch \| International Polychaetology Association Advisory Council meeting | |
| **Systematics and Phylogenetics \| Invasive Species \| Chair: Tammy Robinson** | | |
| 13:30 | 132 | Capturing cryptic diversity of Andaman coral reefs with Autonomous Reef Monitoring Structures (ARMS): First initiative in Indian waters<br>*Tejal V. Vijapure, Centre for Ecological Sciences, Indian Institute of Science (IISc)* |
| 13:45 | 127 | Evaluation of the presence of mitochondrial sequences in Annelida nuclear genomes<br>*Joana Zanol, Museu Nacional, Federal University of Rio de Janeiro* |
| 14:15 | 017 | Colonization patterns of the invasive species *Ficopomatus enigmaticus* (Fauvel, 1923) in a shallow coastal lagoon in Greece<br>*Sarah Faulwetter, University of Patras* |
| 14:30 | 039 | Polychaete diversity in New England marinas after two decades of rapid biodiversity assessment surveys: challenges and future plans<br>*Andrew A. Davinack, Wheaton College* |

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|---|---|---|
| 14:45 | 033 | "Cosmopolitan" species as gateways for cryptic invasions: integrative taxonomy to the rescue<br>*Elena K. Kupriyanova, Australian Museum Research Institute* |
| 15:00 | 018 | The European Research Infrastructure LifeWatch ERIC and its potential for supporting the Polychaete Community<br>*Christos Arvanitidis, LifeWatch ERIC* |
| 15:15 | Q&A | |
| 15:30 | Short presentation from Delheim | |
| 16:00 | Dedicated poster session + wine & cheese<br>*Each attendee will receive 4 x wine tasting vouchers to sample the wines from Delheim Wine Estates. You will also be able to place orders for wine.* | |

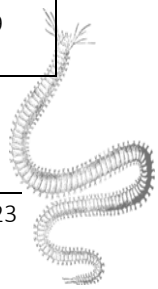
## Friday 7 July – Day 5

| Time | Abstract # | Topic and Speaker |
|---|---|---|
| Education \| Developmental Morphology \| Chair: Patricia Álvarez-Campos | | |
| 08:30 | 154 | **Keynote 4: Building up STEAM: Innovative approaches to engage undergraduate students in investigations of morphology**<br>*Sara M. Lindsay, University of Maine* |
| 09:30 | 151 | Inspiring young polychaetologists in the molecular age<br>*Paul D. Rawson, University of Maine* |
| 09:45 | 138 | Single cell sequencing for evolutionary and developmental biology in annelids<br>*Patricia Álvarez-Campos, Universidad Autónoma de Madrid* |
| 10:00 | 013 | Desmosomal connectomics and muscular system innervation in the *Platynereis* larva<br>*Sanja Jasek, University of Exeter (recording)* |
| 10:15 | 112 | When something goes wrong: comparative analysis of regeneration processes in annelids<br>*Viktor V. Starunov, Zoological Institute of Russian Academy of Sciences* |
| 10:30 | Mid-morning refreshments | |
| Developmental Morphology \| Chair: Ekin Tilic | | |
| 11:00 | 070 | What (a) nerve! A "sensormotor" neuron in the copulatory organ of *Dimorphilus gyrociliatus* dwarf males (Dinophilidae) likely orchestrates glands, muscles and multiciliated cells during copulation<br>*Alexandra Kerbl, Centre for Organismal Studies, Heidelberg University* |
| 11:15 | 135 | Insights into molecular pathways underlying development and paedomorphism in the bone eating worm *Osedax japonicus* (Siboglinidae, Annelida)<br>*Alice Rouan, Marine Biological Section, Department of Biology, University of Copenhagen* |
| 11:30 | 063 | Axial differences in regeneration ability and identification of a putative stem cell niche in the annelid *Capitella teleta*<br>*Elaine Caeia Seaver, University of Florida* |
| 11:45 | 106 | Everlasting tail: organisation and regeneration of *Pygospio elegans* (Spionidae) nervous system<br>*Zinaida I. Starunova, Zoological Institute of the Russian Academy of Sciences* |
| 12:00 | 043 | New Insights into Annelid Chaetogenesis<br>*Ekin Tilic, Senckenberg Research Institute and Natural History Museum* |
| 12:15 | 134 | Insights into male paedomorphosis through postembryonic developmental studies of the sexually dimorphic *Osedax* (Siboglinidae, Annelida)<br>*Katrine Worsaae, University of Copenhagen* |
| 13:30 | Lunch | |
| 13:30 | International Polychaetology Association meeting & next conference bids | |
| 14:45 | Close of Conference & Prize Giving | |

# POSTER PRESENTATIONS

| Abstract # | Topic and Speaker | Poster # |
|---|---|---|
| 062 | From two segments and beyond: regeneration in *Syllis malaquini*<br>*Maria Teresa Aguado Molina, Georg-August-University Göttingen* | 01 |
| 080 | South-West African polychaete diversity and biogeography<br>*Dylan T. Clarke, Iziko Museums of South Africa* | 02 |
| 128 | Polychaete diversity in South African marine muds<br>*Silke F. Brandt, University of Cape Town* | 03 |
| 143 | Population structure and habitat preference of *Timarete ceciliae* (Annelida: Cirratulidae) at Praia da Penha, Northeastern Brazil<br>*Wagner Magalhães, Universidade Federal da Bahia* | 04 |
| 001 | A rapid assessment survey of polydorid infestation on shellfish farms on Cape Cod and Nantucket Island<br>*Andrew A. Davinack, Wheaton College* | 05 |
| 064 | Biological characteristics of *Polydora websteri* (Polychaeta, Spionidae) inhabiting oyster shells (*Crassostrea gigas*) from northeastern Japan<br>*Yuki Nagai, Tohoku University* | 06 |
| 158 | Wiggling money hidden in the 'safe'diment: Early evaluation of *Marphysa* species (Annelida: Eunicidae) with commercialisation prospective<br>*Che Engku Abdullah, South China Sea Repository and Reference Centre* | 07 |
| 088 | Onpalaeozoic polychaete fossil diversity from Paraná Basin (Brazil)<br>*Alexandra Rizzo, Rio de Janeiro State University* | 08 |
| 146 | What have we done? Five years of Polychaetology<br>*Liron Goren, Steinhardt Museum of Natural History, Tel Aviv University* | 09 |
| 060 | Explosion of exotic worms in Arcachon Bay (France) revealed by molecular tools<br>*Guillemine Daffe, CNRS / University of Bordeaux* | 10 |
| 094 | New alien *Polydora* oysters' pests in the Mediterranean<br>*Barbara Mikac, University of Bologna* | 11 |
| 022 | Polychaetes and other invertebrates associated with rhodoliths in a newly discovered rhodolith bed on the northeast coast of Maine, USA<br>*Nancy K. Prentiss, University of Maine at Farmington* | 12 |
| 037 | Utilization of terrigenous leaves by tube-bearing worm *Anchinothria cirrobranchiata* (Onuphidae) in the deep sea<br>*Luna Yamamori, Kyoto University* | 13 |
| 042 | Population dynamics of *Capitella* aff. *teleta* (Polychaeta, Capitellidae) in Gamo Lagoon, northeastern Japan, during a series of restoration works following the 2011 Great East Japan Earthquake and tsunami (from 2016 to 2020)<br>*Waka Sato-Okoshi, Tohoku University* | 14 |
| 048 | Long-term community dynamics of benthic polychaetes in the innermost part of Onagawa Bay, northeastern Japan from 2007 to 2022<br>*Shu Kitajima, Tohoku University* | 15 |
| 057 | Feeding guilds composition of the polychaetes (Annelida) from the Gulf of California shelf, Mexican Pacific<br>*Vivianne Solis-Weiss, National Autonomous University of Mexico (UNAM)* | 16 |
| 058 | Biodiversity and polychaete benthic community structure in rocky intertidal pools of the northwestern coast of Baja California, Mexico<br>*Vivianne Solis-Weiss, National Autonomous University of Mexico (UNAM)* | 17 |
| 077 | Bacteria inhabiting cuticle of two infaunal polychaete species from the White Sea<br>*Alexander B. Tzetlin, M.V. Lomonosov Moscow State University* | 18 |
| 023 | Concentrations and sources of polycyclic aromatic hydrocarbons in fecal pellets of a *Marphysa* species in the Yoro Tidal Flat, Japan<br>*Yuichiro Osaka, Toho University* | 19 |
| 025 | Degradation of polycyclic aromatic hydrocarbons in fecal pellets of a *Marphysa* species in the Yoro Tidal Flat, Japan | 20 |

| Abstract # | Topic and Speaker | Poster # |
|---|---|---|
| | *Atsuko Nishigaki, Toho University* | |
| 041 | First discovery of the epitokous metamorphosis in Spionidae<br>*Hirokazu Abe,Ishinomaki Senshu University* | 21 |
| 142 | Epitoke event of *Laeonereis* cf. *acuta* in the Pardo River Estuary, Canavieiras, Bahia, Northeastern Brazil<br>*Natália Silva, Universidade Estadual de Santa Cruz* | 22 |
| 034 | Unveiling a scale worm species complex inhabiting the continental shelf down to the abyss<br>*Elena K. Kupriyanova, Australian Museum Research Institute* | 23 |
| 073 | Swimming acrocirrids: phylogeny, species descriptions, and a model undergraduate training program<br>*Karen J. Osborn, Smithsonian National Museum of Natural History* | 24 |
| 076 | High diversity in the genera *Anobothrus* and *Amythasides* (Annelida, Ampharetidae) in the North Atlantic Ocean<br>*Tom Alvestad, University Museum of Bergen, University of Bergen* | 25 |
| 081 | The mitogenome of cave-dwelling polychaete *Laubierpholoe massiliana* (Annelida, Sigalionidae)<br>*Anna Zhadan, M.V.Lomonosov Moscow State University, Biological Faculty* | 26 |
| 098 | Evolution of symbiosis between spoon worms (Annelida: Polychaeta: Thalassematidae) and their commensal bivalves<br>Ryutaro Goto, Kyoto University | 27 |
| 104 | New phylogenetic hypothesis from mitochondrial genomes and evolution of gene order in Syllidae (Annelida)<br>*Maria Teresa Aguado Molina, Georg August University* | 28 |
| 136 | Diversity and phylogeny of *Diurodrilus* (Annelida, Diurodrilidae) - Multiple new species but little morphological variation<br>*Eloïse Defourneaux, Copenhagen University* | 29 |
| 097 | New records of polychaetes from Tunisia, with special emphasis on the distribution of *Marphysa gaditana* (Annelida, Eunicidae)<br>*Marwa Chaibi, Faculty of Sciences of Tunis, University of Tunis El Manar, 2092 Tunis, Tunisia* | 30 |
| 008 | Redescription of *Scolelepis tridentata* (Southern, 1914) (Annelida: Spionidae), with description of a new species of *Scolelepis* from the Black Sea<br>*Victor Surugiu, Alexandru Ioan Cuza University of Iasi* | 31 |
| 010 | Infauna communities and environmental drivers of the Namibian continental shelf<br>*Ndamononghenda L. Mateus, University of Cape Town* | 32 |
| 028 | *Boccardia* and *Boccardiella* species (Annelida: Spionidae) in the Berg River Estuary, South Africa<br>*Carol A. Simon, Stellenbosch University* | 33 |
| 031 | The French Museum cruises: the Ali Baba's Cave for polychaetologists<br>*Nicolas Lavesque, CNRS / University of Bordeaux* | 34 |
| 045 | Rooms without views: Description of two new species of *Chaetopterus* (Annelida: Chaetopteridae) from Vietnam hosting complex symbiotic communities<br>*Daniel Martin, Centre d'Estudis Avançats de Blanes (CEAB - CSIC)* | 35 |
| 046 | Taxonomic revision of Nereididae polychaete family in the Berg River Estuary<br>*Danné Beeslaar, University of Stellenbosch* | 36 |
| 047 | Untangling the Magelonidae of South Africa, the legacy of John Day<br>*Kate Mortimer, Amgueddfa Cymru - Museum Wales* | 37 |
| 049 | One species, two surprises! The wide distribution of Marphysa mossambica in the Indian Ocean and the presence of two new cryptic species in Australia<br>*Nicolas Lavesque, CNRS / University of Bordeaux* | 38 |
| 050 | Investigating the taxonomic and molecular diversity of Sabellidae Latreille, 1825 (Annelida) in southern Africa<br>*Jayden Collison, University of Cape Town* | 39 |



| Abstract # | Topic and Speaker | Poster # |
|---|---|---|
| 051 | Re-description of *Arabella iricolor* (Annelida: Oenonidae) and an evaluation of South African species<br>*Teresa Darbyshire, Amgueddfa Cymru-Museum Wales* | 40 |
| 052 | Onuphidae and Eunicidae (Eunicoidea) from the Falkland Islands region<br>*Teresa Darbyshire, Amgueddfa Cymru-Museum Wales* | 41 |
| 054 | Discovering *Solomononereis*: A interesting new species with unique reproductive morphology found in the Marshall Islands<br>*Victor Manuel Conde Vela, National Museum of Natural History, Smithsonian Institution* | 42 |
| 059 | Review of Arctic *Marenzelleria* (Annelida: Spionidae) with the first record of *M. wireni* for North America and comments on *Spio gorbunovi*<br>*Vasily I. Radashevsky, A.V. Zhirmunsky National Scientific Center of Marine Biology, Far Eastern Branch of the Russian Academy of Sciences* | 43 |
| 061 | Integrative taxonomy of west African *Magelona* (annelida, magelonidae)<br>*Kate Mortimer, Amgueddfa Cymru - Museum Wales* | 44 |
| 067 | Not one, but three indigenous species of *Gunnarea* Johannson, 1927 from South Africa - not so monospecific after all<br>*Jyothi Kara, Iziko Museums of South Africa* | 45 |
| 068 | New species of *Scoloplos* (Annelida, Orbiniidae) from the Mediterranean Sea<br>*Anna Zhadan, M.V.Lomonosov Moscow State University, Biological Faculty* | 46 |
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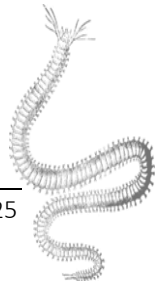
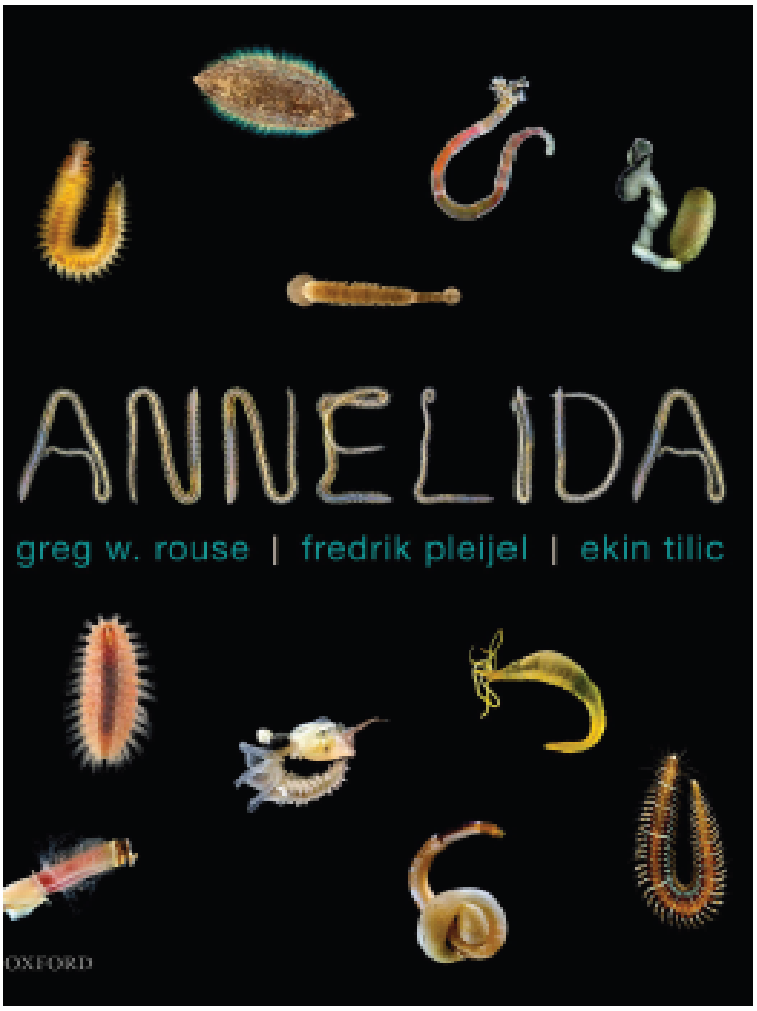


# Annelida




Annelids (the segmented worms) exist in a remarkably diverse range of mostly marine but also freshwater and terrestrial habitats, varying greatly in size and form. *Annelida* provides a fully updated and expanded taxonomic reference work which broadens the scope of the classic Polychaetes (OUP, 2001) to encompass wider groups including Clitellata (comprising more than a third of total annelid diversity), Sipuncula, and Thalassematidae (formerly Echiura). It reflects the enormous amount of research on these organisms that has burgeoned since the millennium, principally due to their use as model organisms to address wider and more general evolutionary and ecological questions.

**THE AUTHORS**: Greg Rouse, Fredrik Pleijel, and Ekin Tilic

**Greg Rouse;** Curator, Benthic Invertebrate Collection and Professor, Marine Biology Research Division, Scripps Institution of Oceanography, University of California San Diego, USA

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## The under-appreciated roles of polychaetes as ecosystem engineers

Emeritus Professor George M. Branch

*Department of Biological Sciences and Marine Biology Research Institute, University of Cape Town, Rondebosch Cape Town - mbranch@mweb.co.za*

Polychaetes do not receive the attention they deserve in terms of their ecological roles, especially as foundational species that influence the composition of ecosystems by altering conditions … ecosystem engineers. I will review four instances of polychaetes in this role.

First, I describe a relatively low-key phenomenon that is quite well known, namely how *Diopatra* species collect and attach seaweeds to the rims of their shelly tubes and then use these as a source of food. These observations are simple; but they started my interest in polychaetes and their profound ecosystem-engineering effects.

Second, I outline original observations on *Spirobranchus kraussi*, which forms complex mats of calcareous colonies. My interest was piqued when I discovered that these colonies serve as nursery grounds for the settlers and juveniles of the false limpet *Siphonaria capensis*. I was always puzzled by the location of small stages the life cycle of this abundant limpet. Field experiments demonstrated *S. kraussi* is where they concentrate, and that removal of this polychaete resulted in the immediate disappearance of the juvenile *S. capensis*.

Third, I discuss a discovery by Georgina Jones that the erect, fanlike projections at the apex of the tubes of *Lanice* '*conchilega*' serve as a nursery for minute juveniles of the detritus-feeding holothurian *Hemiocnus insolens*. Quantification showed that these are roughly 6-10 time more abundant there than on the adjacent substratum. I surmise that the elevated fans lift the holothurians out of the boundary layer and provide a freer flow of detrital particles, as can be demonstrated in flume-tanks. Successive sampling also showed that growth of juvenile *H. insolens* was faster on fans that on the basal substratum.

Finally, and most strikingly, I deal with the ecological roles of the sandy tubes of the sabellarid *Gunnarea gaimardi.* Experimental manipulations show that it (a) serves as a refuge from limpet grazing or desiccation for the algae *Caulacanthus ustulatus* and early stages of *Mazaella capensis* and (b) forms 'dams' by blocking channels, leading to radically different community compositions of 'pool-occupying', vs. 'bare-rock' species. Properties that reinforce these influences include the orientation of tubes to wave action, and the strongly developed habit of 'self-recruitment' of settlers onto existing colonies.

Thus, polychaetes influence all trophic levels – primary producers, detritovores and consumers – and can profoundly alter ecosystem structure and function.

**Biography:** Prof. Branch began his career with a focus on the ecology of limpets, which are more diverse and do more extraordinary things than anywhere else in the world. That passion developed into a broader exploration of rocky-shore ecology, competition, predation and other forms of interactions, and he then shifted from an observational approach to experimental field work. The impact of alien species such as the blue mussel *Mytilus galloprovincialis* and the crab *Carcinus maenas* formed part of the focus of his postgraduate students. His interests then extended to include estuarine ecology, and particularly the remarkable role that sandprawns and mudprawns play. Sandprawns are known as 'bioturbators' because they turn over prodigious quantities of sediment, and powerfully influence the rest of the community, from bacteria to diatoms and other invertebrates. He collaborated with Deena Pillay on these amazing animals, including a monographic review of their ecology. His research has included studies on the ecological

effects of the polychaetes *Arenicola* and *Gunnarea*. From this ecological grounding, he became involved with research on marine invertebrates and algae that are of commercial importance or are harvested as a source of food by recreational and subsistence fishers, including rock lobsters, abalone, urchins, mussels and seaweeds. This led to his involvement with the development of a new fisheries policy and the development of Marine Protected Areas.

He is now nominally 'retired' but is still actively involved with research and the supervision of postgraduate students.

He has been graced with several awards, including a Fellowship of the University of Cape Town, a Distinguished Teachers Award, a Fellowship of the Royal Society of South Africa, the Gold Medal of the Zoological Society of Southern Africa, the Gilchrist Gold Medal for contributions to marine science, the International Temperate Reefs Award for Lifetime Contributions to Marine Science, and an Andrew Mellon Mentoring Fellowship.

He collaborated with his wife Margo, Charles Griffiths and Lynnath Beckley to produce a new edition of the book *Two Oceans* in 2022, which is the only book available that allows identification of the full span of marine life, including algae, invertebrates, fish, birds, reptiles and mammals. This revision involved a complete re-write, the addition of a further 522 species, and a total make-over of the photographs, so that the book now covers 1900 species. Like his previous book *Living Shores*, *Two Oceans* was awarded the UCT book award.

Also in retirement he and Margo rewrote their old classic book 'Living Shores' and published the revision in 2018, synthesising all the exciting marine science that has taken place since the original book appeared in 1981.

MONDAY, 08:45

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## Wiggly Gold: commercial influence in accelerating annelid research in developing region

Dr Izwandy Idris

*Senior Lecturer and Head, South China Sea Repository and Reference Centre, Institute of Oceanography and Environment, Universiti Malaysia Terengganu - izwandy.idris@umt.edu.my*

Recreational and artisanal fishers used baits to catch targeted fish species. Among the baits used, Annelida species are a popular angler choice. Bait polychaetes are a lucrative industry with high employment and international trade in many developed countries. However, that is different in developing regions. Self-employed or part-time bait diggers mostly harvest the annelids used as bait and then sold at the roadside stall. The situation is economically unsustainable, subsequently minimising another potential the annelids can offer. Other commercial applications of annelids, including nanomaterial synthesis, medicine, protein substitute and bioengineering, should be highlighted to spur interest from funders and multidiscipline researchers. Considering the high number of undescribed species and undiscovered applications from described species, the research opportunities on annelids are enormous, subsequently benefitting the related parties' knowledge and economy.

**Biography:** Dr Idris's research interests are the systematics (taxonomy), ecology and biology of marine invertebrate in particular marine worm (Annelida: Polychaeta) and soft corals (Anthozoa: Octocorallia). His academic training covered various marine organisms and topics, including diversity, distribution and reproduction. He has an excellent research network with systematists and curators from various countries and have visited several natural history institutions. The overarching objectives are to systematically catalogue the marine invertebrate diversity in Malaysia, and to apply the kn125owledge on the ecological and biological requirements of the species for the betterment of Malaysian through economic empowerment, health and environment in a sustainable manner.

TUESDAY, 08:30

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## Building up STEAM: Innovative approaches to engage undergraduate students in investigations of morphology

Sara Lindsay, Ph.D

*Professor of Marine Sciences at the University of Maine, School of Marine Sciences & Maine Center for Research in STEM Education, 5751 Murray Hall, Orono ME, USA, slindsay@maine.edu*

In the last decade, the movement to integrate Science, Technology, Engineering and Mathematics with Arts and Humanities (i.e., STEAM or STEAHM learning) has gained traction in K-12 education in the United States. A recent U.S. National Academy of Sciences report (2018) examined the case for integrating humanities and the arts in undergraduate STEM education. For undergraduates studying the life sciences, fluency with describing the morphology of organisms is a key competency that supports learning and understanding of anatomy, cell biology, developmental biology, physiology, ecology, evolutionary biology, taxonomy, and more. Similarly, understanding the relationship between structure and function is a central theme in biology, and one that students struggle with as they encounter unfamiliar terminology and concepts that span different levels of biological organization.

Artists, writers, and scientists alike rely on observation to form their understanding of an object, process, or complex system. Often, understanding comes when we try to explain the central feature or essence of an object, process, or complex system in a simpler way. In this address, I will share several approaches I use to engage first-year undergraduate students in learning and thinking about the morphology of marine organisms. Each of these involves creative work (e.g., drawing a specimen, creating portraits, writing poems), and challenges students to transfer their scientific knowledge to a simpler model with the aim of solidifying their understanding about the organisms. By pairing creative work with more traditional assignments such as searching and reading primary research literature or working with diversity databases such as the World Register of Marine Species, I aim to build students enthusiasm for learning about morphology, structure and function of marine organisms. Creative assignments also provide different ways to assess students' understanding of key concepts, can promote reflection and metacognition, and facilitate shared learning.

**Biography:** Professor Sara Lindsay studies the sensory biology and ecology of marine invertebrates. She is especially interested in chemoreception, tissue regeneration, bioturbation and understanding how polychaetes and other infauna make a living in the mud and sand at the bottom of the ocean. Her research interests span marine invertebrate community ecology, behaviour, physiology, sensory biology and cell & molecular biology.

FRIDAY, 08:30

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## THEME: ECOLOGY, BIODIVERSITY & BIOGEOGRAPHY

### (099) Polychaete Fauna associated with mussel and oyster aggregations in the Mediterranean Sea

Barbara Mikac[1], Eugenio Fossi[1,2], Marina Antonia Colangelo[3,4,5], Alessandro Tarullo[3], Vasily I. Radashevsky[6], Giuseppe Prioli[2], Federica Costantini[3,4,5]

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Mussels and oysters are important ecosystem engineers which create habitats that support highly diverse benthic communities. Shellfish aquaculture is one of the main vectors for the introduction and spread of non-indigenous species throughout the world. The aim of this research was to increase the knowledge of polychaete diversity associated with wild and farmed mussels *Mytilus galloprovincialis* Lamarck, 1819 and Pacific oysters *Magallana gigas* (Thunberg, 1793) in the Mediterranean Sea. Samples were taken in spring and autumn 2020 from several aquaculture farms and wild molluscs in the northern Adriatic Sea (Italy). In total, 65 polychaete species from 15 families were found in mussel beds (49 among wild and 37 among farmed mussels) and 34 species from 13 families were found in oyster aggregations (13 among wild and 32 among farmed oysters). Among these, 50 and 17 polychaete species are reported for the first time in the Mediterranean associated with farmed and wild mussels, respectively. Moreover, all but one polychaete species are reported for the first time in association with Mediterranean populations of Pacific oysters. The richest families associated with both molluscs were Syllidae, Serpulidae and Spionidae. Among the mussels, the most abundant were Nereididae, followed by Serpulidae and Syllidae. Among oysters, a high dominance of Spionidae (representing 62% of the whole specimens) was revealed, followed by Serpulidae and Nereididae. Several non-indigenous species have been found, including the serpulids *Ficopomatus enigmaticus* (Fauvel, 1923), *Hydroides dirampha* Mörch, 1863 and *H. elegans* (Haswell, 1883), the syllid *Syllis pectinans* Haswell, 1920, and three species of the genus *Polydora*: *P. cornuta* Bosc, 1802, *P. websteri* Hartman in Loosanoff & Engle, 1943 and *P.* cf. *haswelli* Blake & Kudenov, 1978. The last two species are known pests of oysters, considered alien in many parts of the world, and are herein reported for first time in the Mediterranean. The large number of species reported for the first time in association with mussel and oyster aggregations, as well as records of new alien species, confirm the need for further research into the fauna associated with these important Mediterranean habitats.

MONDAY, 09:30

**(024) Polychaete communities in the nearshore zone of False Bay, South Africa**

Bomikazi Tshingana[1] & Natasha Karenyi[1]

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Polychaetes have gained publicity for being opportunistic organism that play an important role in impacted soft bottom habitats. These organisms can be used as indicators of negative impact to the environment. The spatial and temporal patterns within the surf zone polychaete communities were studied in False Bay, South Africa to determine whether assemblage compositions, abundance, species richness and diversity vary spatially and temporarily. Sampling was conducted seasonally in one year from three transect with a 0.1m² Van Veen grab. Environmental variables apart from wave data were measured in the same coastal stations as biological sampling. A total of 132 polychaete species were identified from 133634 individuals in three seasons. The sabellid *Euchone rosea* was the most abundant species with 4247 individuals across all three seasons. Other common species include *Spio filicornis, Jasmineira elegans, Exogone clavator, Micronephthys sphaerocirrata* and *Spiophanes* sp. Differences in the surf zone polychaete community composition were found between the selected transects; these differences could be related to variation in physical parameters such as grain size, depth and to some extent wave height, which could be indicative of the role played by morpho-dynamics in False Bay. Seasonally, the abundance trend changed between *Euchone rosea* and *Spio filicornis*. Spring season had higher species richness, but diversity was interchangeable in all seasons. There are large amounts of variation in morpho-dynamics and species in the nearshore zone combined with the influence of the adjacent land. Long term research needs to be conducted in the area to better understand both the communities inhabiting the area and the environmental parameters which drive their distribution.

MONDAY, 09:45

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**(126) Functional similarities of marine polychaetes from the South Africa's northeast mid-shelf is driven by sediment characteristics**

Sikhumbuzo Maduna[1] & Fiona MacKay[1,2]

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[2]*School of Life Sciences, University of KwaZulu-Natal, Durban, South Africa*

Coastal seas support a mosaic of habitats that are occupied by a variety of marine organisms and this biophysical diversity increases the complexity of ecosystem functioning. Polychaetes as a group are frequently used for biodiversity and ecological evaluations because they typically contribute a significant amount to overall macrobenthic community diversity, abundance, and biomass and occupy sizable niches in a variety of life forms in these habitats. In ecosystem studies, a combination of conventional taxonomy- and traits-based measurements are used increasingly to evaluate and compare community diversity. Since this method integrates species identities, traits and their interactions, responses, and ecological roles in the ecosystem, it is better able to describe how ecosystems function. This dual approach was used to characterise and identify taxonomic-functional features of polychaete communities along the subtropical KwaZulu-Natal mid-shelf (50-80m) soft sediments to the north and south of Durban. The analysis was performed on 288 taxa (42 Families and 140 Genera) using nine traits, across 51 trait-categories collected at 19 stations. In muddy, medium-fine, and sandy habitats, multivariate permutational and dispersion analysis differentiated separate sets of functional/taxonomic groupings representing various ecological roles of polychaetes. Free-living carnivorous polychaetes prevailed in muddy habitats, off the central part of the region, while richer and more heterogeneous deposit feeding omnivorous burrowing polychaetes dominated medium fine sand habitats to the south, towards Durban. Semi-mobile filter feeding interstitial polychaetes were noted south of Durban to the Aliwal Shoal MPA. These groups were mainly influenced by the sediment organic and carbonate content and sediment type. Despite lower taxonomic diversity and the presence of opportunistic species identified to the north, this trend was not reflected in functional diversity, possible due to similar dominant functional trait by involved species. Using this dual approach our study provided better insight into

how local polychaetes interact with their habitats. This cannot be fully understood using taxonomic measures only. Likewise, there was an improved understanding of this group's response to different environmental conditions. Accordingly, we argue that local biodiversity assessments should incorporate both approaches, particularly for conservation plans and biodiversity targets that a focus should be on polychaetes given what has been learnt of the important ecological benefits that are derived from these habitats.

MONDAY, 10:00

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**(159) Polychaetes distributed across oceans - examples of widely distributed species from abyssal depths**

Karin Meißner[1], Martin Schwentner[2], Miriam Götting[1], Thomas Knebelsberger[3] and Dieter Fiege[*4]

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[4]*Senckenberg Research Institute and Natural History Museum Frankfurt, Senckenberganlage 25, D-60325 Frankfurt/Main, Germany*

Distributional ranges of selected deep-sea annelids are studied in an integrative approach using genetic markers (COI, 18S) and morphology. The source material came from various deep-sea expeditions to the Pacific and Atlantic Oceans conducted between 1998 and 2015. Selection criteria for the eventual target species were a reliably documented widespread distribution in the deep-sea, and the presence in sufficient numbers of specimens in our source material. Specimens from museum collections were also incorporated. Species identified were *Sigambra magnuncus, Bathyglycinde profunda* and *B. sibogana*, *Progoniada regularis, P.* cf. *regularis*, and *Spiophanes* cf. *longisetus*, plus three newly described species: *Octomagelona borowskii* sp. nov., *Spiophanes australis* sp. nov., and *S. pacificus* sp. nov..

In the talk the haplotype distribution across different oceans of some selected species is discussed, and a newly discovered morphological character useful for the distinction of abyssal species of *Spiophanes* presented.

MONDAY, 11:00

---

**(095) Wide-spread dispersal in a deep-sea brooding polychaete: the role of natural history collections in assessing the distribution in quill worms (Onuphidae, Annelida)**

Nataliya Budaeva[1], Stefanie Agne[2], Pedro A. Ribeiro[3], Nicolas Straube[1], Michaela Preick[2] & Michael Hofreiter[2]

[1]*Department of Natural History, University Museum of Bergen, University of Bergen, Allégaten 41 5007, Bergen, Norway - Nataliya.budaeva@uib.no*
[2]*Evolutionary Adaptive Genomics, Department of Mathematics and Natural Sciences, Institute for Biochemistry and Biology, University of Potsdam, Potsdam, Germany*
[3]*Department of Biological Sciences and Centre for Deep-Sea Research, University of Bergen, Thormøhlens gate 53B, 5006 Bergen, Norway*

Species with cosmopolitan geographical ranges were commonly reported in annelids throughout the 19th – 20th centuries. The reasons for this were often the limitations of the original descriptions, global use of species names originally described from Europe, lack of critical assessment of variation in diagnostic characters, and unavailability of molecular data. Many of these widely distributed species were subsequently proven to be multiple species with minute morphological differences or even morphologically identical species complexes comprising several genetic lineages. Scarce records of presumably non-invasive species with pan-oceanic distribution, confirmed by molecular data, started to emerge only recently. In the present study, we combine all available data on the distribution of *Hyalinoecia robusta* with molecular data obtained from recently collected and historical specimens across its geographical and vertical ranges. We obtained sequences from six molecular markers (COI, 16S, 18S, ITS1, ITS2, and 28S) and 38 *Hyalinoecia* specimens, including a specimen collected during the RV "Michael Sars" North-Atlantic Deep-Sea Expedition in 1910. The

historical sample was sequenced using a combination of ancient DNA methodology and target capture demonstrating an opportunity for obtaining molecular information from such old collection materials including type specimens. We provide an updated species description of *H. robusta* based on examination of the type and extensive non-type material. Furthermore, we present a robust phylogenetic background for delimitation of the three *Hyalinoecia* species inhabiting the North Atlantic Ocean*: H. robusta*, *H. tubicola* and *H. artifex,* and a Pacific species, *H. longibranchiata.* Our results support a wide geographic distribution of *H. robusta* at slope depths at both sides of the Atlantic Ocean and in the Indian Ocean. *Hyalineocia robusta* is known to have a complex reproductive biology including brooding of its young inside parental tubes. Our results contradict the assumption that the reproduction mode is a good predictor of species dispersal potential. One possible explanation of such wide ranges for a species hitherto assumed to have limited dispersal capabilities are unsampled "stepping stone" populations connecting the distant known populations and maintaining the gene flow across its geographical range.

MONDAY, 11:15

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**(120) Diversity and distribution patterns of polychaete fauna on the continental shelf of Southern Namibia**

Amoré Malan[1], Aiden Biccard[1], Jessica Dawson[1], Robyn Payne[1], Kevin Schmidt[1], Kirti Gihwala[1], Deon Louw[2], Josef Shikeva[2], Blessing Kamwi[2], Lapaka Kaimbi[2], Julien Vumazonke[3] & Megameno Mutaleni[3]

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The diversity, composition and distribution patterns of polychaete fauna inhabiting unconsolidated sediments on the continental shelf of southern Namibia was investigated. During the austral summer of 2021, 1,230 Van Veen grab samples were collected in water depths ranging between 43 and 146 m. All benthic macrofauna (>1 mm) were extracted, identified, enumerated, and weighed to four decimal places. Polychaetes were by far the most abundant taxon, equating to 66% of total abundance and 38% of total biomass. A total of 110,474 polychaete specimens comprising 123 species, 89 genera and 36 families were found. Dominant polychaete families included the Spionidae (27.2% of total abundance and represented by 13 species), followed by Capitellidae (14.7%, 4 species), Lumbrineridae (14.3%, ten species), Nephtyidae (8%, three species) and Orbiniidae (7.8%, seven species). Environmental variables such as depth, sediment particle size distribution (PSD), total organic carbon (TOC), total organic nitrogen (TON), redox potential, and distance from the Orange River were recorded. Overall, it was found that sediment PSD and depth were the main predictors of benthic polychaete community structure on the continental shelf. This result confirms that such variables are known to influence infaunal community structure within marine benthic environments, even across small spatial scales. Such studies are invaluable for future benthic survey work, ecological studies, and marine spatial planning.

MONDAY, 11:30

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**(055) Well-connected worms: genetic connectivity of annelids in Australia's eastern abyss**

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In the shallow-waters of oceanic shelves, marked composition changes are observed between temperate and tropical fauna resulting from environmental gradients from the equator to the poles, however, such transitions are not well documented in deep-water fauna where environmental conditions are thought to be more uniform. A biogeographic tropical to temperate transition was recorded between 30–40°S along the

east coast of Australia for lower bathyal (~ 2500 m) and abyssal (~ 4000 m) megafauna (combined sponge, anemone, octocoral, barnacle, decapod, pycnogonid, annelid, echinoderm, gastropod, bivalve, cephalopod and fish species data) collected during the 2017 RV Investigator "Sampling the abyss" expedition. Using the annelid material from this cruise, we further tested this transition with genetic data. Three of the most numerous annelid species *Melinnopsis gardelli*, *Melinnopsis chadwicki* (Melinnidae) and *Jugamphicteis galatheae* (Ampharetidae) were selected for this study and the COI standard barcoding marker was sequenced for 88 specimens. Species differed in the patterns of genetic connectivity. *Melinnopsis gardelli* was recorded across the tropical to temperate biogeographical transition zone with moderate difference in population structure detected between two populations either side of the transition (FST =0.5). One haplotype of *M. gardelli* was shared between sampling locations across the transition (sites 735 km apart). *Melinnopsis chadwicki* was recovered north and *Jugamphicteis galatheae* was recovered south of the biogeographic transition, both species displayed less genetic structure than *M. gardelli*. Haplotypes were shared for *Melinnopsis chadwicki* between locations 726 km apart and *Jugamphicteis galatheae* 950 km apart. Haplotype and nucleotide diversity was high for all species, higher for *M. gardelli* (h= 0.989, π=0.02137) than for *J. galatheae* (h=0.882, π =0.00282) and *M. chadwicki* (h= 0.825, π=0.00392). We found little evidence of a distinct genetic break between tropical and temperate populations despite a high level of genetic diversity within species. These well-connected populations of annelids likely result from their ability to widely disperse via the planktonic lecithotrophic larvae stage. The lack of consensus with general observed biogeographic patters reflects the different life strategies employed by faunal groups which ultimately affect gene flow and thus species distribution.

MONDAY, 11:45

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**(148) Long-term impacts of large-scale herring death on benthic fauna in a shallow silled fjord in Iceland**

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A study was conducted to examine the long-term impacts of a large-scale herring death on benthic fauna in the southern Breiðafjörður bay in Iceland. The study focused on a shallow silled fjord Kolgrafafjörður, where over 50,000 tonnes of herring died due to oxygen depletion in the winter of 2012-2013. The decaying herring sank to the bottom of the fjord and caused hypoxic conditions in the sediment. The effects on the infaunal communities persisted for a few years, with significant changes in the species composition and diversity of the benthic fauna. Initially the polychaete *Capitella capitata*, which is associated with disturbed or polluted sediments, was found in great abundance at all sampling stations but the initial dominance of the *C. capitata* was replaced by other benthic fauna after only two years. As the organic material from the herring decomposed and oxygen levels improved, the recovery of the benthic fauna was marked by a gradual increase in biodiversity, consistent with predictions. Further research conducted over five years indicated that the bottom marine fauna succession after the mass herring death was characterized by a relatively rapid ecosystem recovery. The exact timeline and pattern of succession may depend on various factors, including the magnitude and duration of the herring death, the physical and chemical properties of the sediments, and the availability of nutrients and other resources to support benthic communities. The data analysis is still ongoing, so the results are not yet fully clear. This event provided a valuable opportunity to study the effects of hypoxia on benthic ecosystems in the absence of seasonal hypoxic conditions. The research has implications for various areas of marine ecosystem management, including hypoxia research and organic pollution in aquaculture. The study's results shed light on the succession timeline and pattern of the bottom marine fauna in response to organic pollution.

MONDAY, 12:00

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**(030) Drivers of polychaete distribution within the Berg River estuary, South Africa**

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Polychaetes make a significant contribution to benthic communities in aquatic ecosystems in terms of abundance and diversity. Globally, these predominantly marine annelids are used as bioindicators of disturbed habitats, including estuaries, but this function of polychaetes has received little attention in South Africa. This preliminary study investigates polychaete diversity in the Berg River Estuary, on the west coast of South Africa, to explore the use of polychaetes as indicators of pollution. The Berg River Estuary is the third largest estuary in the country and was recently declared a RAMSAR site, highlighting its ecological importance. However, the estuary receives little formal protection, and is subject to point-source pollution from fish processing plants and non-point source pollution from agricultural run-off, urban development and the polluted river itself. Sediment cores were collected from 9 stations in May 2022, from the mouth (salinity 31.25 ppt) to 15 km upstream (salinity 20.85 ppt). Sediment was sieved through 500 µm mesh, and polychaetes removed, anaesthetized in 7% $MgCl_2$ and fixed in 4% formalin in seawater. Physicochemical parameters measured included salinity, pH, temperature and dissolved oxygen. Additional sediment samples were processed for grain size and organic content. Principal Component analyses of environmental parameters showed that salinity, the proportion of sediment in the 1 mm and 0.55 mm grain size fraction and organic content contributed the most to variation among stations. Nearly 4000 polychaetes, in eight families, were collected. The most abundant and widespread was Capitellidae (3068 individuals), followed by Nereididae (483 individuals) and Spionidae (121 individuals). Remaining families included a maximum of 15 individuals each. The most families were present at the station closest to the mouth (5 families), and the fewest were at the station closest to the fish processing plant (only Capitellidae); all other stations had three or four families. Cluster analyses of families separated the stations into three groups, corresponding to the lower, middle and upper reaches. These results suggest that polychaete communities may be a useful indicator of environmental conditions in this estuary and will be further explored by analysing the distribution of species.

MONDAY, 13:30

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**(006) The role of polychaetes in the interaction of macrofauna with microplastics at the benthic zone: A case study of Tokyo bay**

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The ever-increasing plastic production, coupled with poor post-consumer management, has resulted in the widespread pollution of plastics. Most of the terrestrial plastic waste ends up in the ocean via rivers, runoff, and wastewater discharge (Cai et al., 2020; Tanaka et al., 2015; Lamb et al., 2018). Once in the ocean, large plastic objects disintegrate via different mechanisms resulting in smaller particles, most of which are deposited at the seabed (Gimiliani et al., 2020). Their small sizes and high abundance at the benthic zone render them susceptible to ingestion by benthic faunae (Gimiliani et al., 2020).

The benthic zone hosts a diverse range of organisms, which can be classified by size as megafauna, macrofauna, meiofauna, or microfauna. Within the macrofaunal category, polychaetes are the dominant taxa, playing a vital role in the benthic ecosystem structure and function (Levin et al., 2001). With such

dominance, their interaction with microplastics at the benthic zone is inevitable, making studies on their interaction with microplastics at the benthic zone essential.

To study this interaction, a benthic mud collector on board R/V Seiyo Maru was used to collect near-bottom water, sediment, and macrobenthos samples from four stations in Tokyo Bay. Water samples were first digested using Fenton reagent (Masura et al., 2015), followed by density separation using NaI (1.63g/$cm^3$), and finally filtered using a PTFE filter (dia.: 47 mm, pore size; 10 µm). The sediment samples first underwent density separation using NaI (1.63g/$cm^3$) followed by Wet peroxide oxidation using Fenton reagent and filtered similarly to the water samples. Macrofauna (0.5-02.00 mm) were identified at the Class level, and Polychaeta was further identified at the Family level. All organisms were digested using 10% KOH and filtered using a PTFE filter (dia.: 25 mm, pore size; 1 µm). All samples were analyzed for small microplastics (SMP) with a micro-Fourier transform infrared (µFTIR). KnowItAll was used to identify the polymer types, while ImageJ was used in particle size estimation.

A total of 98 individuals belonging to 9 taxa were recorded and analyzed for SMPs, where ten individuals recorded no SMP ingestion. Polychaeta accounted for 70% of the fauna recorded, represented by 12 families dominated by Lumbrineridae (13), Pillargidae (11), and Goniadidae (8). At the same time, Glyceridae, Maldanidae, Eunicidae, Heterospionidae, and Hisionidae each had one individual in the entire study area. Diversity indices based on the stations indicated a higher taxa number (S) and H' diversity in Station 4 with 5.7±3.5 and 1.3±0.5 respectively, followed by station 6 (S= 4±1.4 and H' 1.1±0.4) and Station SO2 (S=3.7±1.5 and H'=1±0.3) respectively.

The average number of SMPs ingested by the polychaetes was 4.1±3.8 pcs $ind^{-1}$, with Hisionidae recording the highest concentration with 13 pcs $ind^{-1}$, followed by Heterospionidae having 11 pcs $ind^{-1}$. The lowest concentration of ingested SMPs was recorded from Arabellidae with 1 pcs $ind^{-1}$.

For ecological relevance, the various polychaete families were grouped into three groups based on the three major feeding modes; Filter feeders, Deposit feeders, and Predator/Omnivores. Filter feeders had a higher ingestion rate (4.8±5.5 pcs $ind^{-1}$) compared to the other feeding modes, which ingested 3.3 pcs $ind^{-1,}$ each with no indication of bioaccumulation of microplastics. Comparatively, polychaete filter feeders had higher SMPs ingestion rates compared to the other taxa (1.7±2), while the reverse was observed where other deposit feeders (8.8±8.5) had higher SMPs ingestion compared to the deposit-feeding polychaetes.

Polychaetes were the only predators recorded in this study, providing an essential link in the transfer of material up the food chain. Despite cases of SMPs bioaccumulation reported in various studies (Costa et al., 2020), our study and that of Bour et al. (2018) who also analyzed polychaetes, observed no bioaccumulation. This means that the polychaetes may actually minimize the movement of SMPs up the food web through egestion (Weis et al., 2020).

MONDAY, 13:45

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**(003) Assessment of the relationship between benthic macroinvertebrate community structure and the quality of water in selected Ghanaian estuaries**

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In this study, the relationship between benthic macroinvertebrate community structure and water quality was assessed in selected Ghanaian estuaries. Field studies were conducted in Ankobra (Western coast), Whin (Western coast), Ada (Eastern Coast) and Kakum (Central Coast) Estuaries representing different geomorphological characteristics of the coastline. The Estuaries were delineated into upper, middle and lower reaches and based on proximity to mangrove riverine ecosystems. Using the Ekman grab, three sediment samples were collected on a horizontal transect from each site on a monthly basis from April to August 2022 during low tide. This was followed by washing and screening of the samples using sieves of

different mesh sizes. Sediments were retained on a 0.5 mm sieve and preserved in 10 % formalin and eosin dye. Using a dissecting microscope (X20), organisms were identified to the lowest possible taxonomic level with the aid of relevant manuals and keys. A total of 1642 organisms representing 10 families were collected. Relative abundance, percentage composition, species richness, evenness and diversity were recorded. Polychaeta emerged as the most dominant group represented by seven species, followed by four species of crustacea and one belonging to insecta. In Ankobra and Whin, polychaeta was the most abundant group with Capitella sp. leading while Gammarus sp. (crustacea) and Chironomid sp. (insecta) dominated Ada and Kakum Estuaries. The highest sp. diversity was recorded in Kakum (H'=2.0) followed by Whin (H'=1.8) Ada and Ankobra, =H'<1. Margalef's index showed that Whin was the most sp. rich (d=11.85) in comparison to all the other estuaries, while Pielou's evenness index depicted that all the estuaries displayed poor species evenness (j<). All the estuaries are undergoing environmental stress as depicted by results from diversity indices. The majority of organisms encountered are tolerant to pollution indicated by the poor quality of water. The bad quality of water in estuaries can be attributed to anthropogenic activities in the various catchments including illegal gold mining and agricultural activities in Ankobra, discharge disposal in Ada, and agriculture and open defecation in the Kakum catchment.

MONDAY, 14:00

## THEME: REPRODUCTIVE BIOLOGY

### (096) Epitoky in *Alitta succinea* (Annelida: Nereididae): using click chemistry sequencing to characterize gene expression

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*Alitta succinea* (Nereididae) has been widely reported throughout the greater Atlantic basin, although it may represent a complex of cryptic species. Resilient mobile omnivores, these capable charismatic crawlers survive through wide ranges of temperature, salinity, dissolved oxygen, and pollutant levels. They often live in biologically rich environments, and, as omnivores, they play an important role in stabilizing trophic levels by connecting producers to grazing mid-water predators. *A. succinea* reproduces via a strategy called epitoky, where upon sexual maturity individuals metamorphose from a 'crawling form', called an atoke, into a 'swimming form', called an epitoke, prior to entering the water column to spawn. This transmutation has been well described morphologically and functionally in the polychaete taxa Nereididae, Syllidae, and Eunicidae, as well as genetically in Syllidae. To better understand the genetic profiles of nereidid atokes, and pre-spawning females and males, we analyzed their gene expression using Poly(A)- ClickSeq, an emerging economical technique for measuring relative abundance of expressed genes. Poly(A)-ClickSeq uses click chemistry to target the poly(A) tails of messenger RNA, effectively combining fragmentation, ligation, and size-selection into one step. We found significant differences in gene expression between the groups, regarding sexualization, musculature, and visual systems. Females had a more unique genetic profiles compared to atokes and males, indicating a larger regulatory network involved in feminization. Distinct differences were detected between males and females during sexualization. We found a candidate gene associated with onset of puberty in vertebrates, to be upregulated in both females and males, indicating a similar role in sexualization. Genes related to musculature function and maintenance were upregulated in atokes compared to both sexes, corroborating previous reports of muscular degeneration in epitokes This work highlights the utility of an alternative approach to comparative transcriptomics that increases sample size, without increasing cost. Our study highlights the utility of an alternative approach to comparative transcriptomics that increases sample size, without increasing cost, and proposes candidate genes for future studies on sex determination and visual physiology of nereidid worms.

MONDAY, 14:15

**(140) Population structure and reproductive biology of *Sipunculus nudus* (Annelida: Sipunculidae) in Todos-os-Santos Bay, Bahia, Brazil: Preliminary Results**

Erika Catugy[1], Gisele Kawauchi[2] & Wagner Magalhães[1]

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Sipunculans are marine annelids that can be found in sandy, muddy and hard substrates from intertidal to deeper sediments. *Sipunculus nudus* is one of the most studied species but its wide geographic distribution was recently called into question when at least three different lineages were revealed by molecular and morphological divergence. The occurrence of this population in northern Brazil was revealed when local fishermen from Penha Beach in Todos-os-Santos Bay were collecting hundreds of worms to use as bait, highlighting the importance of understanding their population structure and reproductive biology. Thirty individuals were collected monthly from March 2022 to March 2023. Several measurements were taken in preserved individuals such as total length, posterior length (from anal aperture to posterior extremity), width (across anus), length of both nephridia, number of longitudinal bands, and number of intestinal coils. All individuals were sexed, and 30 oocytes from ten female individuals were measured monthly to account for sexual maturity. Preliminary results suggest that the total length of the measured worms is highly correlated to the posterior length and to the length of both nephridia, indicating that these measurements could be used as growth variables. The number of longitudinal bands was not correlated to the other length variables, indicating that this character is not tightly related to growth supporting its taxonomic value. The studied population presented a sex ratio close to 1:1 and the presence of gametes in the coelom of males and females throughout the entire year suggest continuous reproduction. This study highlights the importance of understanding the population dynamics and reproductive biology of this species to contribute to managing strategies and preserve this biological resource.

MONDAY, 14:30

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**(109) The reproductive strategies of *Diopatra aciculata* (Annelida) in the Knysna Estuary**

Stephanie Schoeman[1], Carol A. Simon[1] & Johannes H. van Wyk[1]

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*Diopatra aciculata*, originally described in Australia, has been used as bait in South Africa since the 1970s. Locally known as the estuarine moonshine worm, *D. aciculata* is only reported in the Knysna, Keurbooms, and Swartkops Estuaries and is especially popular as bait in the Knysna Estuary. However, reports of the species in Knysna only start in the 2000s and since then the population has increased to approximately 20 to 24 million individuals. Understanding the sexual systems and reproductive cycles of the species in Knysna can provide insight into the factors contributing to this population increase despite harvesting as bait; hermaphrodism offers a lower effective population size and higher rates of population growth compared to gonochorism. Specimens were collected from January 2021 to June 2022 in the Knysna Estuary at Bollard Bay (Bay regime) and The Point (Estuarine regime). The width at the 10th chaetiger of each individual was measured, the specimen sexed, and gametes were examined. Coelomic fluid smears showed only one type of gamete in the body cavities of each specimen. Furthermore, no meaningful difference in the size of males and females was detected at either site (Bollard Bay: $\bar{x}_{male} = 4.70$ *mm*, $\sigma_{male} = 0.750$; $\bar{x}_{female} = 4.83$ *mm*, $\sigma_{female} = 0.599$, $p = 0.0499$; The Point: $\bar{x}_{male} = 3.86$ *mm*, $\sigma_{male} = 0.589$; $\bar{x}_{female} = 3.90$ *mm*, $\sigma_{female} = 0.534$; $p > 0.05$), suggesting that the species is gonochoristic, not sequentially hermaphroditic. Throughout the study period, oogenesis and spermatogenesis appear to be asynchronous within individuals and across the population as female coelomic fluid showed oocytes at various stages of maturation and male coelomic fluid sperm cells at various developmental stages. However, an overall decrease in oocyte size across the population noted after summer suggests that the population spawns in late summer and early autumn. This suggests that the sexual system and strategies of the species in Knysna could be robust enough to not only counteract the effects of predation and baiting but also contribute to expansion.

MONDAY, 14:45

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**(105) Reproduction and possible feeding habits of branching syllids *Ramisyllis* spp. (Annelida, Syllidae)**

Thilo Schulze[1], Guillermo Ponz-Segrelles[1], Monika Endres[1], Kohei Oguchi[2], Naoto Jimi[3] Christopher J. Glasby[4], Toru Miura[2], Maria Teresa Aguado[1]

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Branching worms are annelids of the family Syllidae that have one single head, but a randomly branching asymmetrical body with multiple posterior ends. These animals have an unusual body pattern that fits with the habitat in which they live: the labyrinthic internal canals of different sponges, with which they maintain a symbiotic relationship. There are currently three branching syllid species: *Syllis ramosa* McIntosh, 1879; *Ramisyllis multicaudata* Glasby et al., 2012 and *Ramisyllis kingghidorahi* Aguado et al., 2012, but current sampling efforts indicate that the diversity of these remarkable animals could be higher than expected. In line with this sampling effort, we present new records of *R. kingghidorahi* in different geographic locations around Japan. Additionally, to further improve our understanding of these animals, we generated the first transcriptome assembly of *R. kingghidorahi* and performed comparative transcriptomic analyses during stolonization to identify sex-specific transcripts expressed during stolonization. Gene expression in the unbranched anterior ends, branched midbody, and stolons of male and female specimens was compared and showed characteristic gene expression patterns. The microbiomes of both *Ramisyllis* species (*R. multicaudata* and *R. kingghidorahi*) and their corresponding host sponges are studied. Finally, possible feeding strategies for the branching worms are discussed.

MONDAY, 15:30

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**(002) Secondary planktotrophic larvae and hermaphroditism, a trend in sessile marine invertebrates? A discussion using the examples of Serpulinae and other invertebrates**

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The evolution in reproduction is often understood as a development from hermaphroditic ancestors to gonochoristic individuals. However, if we look into the reproductive strategies of Mollusca and Polychaeta, this understanding could become challenging. Amongst Mollusca and Polychaeta, it seems that separated sexes in combination with brooding are the most common reproductive traits, and it is suggested to be plesiomorphic for these taxa. However, sessile polychaetes, as well as sessile molluscs, are known to be broadcast spawners, and furthermore, hermaphrodites are reported for both taxa. For oysters, it is now widely accepted that species can alternate sex. The theory of alternating sexes describes the ability to change the sex in response to environmental conditions. My findings on an in New Zealand endemic polychaete suggest that serpulins could also have alternating sexuality. This sexuality in context with a secondary developed broadcast spawning could be understood as an adaption to a perennial sessile lifestyle of marine invertebrates.

Further, I argue the larval development of these species is an adaptation to sessile life. In general, the juvenile stage is the most vulnerable phase in the life of any organism. It is commonly accepted and understood that the larvae, after a brief dispersal stage, will settle and shift to a benthic life followed by metamorphosis. It has been observed that the larvae of some serpulins can prolong the planktotrophic life for months. A prolonged larval stage enables the individual to be more selective in the choice of settlement substrate, which has a crucial effect on the survival and reproduction of the later adult organism. The reproductive traits, as well as the larval development, are major factors for the survival, and reproductive success, of

sessile species. A current focus on non-native marine species discusses the distribution and settlement of pest species without understanding reproductive and larval biology.

MONDAY, 15:45

## THEME: PHYSIOLOGY & ECOLOGY

### (078) Biogeography of polychaetes in South African Bays

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Invertebrate macrofauna play an important role in structuring benthic environments, as well as forming part of the food chain for numerous important fish species. Knowledge of benthic invertebrate biodiversity and distribution patterns along the coastline of South Africa is, however, limited and studies tend to focus on species distribution and abundance within discrete regions or locations. South African has a comparatively rich history of taxonomic research, relative to other African countries. A summary of the number of known marine species in South Africa conducted in 2010 showed that many phyla were underrepresented with species diversity likely underestimated due to a lack of taxonomic attention. However, certain taxa such as fish, molluscs, crustaceans and polychaetes generally receive more attention and can be used to help us better understand distribution- patterns of species along our coastline. Research has shown that species richness and endemism of benthic communities are strongly influenced by geographic location (from west to east along the SA coastline) and water depth. However, bays offer sheltered environments with a diversity of habitat types which translates to generally higher species diversity and abundances relative to more exposed shoreline or coastal areas. In most cases polychaetes are the most abundant taxon in these semi-enclosed, sheltered areas, and with the assistance of Day's taxonomic guides '*The polychaeta of South Africa*' can often be identified to species level. Polychaete communities collected using a Van Veen grab in St Helena, Saldanha, Table, Mossel, Stilbaai, Algoa, Durban and Richards Bay will be compared to determine how the diversity and distribution of polychaetes varies in unconsolidated sediments of bays along the South African coastline.

MONDAY, 16:00

### (032) Polychaeta distribution in *Ecklonia radiata* holdfast along the southeast coast of South Africa

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Recent research has revealed a recurring pattern of variation across multiple spatial scales among several taxonomic units linked to the *Ecklonia radiata* holdfast. These patterns, which use functional groups rather than a single species, are critical for determining the efficacy of marine protected areas. However, functional groups in different habitats react differently to environmental conditions, and such mechanisms may influence their distribution patterns. Here, we compared the consistency in multivariate variation of polychaete worms linked to the holdfast of *Ecklonia radiata* in rock pools and gullies along South Africa's southeast coast. The holdfasts (n = 30 per site) were pried from the substrate with sharp knives in three replicate habitats (about 100m apart) and immediately sealed in ziplock bags to secure the contents. Twelve physical-chemical parameters were measured *in situ*, while sediment and holdfasts were measured in the

lab. The latter was dissected and washed through a sieve with a mesh size of 0.125 µm. Polychaetes left on the sieve were identified to the highest taxonomic resolution possible, and species richness per holdfast was calculated. There were 2.43 species/kelp holdfast overall, with 93 species found in gullies and 72 species found in rock pools. It was discovered that there is a significant site-by-habitat interaction effect. The pairwise test revealed a significant difference between Cwebe and Dwesa, with *Lepidonotus semitectus, L. durbanensis, Arabella iricolor, Lysidice natalensis, and Gunnarea gaimardi* accounting for more than 60% of the difference. Similarly, these species contributed more than 50% of the variation in rock pools and gullies. The polychaete distribution on kelp holdfast was influenced by sediment, sodium, depth, and pH. Our findings highlight the importance of considering habitat complexity in conservation planning. In comparison to rock pools, gullies appear to promote a higher diversity of polychaetes during the study period. Because of their substantial and consistent contribution to variation between sites and habitats, four polychaete species have been identified as potential indicators of environmental change.

MONDAY, 16:15

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**(124) Polychaetes characterise an atypical muddy shelf region of the east coast of South Africa**

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The uThukela shelf is a rare soft-sediment benthic habitat type along the east coast of South Africa with a predominantly muddy substrate, relative to the sandy substrates typical of the rest of the shelf. This environment arises from the uThukela Estuary being fluvially-dominated and relatively small, allowing large amounts of terrigenous sediment in the large uThukela River to pass straight through the typically open mouth and be deposited on the ocean floor, resulting in many estuarine processes occurring offshore. Polychaeta dominate the uThukela shelf benthos, contrasting with the Crustacea dominance in the adjacent shelf communities. The study aim was to focus on the uThukela shelf polychaete community structure and functioning and how it contributes to the shelf ecosystem. This was analysed through assessing replicated quantitative across-shelf grab samples. The uThukela shelf polychaete community was highly diverse and comprised a richer and more abundant community relative to shelf regions north and south, with an average of 256 ind.m-2 over the whole study site, from 180 taxa and representing 123 genera and 42 families. Variability was high in polychaete assemblages and there was little taxa redundancy (abundances were low and many taxa only contained 1 or 2 specimens). With 22 identified taxa, Spionidae was the most taxa-rich family, and polychaete abundances were dominated by Spionidae, Cirratulidae and Nephtyidae. These were mostly represented by *Aonides oxycephala,* the typically uncommon *Cirratulus concinnus*, and *Aglaophamus dibranchis* respectively, but Spionidae also included many *Prionospio* species such as the endemic *Prionospio saldanha*. The community are mostly tubicolous or burrowing facultative deposit feeders that switch to suspension or carnivorous feeding and rely heavily on particulate organic matter and mud deposited on the shelf by the fluvially-dominated uThukela Estuary. Despite high taxa richness and low abundances, this community has high functional redundancy and traits indicative of variation resilience (and have been present in repeated sampling) and is adapted to natural environmental fluxes that occur in habitats much like adjacent to a major river with seasonal freshwater pulses.

MONDAY, 16:30

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**(139) South African subtropical polychaetes: community patterns and biodiversity hotspots shaped by ocean and coastal processes, past and present**

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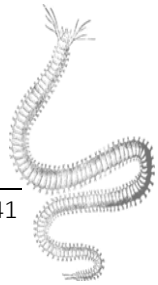

The Natal Bight off the South African east coast has a productive benthic environment because of oceanographic influences such as a semi-permanent eddy in the south, an upwelling feature in the north, the strong Agulhas western boundary current on the shelf break and the central Bight influenced by riverine outflow carrying high volumes of terrigenous sediments and allochthonous particulates. Underpinning this, are several well-preserved relict seafloor features stranded by abrupt rises in sea level since the Last Glacial Maximum of 18 000 years BP, including two shorelines at -60m and -100m punctuating an otherwise sedimentary shelf. The Polychaeta have responded prolifically to these different seascapes by increases in abundance, biomass and species richness. This study aimed to reveal polychaete diversity and variability across this shelf and identify hotspots as surrogates for critical biodiversity areas and future marine spatial planning. Polychaetes here have not received adequate recent attention since historical studies of 40 and 60 years ago. Further, this study aimed to improve on past species lists and the known distributions of taxa by sampling across depth strata (coast to shelf edge at ~200m) and various sediment habitats over some 300km. Previously, 37 polychaete families were known from the area. This study documented close to 50. Of these, 20 were highly common, and the remainder occurred with some regularity or were rare. Capitellidae, Cirratulidae, Lumbrineridae, Onuphidae, Orbiniidae, and Spionidae occurred most commonly and *Onuphis* cf. *eremita* was the most common species. Cossuridae, Dorvilleidae and Sigalionidae were the rarest families, almost exclusively found in the dry season, whereas Cirratulidae, Nereididae, Sabellidae and Scalibregmatidae were mostly sampled in the wet season when riverine inputs are highest. Of the ~350 taxa recently identified, only 20% could be named to species level highlighting two issues: the shortage of east coast specialists and a paucity of local taxonomic literature particularly for the sub/tropical coastal marine and offshore realms. A poor knowledge of soft-sediment species significantly impedes our understanding of marine biodiversity and our ability to manage and conserve these resources when global change pressures threaten the most.

MONDAY, 16:45

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**(019) Sands and gravels of the outer continental shelf off the Cap de Creus (NW Mediterranean) with *Lanice conchilega***

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The demand for marine resources raises expectations that oceans will be the engine of human development in the future as a source of food, materials and space. As these demands reach deeper strata, the need for knowledge on the distribution of species and habitats becomes essential, especially for areas not yet explored. Here we characterize a benthic community dominated by the polychate *Lanice conchilega* and the cerianthárid *Arachnanthus oligopodus* that develops in sands and gravels of the outer continental shelf off the Cap de Creus (NW Mediterranean), an area located within the limits of a Site of Community Importance (SCI) of the Natura 2000 network. The results obtained are compared with historical data from the 1970s. The composition of the macro-infauna was dominated by *Sthenelais boa* and *Apomatus ampulliferus* in biomass, and by *Paradoneis lyra* and *Galathowenia oculata* in abundance. The most abundant epifaunal species was the polychaete *Lanice conchilega*, a tube-forming, ubiquitous terebellid of shelf and slope habitats (90-200 m) that forms extensive aggregations in this area, with densities of 10-20 ind·m$^{-2}$. Although inside the limits of an SCI, this assemblage still receives pressures from the activity of the bottom trawling fishing fleet, and could potentially be affected in the future by an offshore wind farm to be developed in the vicinity. It is likely that *L. conchilega* overcomes moderate trawling disturbances due to its capacity to survive the swipe of the nets by burying itself inside the sediment. *L. conchilega* forms dense beds in sublittoral areas of the Atlantic, where it has a very high functional value, favoring the associated biological diversity and providing feeding grounds for birds and fishes, ultimately displaying a relatively high socioeconomic value. No information exists on how beneficial this species could be to promote fish or megafauna diversity in

circalittoral and bathyal areas of the Mediterranean, but its role in ecosystem functioning below certain depths could be important. Using this assemblage as an example, a revision of soft-bottom benthic assemblages related to Terebellid species is included.

MONDAY, 17:00

## THEME: ECONOMICALLY IMPORTANT SPECIES

**(026) The management of blood worms, *Marphysa* spp. with particular reference to Australia, South Africa and Europe**

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Worldwide bait worms are collected for recreational and subsistence fishing. In Australia, this industry is managed by the various state agencies, and may include representatives of eunicids, glycerids and onuphids. This is despite these species occurring in very different coastal habits. While some collecting is undertaken by recreational fishers for personal use, increasingly commercial fishing is undertaken. Although, actual landings are poorly documented although Queensland Fisheries has recorded significant drops in landings of beach worms in recent years. In South Africa, the collection of bait is regulated by taxon-specific daily limits by the Department of Forestry, Fisheries and the Environment. *Marphysa* worms commonly used as bait have various common names and there is a discrepancy between the usage of common names and scientific names in peer-reviewed papers, legislature, and field guides. In France, professional bait fishing is well developed along the various coasts and a fishing license is compulsory. However, collecting of *Marphysa i*s restricted to Arcachon Bay and concerns an exotic species: *M. victori*. Certainly, management plans need to be far more targeted and also monitored to confirm that the populations of these valuable resources are sustainable. As different species of *Marphysa* are not easy to identify in the field, we suggest that plans need to focus on habitat management and better documentation of actual catches both by commercial and recreational fishers. We also suggest that common names vs. scientific names are standardised across the scientific and fishing communities to help us gain a better understanding of the resources being used as bait. Fishing is common in coastal areas which are increasingly being impacted by habitats being impacted by coastal development and climate change, far better targeted management plans need to be implemented. As well this fauna needs to be better identified as certainly includes some undescribed species.

TUESDAY, 09:15

**(015) Suitability of Polychaete worms (*Marphysa mossambica*) as protein and lipids ingredient for the culture of Tiger prawn (*Penaeus monodon*) in hapa nets in tidal ponds of Mtwapa creek**

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This study presents an evaluation of cultured polychaetes (*Marphysa Mosambicca sp.*) as a suitable protein and lipid source alternative to freshwater shrimp in the feed formulation of Tiger prawn (*Penaeus monodon*) Juveniles. The study was conducted over 94-day period using twelve hapa nets of $1m^3$ each installed in a tidal pond measuring 0.08 ha at Kwetu training centre farm. Each hapa was stocked at a density of 20 juveniles/$m^3$ of *P. monodon* collected within Mtwapa creek. The initial weight and length were recorded before stocking, averaging at 1.28+0.84 grams and 5.26±0.68 cm. Polychaete worms (*Marphysa mossambica*) were cultured

at Kwetu Training Centre mariculture systems, and used for preparation of formulated feeds. Three polychaete substitution diets were formulated with varying contents of polychaetes as follows; Poly-30%, Poly-35% and Poly-40%. The commercial shrimp meal with no polychaete added (0%) was used as a control diet. The four diets were administered to the juveniles @3% body weight for the experiments: (Control (poly 0%), Poly-30%, Poly-35% and Poly-40%). Each diet formulation was randomly allocated to three (3) three treatments, with Control (Poly-0) allocated to Hapa net No. 2, No.7 and No.8), Poly-30% to Hapa No.4, No.5 and No.9), Poly-35% (No.10, No.11 and No.12), and Poly-40 (Hapa 1, 3 & 6). The shrimps were acclimatized for four (4) weeks and thereafter, length and weight sampling to monitor growth, conducted fortnightly. Results showed significant differences in growth rate among the treatments/diets (Weight (g), $F=10.23$, $P<0.05$, Specific growth rate SGR, $F=11.99$, $P<0.05$, and exposure periods (Weight WG, $F=34.17$; SGR, $F=122.49$). The highest weight gain (2.71 g) and SGRs (5.74 % /day) were recorded on Poly-40% and Poly-35% diet treatments, which were significantly higher than both the shrimp meal and poly-30% diets. The Poly-30% diet had a lower SGR (3.50%/day), but weight gain was comparable to the shrimp meal control diet treatments. Limited quantities of cultured polychaetas and drying methodology for the polychaetes limited 100% polychaete substitution. The results of this study provide a basis for the integration of *Marphysa mossambica* in the formulation of diets for Tiger prawn. Refining culture protocols for *Marphysa mossambica* requires further investigation.

TUESDAY, 09:30

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**(009) Performance of eunicid polychaetes commonly exploited by artisanal fishers under different culture and diet regimes between 2015 and 2017 (*Marphysa mossambica*)**

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Eunicid polychaetes are harvested and exploited as fishing bait in various regions around the world (Giangrande, A. et al., 2015). Unregulated harvesting into the intertidal flats of Southeast Queensland, Australia has destroyed the habitat for many biodiversity and loss of the polychaete (Schlacher, T. A., et al, 2011). Culture of the worm could provide an alternative supply of polychaetes as baits for fishing and also as feeds in mariculture. Thus reduce time spent during digging for the bait worms, and pressure on use of *Rastronobela argentia* and sardine which are used as human food. Therefore, this study aimed at investigating the performance of cultured Eunicid polychaete under different regimes. Several species of Eunicid worms have been successfully cultured in laboratory settings for research, aquaculture and bait recreational fishing. This study cultured polychaetes in 2 culture set up regimes (semi intensive cages in situ, and aerated and recirculation lab intensive cage) on known stocking densities. The diet regime comprised of spinach, manure and a mixture of both manure and spinach diets on known quantities. The performance was monitored on growth rate, survival rate, reproduction, and burrowing behavior. The results obtained indicated mean survival rates were highest in the semi-intensive cage at 75.31% compared to the aerated and recirculation system at 45.11%. Similarly, the highest mean growth rates recorded was in the semi-intensive cage in situ at 0.057- 0.102 mm/day against the aerated and recirculation lab intensive cages at 0.015 – 0.021 mm/day. On the other hand, in the diet regime where spinach was used as a control. The survival and growth rate were highest on the cow dung manure diet followed by spinach diet and lowest in the 1:1 mixture of manure and spinach. It can be concluded that, the semi-intensive cage in situ and cow dung manure diet could offer the best culture technique that can be adopted for the artificial rearing of the Eunicid polychaete. This can be compared to the survival rate obtained for the *Marphysa sanguinea* spp recorded of up to 90% (e.g., Xu et al., 2015) and a mean growth rate of 0.19-0.25 mm/day Xu et al. (2015) grown under laboratory conditions. Another study by Naylor et al. (2011) reported growth rates of 0.16-0.44 mm/day for *Marphysa sanguinea* collected from estuarine mudflats in the UK.

TUESDAY, 09:45

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**(014) Polychaete Fishing as a Pathway to Women's Wellbeing**

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This study is an initial documentation of the life stories of women in polychaete fisheries in the island municipality of Anda, Pangasinan in the Philippines. This study used a mixed methods research design, underscoring a qualitative method that focused more on feminist research highlighting the subjective knowledge, voice and agency particularly of women. Qualitative data were gathered through life story interviews, focus group discussions (FGD) and Key Informant Interviews (KII). Descriptive statistics formed part of the quantitative data: incomes, frequency of gathering by women, and volume of polychaetes gathered were generated from the records of the traders. The wellbeing approach uncovered the three dimensions of women polychaete fishers' wellbeing: the subjective, material and relational dimensions. The subjective dimension reveals the primacy of the children and family in womens' lives, with the common aspiration for their children to have education. Food, good health, decent housing, family togetherness and a relationship with God are also important for womens' subjective wellbeing. In terms of the material dimension, polychaete fishing has provided women the substantial income that enables them to see through each day in the midst of declining catch of their fisher husbands. Womens' relationship with the environment is characterized as one of respect with the use of the "puspus" and "latag" methods in catching for polychaetes. Their relationship with their fellow women fishers is one of trust and mutual support.

Catching polychaetes is a gendered fishing activity that has become an economic recourse and a social activity that helps women achieve their wellbeing and that of their families' wellbeing. It highlights womens' capabilities and agency which has enabled them to surpass the everyday struggles for a decent life. With more women and girl-children engaging in polychaete fishing, the feminization of this activity is a growing phenomenon.

TUESDAY, 10:00

## THEME: PHYSIOLOGY AND ECOLOGY

**(036) Variability in euryhalinity of two Ponto-Caspian invasive annelid species**

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The voluntary or accidental introduction of non-indigenous species (NIS) is one of the major environmental challenges, leading to a homogenization of the biodiversity worldwide. One of the main sources of freshwater NIS in Europe is the Ponto-Caspian region, which has turbulent geological history characterized by several sea-level changes and fluctuating environmental stressors, such as salinity, temperature, and oxygen. Such conditions fuelled radiation of several groups of aquatic organisms, including crustaceans, molluscs, annelids, and fishes, leading to both a high level of endemism, and a high level of tolerance to physio-chemical conditions of the environment. The ampharetid *Hypania invalida* (Grube, 1860) and the sabellid *Laonome xeprovala* Bick & Bastrop, 2018 stand among the species coming from this region and they are well known for their successful spread all over Europe in the last decades. Although data about the ecophysiology of these species are scarce, salinity regime tolerance is considered one of the most significant factors limiting the distribution of the species in aquatic environments. In fact, a higher euryhalinity seems to facilitate the

establishment and invasion success of species in new habitats, representing an important trait of invasive species. The invasion of freshwater habitats by brackish/marine species has been reported frequently for those coming from the Ponto-Caspian region, notwithstanding the high energetic costs required to retain osmotic levels in body fluids when inhabiting freshwater environments. The work aims to firstly assess the expression of some proteins involved in osmoregulation in these species, such as Na-K-2Cl co-transporter (NKCC) and aquaporins (AQPs), through an integrative approach that combines experiments, microscopy, and molecular biology. We recovered the presence of both NKCC and AQPs in annelids, by investigating the public databases, experimentally confirming through Sanger sequencing or immunofluorescence. Work is in progress to experimentally assess their euryhalinity and to histologically characterize their integument. Novel and valuable insights into annelid and invasion biology are anticipated.

TUESDAY, 11:15

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**(137) Expanding our understanding of the diet and trophic role of the cryptogenic estuarine moonshine worm (*Diopatra aciculata*) in warm temperate estuaries of South Africa**

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The estuarine moonshine worm, *Diopatra aciculata*, is an onuphid that is popularly used as bait in at least three estuaries along the south coast of South Africa. Its recent discovery in South African estuaries, together with its confusing historical presence locally and cryptogenic nature, has spurred research into ecological roles. A recent stable isotope analysis in the Knysna estuary described *D. aciculata* as a facultative carnivore, often having the highest trophic position of the benthic macroinvertebrates sampled. However, Knysna Estuary is a large estuarine bay that is unique in the warm temperate region, and results from here may not necessarily be applicable to more typical estuaries of the region. In this paper we sampled two similar, more typical, estuaries in the warm temperate region: the Keurbooms estuary, where *D. aciculata* is present, and the Kromme River estuary, where its presence has not been reported. We set out to 1) investigate the isotopic landscapes of communities with and without *D. aciculata* and compare to those in Knysna and 2) if *D. aciculata* has a similar diet and trophic position within its community as it had in Knysna. We collected common benthic macroinvertebrates, macrophytes and particulate organic matter samples from the intertidal for a stable isotope analysis of carbon and nitrogen. Isotopic landscapes in both estuaries were similar to those in Knysna, in both diversity and positioning of species in the isotopic landscape. Similarly, *D. aciculata* likely has a carnivorous diet as it shares the highest trophic level, of sampled species, in the Keurbooms river estuary with the carnivorous sand shrimp *Palaemon peringueyi*. The isotopic landscape of the Kromme River has an open niche that *D. aciculata* could occupy. This suggests that the system may be vulnerable to invasion/expansion of *D. aciculata*.

TUESDAY, 11:30

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**(021) Identifying G protein-coupled receptors (GPCR) involved with mating behaviour in *Platynereis dumerilii* to shed light on the impact of ocean acidification on chemical communication**

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One important part of climate change is ocean acidification (OA) caused by the increase of atmospheric $CO_2$ since the industrial revolution, lowering the pH from 8.2 to 8.07. By the year 2100, a pH of 7.7 is predicted with increased fluctuations of pH during the day. So far only a few studies have investigated the impact of OA on chemical communication, which directly affect the survival of species (detection of prey/predator, mating partner), causing changes in the marine food webs, marine communities. This study focuses on the globally distributed non-calcifying model species *Platynereis dumerilii* and on the potential effect of a lower pH on the chemical communication used in their mating behavior. It is known that *P. dumerilii* males and females use pheromones, such as 5-methyl-3-heptanone, uric acid, and L-Ovothiol-A, to induce rapid swim speed or to trigger the release of their gametes. Here, we aim to identify the receptors of these pheromones in *P. dumerilii* and determine if a lower pH impacts their pheromones and/or receptors. On one hand, we tested if a lower pH impacts the response (swim speed) to the pheromones with behavioral assays. On the other hand, we identified candidate genes for the receptors of the pheromones coding for G protein-coupled receptors (GPCRs) using comparative transcriptomics. With gene trees and deorphanization assays, we found a few promising candidates for which we will perform knock-out experiments. Once we validate the function of these genes, we will also be able to determine with computational modelling if such receptor might be impacted by a lower pH and if *Platynereis* populations living in more acidic environments use different receptors. This study helps to better predict how OA impacts the marine communities by modifying their chemical communication, whether acclimation and adaptation occur and at which costs.

TUESDAY, 11:45

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**(123) Which sea cucumbers do worms like? Host choice of the ectoparasitic polynoid *Gastrolepidia clavigera* Schmarda 1861**

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The family Polynoidae, also known as scale worms, includes numerous commensal and parasitic species. Symbiotic polynoids live on various taxa (e.g., cnidarians, decapods, and polychaetes), and the range of hosts for each species is different. *Gastrolepidia clavigera* is a polyxenous species that occurs in at least three families of Holothuroidea. This worm exhibits body colors that match those of its hosts, enabling it to camouflage itself with various holothuroids. However, the host preference of *G. clavigera* has not been quantitatively investigated. In this study, we surveyed the rates of parasitism by the worm on 10 holothuroid species in the shallow waters of the Ryukyu Island, southern Japan. As a result, the worm occurred in seven holothuroid species from two families of Holothuroidea and its body color matched that of its hosts. Additionally, the rates of parasitism varied among the host species. Interestingly, the two holothuroid species that regularly burrow in the sandy sediment were rarely utilized as hosts by the worm. This implies that the burrowing habit of holothuroids may prevent the parasitism by this scale worm.

TUESDAY, 12:00

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## THEME: TAXONOMY AND MORPHOLOGY

**(111) Intertidal polychaetes of Kuwait – an update since 2016**

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An intertidal biodiversity survey of marine macrofauna of Kuwait was conducted at 36 transects, from Khor Al-Subiya in the north to the border with Saudi Arabia in the south, including sites at mainland areas and five offshore islands. These transects were sampled qualitatively and quantitatively during the late autumn and winter between 2013 and 2016. Preliminary results of this Project were presented at the 12th International Polychaete Conference in Cardiff (Wales, UK) in 2016. Of 750 macrofaunal species distinguished at that time, 29% (179 species from 48 families) were polychaetes. Extra surveys were conducted at Umm Al-Namel, Auha and Miscan Islands from October 2018 to October 2019. Nereididae and Spionidae were the most species-rich families. Fifty-four (30%) of the identified species were new to the Arabian Gulf, and a great part of the unidentified species included undescribed species new to science. Here we present an update in the identification of polychaetes collected from Kuwait. To date, seven papers on the taxonomy and biology of Kuwaiti polychaetes have been published in international journals. Nine species from the families Serpulidae, Spionidae, and Opheliidae have been described as new, one species of Orbiniidae is in process of description. The taxonomic status of most of them has been clarified by the molecular data. Reproductive biology and larval morphology are described for four species of the family Spionidae. The identification of the collected polychaetes is still ongoing, but the data obtained have shown the extreme diversity of the Arabian Gulf polychaete fauna, most of whose species are still waiting to be studied.

TUESDAY, 13:30

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**(116) New records and species of polychaetes from an anchialine cave of Mallorca (Balearic Islands)**

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Anchialine caves (caves connected to coastal saline aquifers without obvious connections to the open sea) are singular environments characterized by a lack of light, constant temperature, low nutrients and dissolved oxygen, and vertical stratified water layers. Anchialine caves are considered unique systems of great conservation interest, but being difficult to access, they are one of the least known frontiers on Earth. Anchialine communities are geographically restricted and ecologically specialized, therefore highly sensitive to anthropogenic disturbance. Exploration of a cave in the north of Mallorca, Balearic Islands (Western Mediterranean) revealed the presence of very scarce but remarkable annelids, including new species and records of Polynoidae, Terebellidae and Sepulidae. Some of these taxa show morphological adaptations typical of cave fauna. In this study, we describe the environment of the cave and, thorough morphological and molecular analyses, we offer novel information about the evolutionary relationships between anchialine and open sea taxa. Our study provides new insights into the colonization and speciation processes leading to the origin of Mediterranean coastal aquifer fauna.

TUESDAY, 13:45

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**(044) The polychaete legacy of Marian Pettibone: a look ahead**

Víctor M. Conde-Vela[1], Brett C. Gonzalez[1], Raven Capone-Benko[1], & Karen J. Osborn[1]

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The Pettibone Legacy Project aims to uncover and share the significant contributions of Dr. Marian Pettibone, a pioneering female polychaetologist at the Smithsonian National Museum of Natural History (USNM), whose impact on scale worm research remains unparalleled. Our objectives for this one-year project include digitization of historical collections, systematic research, taxonomic training of undergraduates, and public outreach. One of the primary objectives of the project is to create digital surrogates of the unique and frequently requested Pettibone types. We are using uCT to create 3D images of all type specimens and

creating interactive videos of the external and internal morphology of each specimen. The resulting 172 digital surrogates will be publicly accessible through the USNM catalogue and enable critical morphological comparisons worldwide without the need of shipping delicate specimens. This digitization project demonstrates how democratizing access to historical specimens can revolutionize organismal research and serves as a model for 3D digitization of soft tissues and open access data in museum collections. As part of her legacy, Pettibone left 111 incipient types in the USNM Polychaete Collection – specimens she identified as new to science but she didn't have time to formally describe these. These specimens hold a wealth of information about the diversity of Polynoidae from multiple, hard to sample habitats. The collection has been evaluated and specimens prioritized for description based on novelty and impact on resolution of systematic questions in the family. Through the study of her collection, unpublished illustrations, notes, and correspondence, as well as interviews with colleagues and family members, we have recovered some of Pettibone's history. We are sharing Pettibone's legacy with a broader audience through social media, online and onsite educational events and published stories about Pettibone and the work on her legacy collection. In addition, we are using her incipient types and building partnerships with universities to train undergraduate students in systematic work. We teach students how to find scientific literature, distinguish a species, illustrate species, build figures, and write a description. This talk will focus on demonstration of virtual types with highlights from the systematic research and training activities associated with it.

TUESDAY, 14:00

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**(011) Taxonomy of European Cirratulidae – Latest Progress and Future Prospects**

Maël Grosse[1,2], Torsten Struck[1], Arne Nygren[3] & Maria Capa[2]

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The family Cirratulidae is a group of benthic polychaetes characterized by their simple body plan with long filamentous branchiae and dorsal tentacles. They are often considered difficult to identify, as they are very diverse and only have a few characters allowing for differentiation. In the past three years, we have gathered and studied several hundreds of specimens from various locations in European waters, ranging from intertidal to abyssal depth, and focussed mainly on the North-East Atlantic. DNA sequencing and detailed morphological studies of these specimens revealed several species complexes and many undescribed species, as well as the need to re-describe existing species for which the original description is outdated. Before our study, about 55 species were reported and considered valid in European waters. However, many names are considered outdated with insufficient descriptions and taxa lack type material. In total, we have sequenced about 70 species so far. The overlap with existing records is still partially unclear. Not accounting for species that have been recently described or re-described (by us or other colleagues) we have compiled detailed morphological data for about 30 species. In the coming years, we are planning to (i) publish descriptions or re-descriptions for these species, (ii) publish online identification resources, and (iii) complete phylogenetic studies at the family level to revise generic diagnostics.

TUESDAY, 14:15

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**(071) Fine morphology of jaw apparatus of *Scoletoma fragilis* (Lumbrineridae, Annelida)**

Anna Koroleva[1] & Alexander Tzetlin[1]

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Eunicida is a group of errant annelids characterized by their complex jaw apparatuses. It includes seven extant families and even more extinct Paleozoic groups known mostly from scolecodonts (parts of their jaws). Studying the morphology of the jaws of modern eunicids is important for the correct interpretation of paleontological findings and thus for understanding the evolutionary history of the group. Despite the fact

that data on general jaw morphology are abundant, data on jaw ultrastructure are scarce and absent for some families. The purpose of our work is to study the jaw ultrastructure of the representatives of the family Lumbrineridae. In this study, we used *Scoletoma fragilis* (O.F. Müller, 1776), a lumbrinerid species from the White Sea, to examine the fine scale morphology of its jaws in worms of various sizes and ages (from juveniles to adults). Our data reveal two principal patterns of adult worms' maxillae structure in different parts of the jaw. The thick and mineralized plates consist of three ultrastructural layers that correlate with maxillae organization found in Onuphidae and Eunicidae. However, elastic parts of maxillae have a different structure, which consists of sclerotized areas alternating with areas of collagen grid and microvilli between the sclerotization sites. The maxillae of juvenile worms differ from those of adults and consist of a single homogenous electron-dense layer. This structure resembles the jaw structure found in the Dorvilleidae, Histriobdellidae and in juveniles from the Onuphidae as well. The presence of elastic non-mineralized zones in the maxillary plates of *S. fragilis* is the first finding of this kind in Symmetrognatha and Labidognatha maxillae and it may be the basis for the hypothesis of continued growth of maxillae in Lumbrineridae, however, a number of unclear questions remain. The work was supported by the Ministry of Science and Higher Education of the Russian Federation under grant No. 21-14-00042.

TUESDAY, 14:30

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**(084) Developing taxonomy – DNA sequencing and morphology in the description of new species of Lumbrineridae (Annelida: Eunicida) from the North Atlantic**

Eivind Oug[1], Nataliya Budaeva[2], Polina Borisova[3] & Jon Anders Kongsrud[2]

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Lumbrineridae is a widely distributed family occurring in mostly soft bottom environments from intertidal to abyssal depths all over the world. They are of rather simple external morphology resembling earthworms but bearing a complex maxillary apparatus in the pharynx, as is present in other Eunicida families. In recent years, characters of the maxillae have been extensively used for characterisation of different genera and species. Presently there are more than 200 recognized species in 19 Lumbrineridae genera. Because of the morphological homogeneity, however, species discrimination has been problematic in several genera. With the advent of DNA sequencing as tools in species taxonomy and phylogeny, resolution of generic and species' affinities are advancing. We here present an overview of results from a study focusing on tentative *Abyssoninoe* and *Augeneria* occurring in shelf and deep waters (300-3600 m depth) in the North Atlantic. In total, 160 specimens collected in the projects Mareano, AnDeepNor, IceAge, and CGB Deep-Sea were sequenced for CO1, 16S and 28S. Phylogenetic analysis using Bayesian inference revealed four genera. One form previously identified as *Abyssoninoe* sp A was found to represent a new genus with five new putative species. The genus is restricted to deep water (> 1200 m) north of the Greenland-Iceland-Faroe Ridge with temperatures < 0°C. *Abyssoninoe* was confirmed to include four species, some or all probably described, but their identities have to be confirmed from type specimens or topotypic material. The material originally referred to as *Augeneria* included the genus *Gallardoneris* previously not known from the North Atlantic. The genus was found to comprise five new putative species. *Augeneria* included three species, of which one was previously described (*Augeneria algida* (Wirén, 1901)). Present morphological studies indicate that several of the new putative species can be distinguished using characters obtained from the chaetae and maxillary apparatus.

TUESDAY, 14:45

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**(079) Chaetopteridae of Macaronesia and the Atlantic coasts of Africa**

Jenna M. Moore

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The chaetopterids of Macaronesia and the Atlantic coasts of Africa are poorly known, despite several European expeditions to these regions in the late 19th and early 20th centuries. Mediterranean species names were applied to several specimens from these expeditions, either originally or by subsequent synonymy. However, the biogeographic patterns in the region are complex, with high rates of endemism in the marine invertebrate fauna of Cabo Verde. Therefore, these taxonomic assignments warrant re-evaluation. The 2022 DISCOVER expedition to Cabo Verde recovered several chaetopterid species and presented an opportunity to revisit the taxonomy and biogeography of Chaetopteridae from Atlantic Africa and Macaronesia using both morphological comparisons and genetic analyses. Chaetopterid specimens from the Atlantic coasts of Africa and Macaronesia examined by Ernst Ehlers and Hermann Augener, including the syntypes of *Spiochaetopterus vitrarius* (Ehlers, 1908) are in the Annelida collection at the Museum of Nature Hamburg. The type material of *Spiochaetopterus tropicus* Grube, 1877, described from Cabo Verde, was formerly in the collections of the Museum für Naturkunde Berlin, but was destroyed. The type material for *Spiochaetopterus madeirensis* Langerhans, 1880 has not been located. For this study, *Spiochaetopterus vitrarius* Ehlers, 1908 was re-described from type material. Non-type specimens from the regional collections were re-examined and reidentified. Recently collected chaetopterid specimens from Cabo Verde were identified, characterized, and compared to the older museum material. Field-collected tissue samples were COI barcode sequenced to aid in identification and for comparison to reference chaetopterid sequences from other regions. The chaetopterid diversity of Atlantic coasts of Africa and Macaronesia is clarified, and the taxonomic affinities and biogeographic patterns in Chaetopteridae are discussed.

TUESDAY, 15:30

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**(056) Reconciling morphology and molecules to explore diversity of gossamer worms (Polychaeta, Tomopteridae)**

Karen J. Osborn[1,2] & Sarit B. Truskey[1,3]

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Commonly called gossamer worms, the Tomopteridae are a globally distributed group of midwater polychaete worms found from the surface down through the bathypelagic depths. With their distinctive delicate gelatinous bodies and long pair of “whiskers”, tomopterids are easily recognizable at the family level and of great interest for their bioluminescence, use in physiological and biomechanical research, and studies of nervous systems. Approximately 60 species have been described, based primarily on the presence and arrangement of parapodial glands in fixed animals. Unfortunately, most descriptions are incomplete or ambiguous and types not available. Coupled to these minimal, often contradictory descriptions with tomopterids’, simplified morphology, and easily damaged bodies, makes species identification, especially of live animals, particularly challenging. For this project, approximately 350 specimens were collected from the NE Pacific (USA), Gulf Stream off Florida (USA), Gulf of California (Mexico), and Antarctica, photo-documented while alive and tissue sampled for genetic work. We used multiple genes (COI, 16S, ITS1, H3) to explore species diversity and distribution using phylogenetics and a suite of species delimitation methods. We then reconciled morphological characters from both live and fixed animals to species units recovered in molecular-based analyses. We provide a clearer picture of what characters are useful in diagnosing and identifying species and a first step towards the revision of the family. We were surprised to find more than 17 species of *Tomopteris* off the U.S. Pacific coast alone and make recommendations for careful use of tomopterid names.

TUESDAY, 15:45

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**(156) 200 years of holopelagic annelida taxonomy: new methods - new complexities**

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Holopelagic Annelida were collected in the Atlantic during cruises of the R/V *Atlantis* (2012) and R/V Akademik Mstislav Keldysh (2021-2022). In the present study, we have focused on several problematic species that have incongruences in their descriptions from different localities or that are suspected of having cryptic diversity. The material was studied using morphological and molecular methods; 18S and 28S genes were used as molecular markers. Our attempt to obtain mitochondrial COI and 16S was unsuccessful. Perhaps, the mitochondrial DNA of holopelagic Annelida is highly modified. The use of only 18S and 28S is not convenient for phylogenetic inference in holopelagic polychaetes, but these markers can be used to solve particular problems, such as describing new species or checking the validity of species described previously. Thus, within Alciopini, the genus *Vanadis* contains several groups of species with unclear relations and confusing diagnostic characteristics. We suggest preferable characteristics for distinguishing between *V. antarctica* McIntosh, 1885 and *V. longissima* Levinsen, 1885. We support synonymizing *V. studeri* Apstein, 1893 and *V. fuscapunctata*, Treadwell, 1906, but reject uniting any of them with *V. formosa* Monro, 1930 or V. *minuta* Treadwell, 1906, that has been implemented by different authors. Individuals formally matching the description of *Krohnia lepidota* Quatrefages, 1865 clearly fall into two morphologically distinguished clades which are supported by molecular data. Amongst family Lopadorrynchidae *Pelagobia longicirrata* Greeff, 1897 specimens from the Antarctic and Arctic are genetically identical, but have distinct differences from Central Atlantic specimens, that may indicate cryptic species with bipolar distribution. *Maupasia coeca* Viguier, 1886 also has cosmopolitan distribution, and specimens from the Antarctic and Atlantic are similar both morphologically and genetically. Within the family Iospilidae we have probably found new *Phalacrophorus* species. *Phalacrophorus* cf. *pictus* from the Antarctic and Atlantic formally correspond with the original description by Greeff, 1897, but genetically form two distinct clades. Finally, for Typhloscolecidae which are extremely difficult for morphological identification, we refine the descriptions and distributions of "old" species with unclear diagnoses as much as possible.

TUESDAY, 16:00

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**(005) Unravelling the slime worm ball: An overview of *Myxicola* species from the coasts of North America**

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The Sabellidae genus, *Myxicola* Koch in Renier, 1847, currently includes 8 accepted species and 16 invalid species (WoRMS, 2023). All but two of the currently invalid species represent subjective synonyms of *Myxicola infundibulum* (Montagu, 1808), which was considered to be a "cosmopolitan species" occurring in the northeast Atlantic (British Isles & France), the Mediterranean Sea, the northwest Atlantic (Labrador Canada to the mid-Atlantic North American coast), the Arctic Ocean (Point Barrow, Alaska), the northeast Pacific (Aleutian Islands, Alaska to southern California) and in the southeast Atlantic on the west coast of Namibia, Africa. The remaining two invalid *Myxicola* species, *M. glacialis* Bush, 1905 from Unalaska Island, Alaska, and *M. dinardensis* St. Joseph, 1894, from Dinard, France, were synonymized under *Myxicola aesthetica* (Claparède, 1870), described from the Gulf of Naples in the Mediterranean Sea (WoRMS, 2023). The name *Myxicola aesthetica* has been attributed to specimens from the Mediterranean Sea, the northeastern Atlantic and from the Aleutian Islands to western Mexico in the northeastern Pacific Ocean. The current study is restricted to *Myxicola* specimens obtained from the North American coasts. Type material and original descriptions of five invalid nominal species from the west coast of North America were examined: *Myxicola monacis* Chamberlin, 1919, *M. glacialis* Bush, 1905, *M. conjuncta* Bush, 1905, *M. affinis*

Bush, 1905 and *M. pacifica* Johnson, 1901. Non-type specimens of *M. aesthetica* (Claparède, 1870), *M. infundibulum* (Montagu 1808) or *M. infundibulum* (Renier, 1847) and *M. steenstrupi* Krøyer, 1856, along with many specimens identified as "*Myxicola* sp." were also examined. Recently collected *Myxicola* specimens from the northwest Atlantic (Maine) and from the northeast Pacific (California and Washington) were compared to museum material through morphometric analyses, SEM imaging and DNA sequencing.

TUESDAY, 16:15

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**(113) Integrative Taxonomy of *Eunice* cf. *aphroditois* (Annelida: Eunicidae) from Japan: Comparative Analysis of Juvenile and Adult Forms and Phylogenetic Placement within the Family**

Chiharu Shinomiya[1], Genki Kobayashi[2], Koji Seike[3,4], Momo Yamashita[3,5], Kanto Nishikawa[6,7] &Ryutaro Goto[8]

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The genus *Eunice* Cuvier, 1817 is composed of 250 species and is one of the largest genera found in the phylum Annelida. It occupies more than half of the family Eunicidae, which consists of around 450 species. *Eunice aphroditois* (Pallas, 1788), the type species of the genus, was originally described from Sri Lanka. This species has been recorded worldwide, distributed from the Pacific Ocean to the Indian Ocean, and is now regarded as cosmopolitan. It is known as one of the largest species in the genus, growing up to approximately 3 meters in length. In Japan, *E.* cf. *aphroditois,* which is morphologically very similar to *E. aphroditois* but could be a distinct species, is found on the rocky shores of the temperate and warm Pacific coasts. Their body color was suggested to be used to distinguish between juveniles and adults of this species. Juvenile was previously identified as separate species, *E. flavopicta* Izuka,1912 and *E. ovalifera* Fauvel, 1936, but are now classified as junior synonyms of *E. aphroditois*. In this study, we re-evaluated the validity of the current taxonomy, with the observation of morphological characters including SEM and micro-CT analyses and the genetic distances of three molecular markers [cytochrome *c* oxidase subunit I (COI), 16S ribosomal RNA (rRNA), and histone H3 genes]. We also investigated the phylogenetic position of *E.* cf. *aphroditois* from Japan within the family Eunicidae using the combined dataset of three genes (COI + 16S + 18S). As a result, the adult and juvenile forms could be distinguished in several characteristics (e.g., their body size and color) but not in the other characteristics. Interestingly, one individual showed an intermediate body color between the two forms. The molecular analyses showed that the two forms shared major haplotypes and the maximum K2P genetic distance of COI was only 1.7%, indicating intraspecific variation. In the phylogenetic tree based on the combined gene dataset, *E.* cf. *aphroditois* was closely related to *Eunice roussaei* Quatrefages, 1866 and *Eunice* cf. *violaceomaculata* Ehlers, 1887, large species from the Mediterranean Sea and the Caribbean Sea, respectively.

TUESDAY, 16:30

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**(072) What is Myzostomids parenchyma?**

Glafira Kolbasova[1], Dmitry Fedorov[2], Anna Frikh-Khar[3] & Alexander Tzetlin[1]

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*[3]Center of Marine Research of Moscow State University, Moscow*

Due to their unusual morphology, the phylogenetic position of Myzostomida has been doubted for 200 years, before their larval development was studied. Currently, these colorful and bizarre marine worms are placed within Annelida, and phylogenomic analysis indicates early divergence of this taxon within errant polychaetes. Unlike other Annelida, Myzostomida has a reduced coelom, and parenchyma which fills the whole body. The morphological data on the myzostomid parenchyma's structure and origin are still surprisingly scarce. Here we analyzed the fine structure of parenchyma in *Hypomyzostoma jasoni* (Summers and Rouse, 2014) and *Myzostoma alatum* Graff, 1884. Our newly obtained TEM data show that myzostomid parenchyma is a mesodermal myoepithelium. The parenchymal cells are polarized cells, being in contact with the basal membranes of the ectodermal epithelium or the epithelium of internal organs. The parenchymal cells produce numerous spacious meandering protrusions and are connected via dense contacts. These indicates the myoepithelial origin of parenchymal cells. Our findings align with the ones on mesodermal tissues of a range of other annelids, for example in Phyllodocidae and Cossuridae. The conception implying that the mysostomids and flatworms parenchyma have the same origin is not supported by our data.

THURSDAY, 09:15

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**(131) Current knowledge of the family Capitellidae (Annelida) in Brazil: what have been done and next steps**

Camila Silva[1,2], Cecília Z. Amaral[2] & Paulo Y. G. Sumida[1]

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The family Capitellidae is composed of polychaetes characterized by a body that is systematically divided between thorax and abdomen, and they lack parapodia and prostomial and peristomial appendages. This homogeneity, compared to other families, led to a lack of prior interest in studying it, resulting in little knowledge of its biodiversity. This scenario has been changing for over a decade: in Brazil, the study of capitellid systematics has revealed great diversity in different habitats (coastal and shallow areas, deep sea and reducing environments - organic falls). In shallow areas, morphological based taxonomy revealed a new species for the genera *Leiocapitella* and *Mastobranchus*, and three new species for *Scyphoproctus*. The taxonomy and distribution of the genus *Leiochrides* was analyzed, with the description of four new species delimited by specific water masses occurring across a bathymetric gradient. In the deep sea, new species of *Peresiella* and *Polymastigos* were also described; the latter two genera together with *Mastobranchus* and *Leiochrides* were all new occurrences for Brazil. *Capitella* is a well-studied genus: along the Brazilian coast, the "*Capitella capitata*" complex was analyzed through morphological and molecular approaches that revealed four new species, none of which were *C. capitata*. In reducing organic fall environments, seven new species were described living inside whale bones or wood logs based on morphological and molecular data. This is particularly important to understand the colonization of these ephemeral substrates and their connection among ocean basins. Several species from different genera collected from shallow and deep waters are currently being analyzed (*Notomastus* - the most diverse*, Barantolla, Dasybranchus, Heteromastus, Mediomastus,* and *Rashgua*), some of them also representing new records for Brazil (*Parheteromastus, Neoheteromastus,* and *Notodasus*). As capitellids have only recently been more intensely studied, most species are new to science. Several type materials were redescribed and/or synonymized, which aided in the systematics of the family. Additionally, some new morphological characters have been

proposed to different genera, also contributing to the morphological systematics of the group. Phylogenetic analysis should be the next focus; however, unfortunately most existing specimens were formalin-fixed, limiting DNA extraction. Partnerships aiming to interchange samples is the best way to uncover the phylogeny of Capitellidae.

THURSDAY, 09:30

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**(069) Clarifying the identity of beach dwelling polychaetes of the genus *Scolelepis* (Annelida: Spionidae) from the Atlantic coast of North America, previously confused with the European species *Scolelepis squamata* (O.F. Müller, 1806)**

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Polychaete worms of the genus *Scolelepis* are one of the most abundant members of beach ecosystems worldwide, providing a critical food source for fish, wading birds, as well as infaunal predators. Along the Atlantic coast of North America, specimens of *Scolelepis* inhabiting high-energy beaches and have long been erroneously identified as the European species *Scolelepis squamata* (O.F. Müller 1806). In this study, we examined specimens of *Scolelepis* collected from coastlines of Massachusetts, Rhode Island, New York, and Virginia using light and scanning electron microscopy. These specimens overlapped in key morphological features that match *Scolelepis agilis* (Verrill 1873), originally described from beaches in New Jersey. *Scolelepis agilis* can be most easily distinguished from *S. squamata* based on differences in palp ciliary pattern, morphology of neuropodial lamella, and the quantity and start of both notopodial and neuropodial hooded hooks. Live specimens of *S. agilis* collected from Lido Beach, New York were examined to provide data on the reproduction of the species (e.g., egg and sperm morphology, percentage of ovigerous individuals present, and average number of ovigerous segments and season collected). In addition, molecular analyses based on nuclear (18S and 28S rRNA) and mitochondrial (cytochrome c oxidase I and 16S rRNA) genes showed that specimens of *S. agilis* from the north to mid-Atlantic coast formed a monophyletic group (*p*-distance ≤ 4.1% for MA, RI, NY and VA populations) and were distinct from *S. squamata* (*p*-distance ≥ 78.3%). Is this 21,7% divergent – 78% distant seems wrong?The molecular data also suggests the presence of several undescribed species of *Scolelepis* from the west coast of Canada, Alaska, and the Gulf of Mexico, highlighting the need for additional taxonomic work on the genus from these localities as well as others (e.g., South Africa) where the worms have been lumped in the bin of "*S. squamata*."

THURSDAY, 09:45

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## THEME: SYSTEMATICS AND PHYLOGENETICS

**(035) Revisiting the evolution of annelid larval forms**

Greg. W. Rouse

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The term trochophore has commonly been used for larvae with opposed-band feeding and a particular set of ciliary bands. However, most annelid lineages lack such a larval form, leading to a redefinition of the trochophore as any larva with a prototroch. This broader definition covers a wide variety of larvae across Annelida, Mollusca, and Nemertea and is now generally accepted. However, the evolution of larval forms in Annelida, particularly in reference to feeding (planktotrophy) and non-feeding (lecithotrophy) has not been assessed in many years. My analysis of this topic more than 20 years ago concluded that lecithotrophy is the plesiomorphic condition for annelids and that feeding larval forms have evolved multiple times. The phylogenetic hypothesis on which that conclusion was based has been questioned with the advent of

phylogenomics. Here I reassess the evolution of annelid larval forms in the context of our current understanding of the phylogeny of the clade.

THURSDAY, 10:00

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**(103) Species diversity of the pelagic polychaete family Tomopteridae in the eastern Indian and Pacific**

Kanako Amei[1], Junya Hirai[1] & Yuichiro Nishibe[1]

[1]*The Atmosphere and Ocean Research Institution, The University of Tokyo - amei@aori.u-tokyo.ac.jp*

Pelagic polychaetes are considered to have evolved polyphyletically from several benthic clades by adapting to pelagic environments and diversified in the open ocean. Tomopteridae is the common pelagic polychaete family with ubiquitous distributions in the global ocean. Tomopterid species have fragile gelatinous bodies and often lose their important morphological traits for species identification during net-sampling or fixation, so species diversity of this family has been poorly understood due to taxonomic confusions. Toward understandings the global diversity of pelagic polychaetes, we investigated the species diversity of Tomopteridae in the eastern Indian and Pacific Oceans using molecular methods. Zooplankton samples were collected by ORI net (mesh size: 335µm) from 15 stations covering the eastern Indian and Pacific Oceans and fixed with 99% ethanol. A total of 230 tomopterid polychaetes were obtained. Genomic DNA was extracted from the parapodium or whole body of each specimen, and both COI and 28S sequences were obtained. COI OTUs were defined based on 98% sequence similarity. We also obtained genome-wide SNPs data using MIG-seq to detect species boundaries between OTUs. The phylogenetic analysis based on COI revealed 25 OTUs of Tomopteridae, which were about three times higher than that reported in the western North Pacific. None of the OTUs were identified into species based on morphological traits. Although there were no differences of 28S between closely related OTUs, SNPs data supported that each OTU based on COI is distinct species with reproductive isolation. The most abundant OTU, *Tomopteris sp.*_coi1 (n=139), was detected at all stations, leading to a wide distribution through the eastern Indian and Pacific Oceans. The second dominant OTU, *Tomopteris sp.*_coi15 (n=58), also showed wide distribution except for the oligotrophic subtropical Pacific Ocean. The detailed analysis of SNPs data revealed subdivided populations or lineages within these OTUs of *Tomopteris sp.*_coi1 and *Tomopteris sp.*_coi15. Other OTUs showed confined distributions to specific regions such as the subtropical region, a region off Japan and a region off California. These results suggest that diversifications of Tomopteridae have occurred by specialization towards each pelagic region due to different marine environments.

THURSDAY, 10:15

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**(074) Dating the annelid tree of life**

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The phylogenetic relationships among Annelida were debated for centuries, but recently the backbone phylogeny has largely been resolved. This enables us to address many aspects of evolution within Annelida. One such aspect is the time of origin of Annelida and the time of the major evolutionary events within the group. Selected clades within Annelida have been dated so far, but up until now, molecular dating of all major annelid clades has not been done. As the fossil record of annelids is sparse, molecular dating is the most appropriate approach to date the annelid tree of life. Hence, it is the aim of this study to date the divergences between all annelid families for which genomic or transcriptomic scale datasets were available. Using modern molecular dating techniques such as RelTime and Bayesian dating and multiple fossil calibrations, we dated the annelid tree based on two hypotheses of annelid relationships. Besides using different backbone trees, we explored the effects of other changes to the analyses. We excluded genes, which are more strongly

affected by misleading biases such as branch length and compositional heterogeneity and missingness. As the analyses were conducted at the family level, we used either a single individual representative for each family or a composite representative from all available species of the family to minimize missing data. Finally, we also evaluated the effect of excluding different calibration points. We concentrated especially on the origin and deep splitting events in the annelid tree. Hierarchical clustering analyses of 12 selected nodes across the annelid tree revealed that besides the very strict min/max dating approach the most influential factor on the dating of the tree was the selection of the calibration points. Using different sets of calibration points could result in differences in the estimated ages as large as 100 million years for deeper nodes. All other factors such as backbone phylogeny, family representation, or gene selection had minimal effects on the dating. Given all results, we conclude that annelids originated about 528 million years ago, in the early/mid Cambrian. However, removing root constraints pushed that age back to about 570 million years ago.

THURSDAY, 11:00

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**(107) An update on the phylogeny of scale worms (Aphroditiformia, Polychaeta)**

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Scale worms (Aphroditiformia) are a big group of polychaetes with representatives found in intertidal to deep-sea ecosystems. Aphroditiformia comprise six families with more than 1000 recognized species. There have been several phylogenetic studies of Aphroditiformia, which revealed some families to be paraphyletic or polyphyletic, especially Polynoidae and Sigalionidae. Therefore, we collected six species of Polynoidae and four species of Sigalionidae, one species of Aphroditidae, and one species of Acoetidae, obtained their mitochondrial genomes by high-throughput sequencing and constructed phylogenetic trees. Our work will provide useful molecular resources for Aphroditiformia and help clarify some of their evolutionary relationships.

THURSDAY, 11:15

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**(118) The *Syllis prolifera* species complex: a morphological and molecular approach**

Irene del Olmo[1], Josep Roma[2], Maria del Rosario Martín-Hervas[2], Lucas Cervera[2] & Patricia Álvarez-Campos[1]

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Polychaetes annelids constitute a dominant group within the marine benthic macrofauna, occurring in nearly all marine habitats from intertidal zones to deep sea, in both cold and tropical seas. Within them, the family Syllidae Grube, 1850 is one of the largest and most diversified families of polychaetes with a difficult taxonomy. Current taxonomic identifications often rely on differentiation of morphologically ambiguous characters and frequently lead to misidentifications due to the presence of cryptic taxa. Besides, molecular research has confirmed worldwide distribution patterns among annelids are scarce, and thus, ecological and molecular divergence without clear morphological differences, leads to cryptic or pseudo-cryptic speciation patterns, making it difficult to properly delimit species. This is the case of the putative cosmopolitan polychaete *Syllis prolifera* Krohn, 1852 (Syllidae, Annelida), which inhabits a large range of different substrates from both temperate and tropical coastal waters. Here, using integrative taxonomy, we have investigated the morphological, ecological, and molecular features of individuals sampled at six locations across the western Mediterranean Sea and the Strait of Gibraltar and one form Australia. Our multilocus molecular analysis including two mitochondrial DNA markers (COI and 16S rRNA) agree on the polyphyly of

*S. prolifera*, and showing genetic differentiation between the *S. prolifera* populations analyzed. The *S. prolifera* complex is distributed in two different well supported clades (PP > 0.95), and nested with other *Syllis* species. Moreover, species delimitation analysis identified at least five distinct lineages, some of them with distinct ecological features and subtle morphological differences in the alternating length pattern of the dorsal cirri of the first five anterior segments. Overall, our study does not support the cosmopolitanism, and not even the monophyly of S*. prolifera*, providing evidence of a new case of pseudo-cryptic speciation event within the family Syllinae.

THURSDAY, 11:30

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**(119) Integrative taxonomy to study syllid annelids of Bermuda with reorganization of the genus *Megasyllis***

Paula Moreno-Martín[1], Aida Verdes[2], & Patricia Álvarez-Campos[1]

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Syllinae is the most diverse and abundant subfamily within syllid annelids, but also the most problematic one in terms of its taxonomy and systematics. Several genera have been shown to be non-monophyletic in the most recent molecular studies and numerous morphological features traditionally used to identify species are homoplastic or ill-interpreted. In this study, we have carried out an exhaustive analysis of syllid species collected in Bermuda, combining both morphological and molecular data. Using optical and electron microscopy, together with the analysis of four molecular markers (*cytochrome c oxidase subunit I*, *18S rRNA*, *16S rRNA* and *28S rRNA*), we have identified and established the phylogenetic position of 8 species (6 new) belonging to some of the most problematic genera within Syllinae including *Haplosyllis*, *Opisthosyllis*, *Syllis* and *Megasyllis*, showing once again their non-monophyly. In addition, we provide a re-description and molecular data for *Haplosyllis cephalata* in its type locality,. We place special emphasis on *Megasyllis*, since it is one of the most problematic genera within syllid annelid - the morphological characters traditionally used to recognise them, such as body shape, coloration, or type of chaetae, are homoplastic in the most recent molecular analyses. In the present study, we have compiled the largest molecular and morphological data set to date, including almost all currently known species, together with its closely related genera *Alcyonosyllis* and *Paraopisthosyllis*. In addition, we are including specimens of *Megasyllis procera* from Bermuda, which represent the first report of *Megasyllis* for the Atlantic Ocean, effectively extending the distribution of this genus that was previously restricted to the Indo-Pacific. We have performed a detailed morphological study of *Megasyllis* species and phylogenetic analyses using Maximum Likelihood and Bayesian Inference for 58 species of Syllinae, showing once again the paraphyly of the genus. Our results demonstrate the doubtful consideration of *Megasyllis* as a valid genus and we propose a taxonomical solution to resolve this issue.

THURSDAY, 11:45

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**(085) Phylogeny of Orbiniidae (Annelida) based on genome skimming**

Miguel A. Meca[1], Anna Zhadan[2], Torsten Struck[3], Ricardo Castro-Álvarez[4], Joachim Langeneck[5], Christoph Bleidorn[6], Daniel Martin[7], João Gil[8], Leslie Harris[9], Brent Haggin[10] & Nataliya Budaeva[1]

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Orbiniidae is a diverse group of annelids, comprising more than 200 described species grouped into 20 genera. Orbiniids are common and abundant in shelf habitats, representing nutritional resources for many types of sealife (including commercial seafood), and are subjects of ecological monitoring investigations, including as indicators of marine pollution. Despite their common appearance in benthic studies, orbiniids are one of the annelid families with an unresolved phylogeny and unclear diagnoses of most genera. Significant incongruence remains between traditional taxonomy and molecular studies in Orbiniidae, with the genera *Scoloplos*, *Leitoscoloplos*, *Leodamas*, *Orbinia*, *Naineris* and *Phylo* recovered as paraphyletic in several molecular studies, but still considered as valid in current monographs. Here, we present our attempt to revise the phylogenetic system of Orbiniidae using genome skimming data generated by the Illumina sequencing technology. We successfully obtained whole-genome reads for 96 orbiniid specimens from 10 different genera and 55 species. The chosen target genes included 13 mitochondrial protein coding, 2 mitochondrial ribosomal, and 4 nuclear ribosomal markers. Maximum Likelihood and Bayesian analyses of the supermatrix resulted in a robust orbiniid phylogeny showing six major clades. Clade 1 combined the representatives of *Scoloplos* and *Leitoscoloplos*. Clade 2 consisted of specimens belonging to *Orbinia* and *Phylo*, together with *Methanoaricia dendrobranchiata*. Clade 3 included all the *Leodamas* species. Clade 4, with a single species of *Orbiniella* represented by two specimens, was of uncertain placement due to a possible long branch attraction artifact. Finally, *Naineris* was shown to be polyphyletic, with *N. quadricuspida* (type species of the genus) as clade 5 being recovered separately from the rest of the species, which together with *Protoaricia* formed clade 6. We discuss the topologies of the obtained trees and propose changes for the current phylogenetic system of Orbiniidae.

THURSDAY, 12:00

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**(066) Orbiniidae (Annelida, Sedentaria) - does morphology match molecular data?**

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Orbiniidae are very common inhabitants of soft sediments all over the world. They include more than 200 species and 20 genera. Their external morphology is quite simple and poor of characters useful for systematics. Progenesis and character loss played important roles in orbiniid evolution. The preliminary reconstruction of Orbiniidae phylogeny using a genome skimming approach and 55 species from three subfamilies (Orbiniinae, Methanoariciinae, Microrbiniinae) revealed six clades: *Scoloplos/Leitoscoloplos, Orbinia/Phylo/Methanoaricia, Naineris/Protoaricia, Naineris quadricuspida, Leodamas,* and *Orbiniella*. We examined the representatives of these clades using light and scanning electron microscopy in an attempt to characterize the morphology of monophyletic groups within Orbiniidae and to provide a baseline for the future generic revision of the family. Characters, potentially useful as synapomorphies for each clade are discussed.

THURSDAY, 12:15

**(132) Capturing cryptic diversity of Andaman coral reefs with Autonomous Reef Monitoring Structures (ARMS): First initiative in Indian waters**

Tejal Vijapure[1], Harshal Patil[1], Divyashri Varadharajan[1], Titus Immanuel[1], Goutham Bharti[3], Akshta Joshi[1], Mudra Deshpande[1], Naveen Namboothri[2], Archana Anand[4], David Baker[4] & Kartik Shanker[1]

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Coral reefs worldwide are experiencing severe impacts from climate change resulting in the loss of biodiversity. Tropical reef ecosystems need to be monitored as they harbor extraordinary biodiversity. Despite being one of the globally significant reef systems in the Indian Ocean, there is poor knowledge of coral-associated biodiversity in the Andaman and Nicobar Islands of India. Our research aims to address this gap by employing Autonomous Reef Monitoring Structures (ARMS), a standardized methodology to understand the cryptic diversity of coral reef ecosystems in the Andaman Islands. The present study is the first deployment of the global ARMS protocol in Indian waters. Altogether, twelve ARMS units were deployed for a duration of around 24 months in two distinct reef habitats of Wandoor and Swarajdweep, situated along the west and east coast of Andaman Islands respectively. Preliminary findings of the ARMS analysis, focusing on cryptofaunal polychaetes, are outlined here. Phylum Annelida formed a major component of the ARMS community, dominated by polychaetes in both motile and sessile fractions. Photographic analysis of the sessile community revealed that the top surfaces of ARMS plates provided a suitable micro-habitat for the polychaete tubes with negligible colonization on the bottom at both study sites. The motile cryptofaunal polychaetes belonged to eight families of the Order Errantia and two families of the Order Sedentaria. Errant families like Eunicidae and Syllidae were species rich with wide distribution while Phyllodocidae and Nereididae were only found at Wandoor. Members of the sedentary family Terebellidae were distributed at both study locations while the rest were singletons with restricted occurrences. A key component of this project is to extend the findings with genetic information of polychaetes along with other taxonomic groups encountered using the COI marker. The research aims to create comprehensive baseline data for the cryptic fraction of the Andaman reef diversity that can be used in comparative censuses at the global scale.

THURSDAY, 13:30

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**(127) Evaluation of the presence of mitochondrial sequences in Annelida nuclear genomes**

Rodolfo Leandro Nascimento[1], Victor Corrêa Seixas[2] & Joana Zanol[3]

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Nuclear mitochondrial translocations (NUMTs) are insertions of mitochondrial DNA (mtDNA) into the nuclear genome (nuDNA), which result in similar nucleotide sequences evolving independently from each other. Thus, whenever mtDNA loci and its NUMTs are interchangeably sequenced and not differentiated before analyses, NUMTs can disrupt the understanding of species evolution and of estimates of diversity based on molecular methods such as DNA metabarcoding. Here, we investigate the presence of NUMTs in the nuclear genome of 18 Annelida species, 17 Sedentaria and one Oweniida. Genomes retrieved from NCBI were searched for NUMTs candidates with BLAST tools using sequences of mitochondrial protein-coding genes as

queries. In verification of NUMTs candidates, we only considered those in scaffolds longer than expected for mitochondrial genome, checked for changes in the reading frame, presence of stop-codons, and ratio of non-synonymous and synonymous substitutions (dN/dS) . We also assessed amplification probabilities for COI NUMTs through *in silico* PCR using common primers used for Annelida. NUMTs were found in 15 Sedentaria species, such as *Enchytraeus crypticus* (48), *Capitella teleta* (9), *Dimorphilus gyrociliatus* (4), *Parescarpia echinospica* (1), *Streblospio benedicti* (1). No NUMTs were found in *Hydroides elegans* and *Owenia fusiformis*. NUMTs were found for all 13 mitochondrial coding genes, most from CYTB, COI, and NAD5, conversely, least from ATP8 and ND4L, one and four, respectively. Stop-codons were found in many NUMTs and most of them have high dN/dS ratios, such as 0.737 in contrast with 0.001 of mtDNA gene of *D. gyrociliatus.* NUMTs amplification probability for COI gene range from 80% (*Hirudo medicinales*) to 96% (*Aporrectodea caliginosa*), both with feasible annealing temperature. Small fragments of rRNA and tRNA genes were also found in the nuDNA. Phylogenetic analyses using COI retrieved NUMTs positioned together with each respective species, however with different evolutionary history. The presence of NUMTs in Annelida nuDNA has the potential to cause undesirable intrusions in studies using mtDNA markers. Further analyses are being undertaken to better understand these consequences.

THURSDAY, 13:45

## THEME: INVASIVE SPECIES

### (017) Colonization patterns of the invasive species *Ficopomatus enigmaticus* (Fauvel, 1923) in a shallow coastal lagoon in Greece

Sarah Faulwetter[1], Athanasia-Violeta Ntzoumani[1], Alexis Ramfos[1] Konstantinos Nikolakopoulos[1] & Pavlos Avramidis[1]

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The serpulid *Ficopomatus enigmaticus* (Fauvel, 1923) is an invasive species in many regions of the subtropical and temperate zone globally. It colonizes brackish waters where it constructs massive reefs that are frequently associated with impacts on water circulation, sedimentation rates and nutrient fluxes in these ecosystems. Through its biofouling activities on ships, in marinas, on pipelines and other manmade structures, the species' presence often has detrimental impacts on economic activities. In the coastal lagoon of Prokopos in Western Greece, the species first appeared ca. 30 years ago. Since then, it has massively spread within the lagoon, disrupting fishing activities and water circulation. As part of supporting the design of management measures in the lagoon, we conducted an experimental study to quantify the extent of the colonization as well as settlement patterns and growth rates in relation to environmental parameters in the lagoon. Through satellite images and photogrammetric imaging via drone, the reef coverage was calculated as ca. 25% of the lagoon surface. Three different experiments over the course of one year were conducted to determine spatiotemporal settlement patterns and growth rates in monthly intervals, accompanied by measurements of physicochemical parameters and nutrient concentrations in the water column. Larval settlement was clearly determined by lower thresholds of salinity and temperature, occurring from May to October when temperatures ranged between 15°C – 29°C and salinity between 5 – 42, disrupted only by hypoxic and anoxic conditions. Nutrient and chlorophyll-α concentrations were unrelated to growth rates which were likewise higher during the warm months. The maximum observed density was 560.000 ind./m², while dry biomass reached 18.9 kg/m² within 11 months, with different settlement and growth patterns in different lagoon parts, again depending on environmental parameters. The data obtained during the study provide important insights into the colonization dynamics of the species in the lagoon and its impact on water circulation, which in turn is required to consider future management interventions aiming at improving water renewal, nutrient level reduction, prevention of dystrophic crises and improvement of the ecological status of the lagoon.

THURSDAY, 14:15

**(039) Polychaete diversity in New England marinas after two decades of rapid biodiversity assessment surveys: challenges and future plans**

Andrew A. Davinack[1], James T. Carlton[2] & Judith Pederson[3]

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The New England region of the United States has had a rich history of polychaetology with seminal monographs completed on most polychaete groups since the 1950s. More importantly, almost all regional descriptions are linked to vouchers that are available in both national and local natural history museums. However, many of these monographs have not been revised in more than half a century. This was sufficient time for the 'molecular revolution' to not only completely reorganize the taxonomy of several polychaete families but also call into question the native ranges of many supposedly cosmopolitan species. Together, these issues have severely hindered biodiversity assessment surveys in the region with the native status of several species now being questioned. In this study, we compiled 20 years of biodiversity data for polychaetes collected from rapid assessment surveys along the New England coast. These surveys were primarily concerned with examining the presence of native and non-native species, and as a consequence, they were all conducted at marinas and port systems which are known gateways for the introduction of alien marine fauna. In total, more than 72 polychaete species were listed after examination of 73 sites since 2000. An assessment of the taxonomic status of each polychaete in addition to their native, alien and cryptogenic status will be presented based on the most recent morphological and molecular analyses. Furthermore, we will present trends in the number of alien polychaetes that have been recovered from New England marinas since the surveys began. Finally, a framework for advancing polychaete taxonomy in the eastern United States will be presented in light of these findings.

THURSDAY, 14:30

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**(033) "Cosmopolitan" species as gateways for cryptic invasions: integrative taxonomy to the rescue**

Elena Kupriyanova[1] & Guillemine Daffe[2]

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Biological invasions which pose one of the greatest threats to the world's oceans in the Anthropocene are unwanted by-products of anthropogenic triple T: trade, transport, and tourism. Our potential ability to prevent invasions critically depends on our ability to recognise species and to distinguish apart native, non-native, and undescribed ones. Effective management of potential bioinvasions is possible only when introduced species are correctly and promptly identified. However, the problem of alien recognition stems from the taxonomic impediment, shortage of active taxonomists and as a result, lack of reliable taxonomic information. Much of earlier taxonomic work led to the misconception that many marine organisms, especially polychaetes, have natural cosmopolitan distributions resulting in thousands of species world-wide bearing European names. Modern taxonomic studies consistently show that reportedly cosmopolitan shallow-water species are in fact complexes of species with restricted regional distributions, extremely successful invaders, or a combination of both. Unrecognised species with high invasive potential are particularly difficult to track because they are often assumed to be native species and provide potential gateways for cryptic invasions. Using polychaete case studies, we demonstrate the role integrative taxonomy plays in prevention of problematic cryptic bioinvasions.

THURSDAY, 14:45

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**(018) The European Research Infrastructure LifeWatch ERIC and its potential for supporting the Polychaete Community**

Christos Arvanitidis[1], Juan Miguel González-Aranda[2], Alberto Basset[3], Peter Van Tienderen[4] & Lucas de Moncuit[1]

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LifeWatch provides e-Science research facilities and services to scientists investigating biodiversity and ecosystems. It is a distributed research infrastructure consortium composed of eight EU Member States (Belgium, Bulgaria, Greece, Italy, Netherlands, Portugal, Slovenia and Spain). After a preparatory phase (2006 – 2010) and a transition phase (2010 – 2017), LifeWatch was established as a European Research Infrastructure Consortium (ERIC). During the period 2017-2022, LifeWatch ERIC has created a prototype of its infrastructure in terms of human capital, organization, services and virtual research environments, integration and community engagement. The essential elements of the prototype are: Catalogue of Resources (Metadata Catalogue); Repository of Semantic Resources (e.g. Controlled Vocabularies, Thesauri, and Ontologies: EcoPortal); FAIR compliant datasets (1,502 in total); Web services (113); Thematic services (11); Virtual Research Environments (VREs; 12); Workflows (5); Training resources (25); Research sites (10); LifeBlock (first Research Infrastructure applied BlockChain technology); Tesseract and its VRE building platform (including Jupyter Notebook) (horizontal composability layer); Network of communities engaged; and access to next-gen e-Infrastructures (e.g. EOSC Future). The next period, 2022 – 2026, will witness LifeWatch ERIC becoming a fully operational Research Infrastructure, bringing it to a stage of continuous acceleration by industrializing its prototype in order to consolidate the resources developed by its partnering Member States. It will undergo continuous upgrading and (co-)construction, responding to the needs of its target communities and stakeholders. The independent data, software components, publications and other types of research products will be assembled into systems. The research communities will benefit from the use of its resources, ranging from single data-sets and web services to multiple executable on the fly workflows and virtual research environments, as well from personal and collaborative working space. They will have the Infrastructure needed to demonstrate their research as transparent, reproducible and without limitations for storage and computing resources. LifeWatch ERIC is presenting its Infrastructure which now opens to the needs of the International Polychaete Community and seeks potential models for this Community to benefit from its engagement with the research resources made available.

THURSDAY, 15:00

## THEME: EDUCATION

**(151) Inspiring Young Polychaetologists in the Molecular Age**

Paul Rawson[1] & Sara Lindsay[1]

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The advent of molecular tools has provided for dramatic advances in a broad diversity of fields including phylogenetic studies, functional analyses of gene action, and analysis of genetic variation underlying phenotypes. All too often, however, there is a rush to apply molecular techniques to problems that require a more nuanced approach that combines careful study of morphological and ecological features of a given system. In undergraduate education, there can often be limited opportunities to provide significant training in more traditional approaches typically resulting in an overemphasis in the application of molecular tools. We will present three case studies of undergraduate projects that undertook a more holistic approach that included ecological, morphological and molecular approaches to study the taxonomy, life history, and

ecological interactions of shell-boring, spionid polychaetes. As an outcome of their involvement in these projects, students gained training in molecular phylogenetics and taxonomy but also learned significant skills in microscopy, field sampling and ecological analyses. More importantly, they learned about formulating strong hypotheses and then choosing appropriate tools to address those hypotheses. Although spionid polychaetes are generally not considered "model organisms" we believe that they provide an excellent opportunity to engage students in learning key competencies and skills that are essential to conducting research, and that contribute to solving local problems.

FRIDAY, 09:30

## THEME: DEVELOPMENTAL MORPHOLOGY

### (138) Single cell sequencing for evolutionary and developmental biology in annelids

Patricia Álvarez-Campos

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Single-cell technologies are revolutionizing biology, since they allow us to follow biological processes with an unprecedented level of detail. Studies on cell identity and differentiation are nowadays carried out by using single-cell RNA sequencing (scRNAseq), a powerful technology to simultaneously profile the transcriptome of thousands of individual cells. Cells are the building units of all organisms and their individualized study reveals details about their states, types and maturation processes. The analysis of thousands of single cells has enormous applications, ranging from basic questions of developmental biology and evolution to biomedical research. scRNA-seq analysis has already revealed the cell type atlas of several model organisms, opening questions about the molecular evolution of these cell types. We have recently optimized a new pipeline for scRNA-seq in different annelid species, combining ACME (ACetic-MEthanol), our novel method for tissue dissociation and fixation, with the combinatorial cell labelling protocol SPLiT-seq. ACME is a dissociation approach for single-cell transcriptomics that simultaneously fixes cells, obtaining high RNA integrity. It also contains multiple steps for cryopreservation that facilitate the workflow avoiding the typical problems found with traditional scRNA-seq tools and alive cells. This method uses affordable reagents, can be done even in the field, and thus will enable the investigation of cell type diversity and dynamics in multiple across annelid species. Our data reveals the cell type diversity of adult annelids for the first time and serves as a resource for studying different developmental trajectories and the evolution of Annelida cell types.

FRIDAY, 09:45

### (013) Desmosomal connectomics and muscular system innervation in the *Platynereis* larva

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Marine larvae have many complex behaviours that enable them to survive in their environment, e.g., swimming, crawling, startle response and avoidance. In order to better understand these behaviours, we describe the muscular and nervous systems of the larva of the marine annelid *Platynereis dumerilii*, on a cellular level. We use volume electron microscopy, which enables us to see ultrastructural detail, to identify synapses and reconstruct cells in 3D. We reconstructed all muscle cells and mapped their attachments to supportive tissues like epithelial cells, bristle cells and acicula (endoskeletal elements in annelid limbs) to identify which muscles move which body parts. We identified neural cells and mapped synapses to create a whole-body connectome. We identified several types of motor neurons which innervate different muscle

groups, thus implicating them in different types of behaviours – e.g., we identified a group of motor neurons which innervate limb muscles and are likely involved in the startle response. Conversely, a group of motor neurons innervating only the longitudinal muscles is implicated in turning during swimming.

Furthermore, we identified synaptic inputs for these motoneurons and analyzed signal flow from sensory neurons to effector cells. These analyses, paired with experimental data can help us gain holistic understanding of circuits involved in locomotion, from sensors to effectors.

FRIDAY, 10:00

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**(112) When something goes wrong: comparative analysis of regeneration processes in annelids**

Viktor V. Starunov[1], Elena L. Novikova [1,2], Zinaida I. Starunova[1] & Ksenia V. Shunkina[1]

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Having a rather complex body organization, annelids possess outstanding regenerative abilities, which can strikingly differ even within the same genus. Thus, one of the main question is the reason of these differences? To find the answer we studied regenerative processes in two species: *Platynereis dumerilii* (Nereididae) which is capable to restore only the posterior end, and *Pygospio elegans* (Spionidae) that perfectly regenerates both the anterior and posterior parts.

First, we performed a histological analysis of regeneration in both species. The results showed a significant similarity in the general course of the initial regeneration processes. However, the specific details, such as the relative time of formation of individual organs, the redevelopment of the circulatory system, the number and shape of cells in the body cavity, differ.

To study the positional information gradients along the anterior-posterior axis, we performed RNA-seq analysis of body fragments. Animals were divided into 12 fragments in such a way that the boundaries of the fragments coincided with the boundaries of the body regions. Our results revealed a number of protein-coding sequences with a significant expression at least in one body fragment.

Conservative transcription factors, such as Hox and ParaHox genes, as well as the Wnt and Hedgehog pathways, play an important role in body patterning and segmentation. We studied the expression of these genes in intact and regenerating worms and found that in *P. elegans* Pele-wnt, Pele-caudal, and Pele-Post2 genes mark primarily the posterior domains of the body. During the regeneration of *P. elegans*, the genes showed early activation in the posterior part of the body, while in the anterior part, they were expressed only at later stages or were not expressed at all. *P. dumerilii* on the contrary, shows the expression of some posterior markers at the anterior regeneration site. We suggest that disruption of positional patterning along the anterior-posterior body axis of *P. dumerilii* during regeneration may affect its ability to regenerate the anterior part of the body.

The work was completed using equipment of the Core Facilities Centre “Taxon” (Zoological Institute RAS) and supported by the Russian Science Foundation grant no. 21-14-00304.

FRIDAY, 10:15

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**(070) What (a) nerve! A “sensormotor” neuron in the copulatory organ of *dimorphilus gyrociliatus* dwarf males (dinophilidae) likely orchestrates glands, muscles and multiciliated cells during copulation**

Alexandra Kerbl[1], Réza Shahidi[2], Sanja Jasek[1,3], Katrine Worsaae[4] & Gáspár Jékely[1,3]

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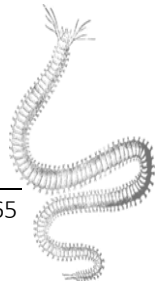

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*Dimorphilus* is a peculiar annelid genus: miniaturized, lacking external signs of segmentation, fast and direct developing, strongly dimorphic, the list goes on and on. After exploring especially the female nervous system in great detail, we focused our efforts now on the dwarf males: those are approx. 50µm long and consist of approx. 360 somatic cells, among them 68 neurons. Due to their small size they are ideal test-subjects to use in the modified array tomography setup developed at the University of Exeter, which allow the relatively rapid acquisition of section series at ultrastructural resolution. Since we have previously found most immunoreactivity in the nerves associated with the glandomuscular copulatory organ of the dwarf male, we focused our tracing efforts onto this part of the body. This circumpenial fibre mass is formed by neurites of posterior sensory neurons, interneurons of the penis ganglia and to a smaller extend (so far) untraced elements of the anterior part of the nervous system. One dorsoposterior pair of (chemo-) sensory neurons is standing apart from the rest: it is the only neuron pair immunoreactive against MIP, a neuropeptide reportedly involved in larval settlement, feeding and causing muscular contractions in larval and juvenile *Platynereis dumerilii*. The sensory neurons furthermore exhibit synaptic connections to adhesive and stylet glands, penis sheath muscles and potentially also multiciliated cells of the posterior ciliary field. These neurons play likely a crucial role in orchestrating attachment to females by regulating glandomuscular activity to dissolve and rupture the female epidermis and cause pumping movements of the penis cone within the sheath. Given their connection to other neurons in the posterior region of the nervous system, these cells possibly trigger copulation in *D. gyrociliatus* dwarf males or play a crucial role within this specific circuit.

FRIDAY, 11:00

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**(135) Insights into molecular pathways underlying development and paedomorphism in the bone eating worm *Osedax japonicus* (Siboglinidae, Annelida)**

Alice Rouan[1], Katrine Worsaae[1], Ekin Tilic[1,2] & Norio Myiamoto[3]

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*Osedax* (Siboglinidae, Annelida), discovered 19 years ago in whale falls, is an interesting model for studying the evolution and development of sexual dimorphism and paedomorphosis. *Osedax* is characterized by gutless, macroscopic, sedentary females that feed on bones through a specialized root structure containing heterotrophic bacteria. Except for *Osedax priapus*, having macroscopic males resembling the female body plan, all other species of *Osedax* have nonfeeding, microscopic, dwarf males living in "harems" on the female trunk. The sex is proposedly environmentally determined, and the larva may develop into macroscopic females or paedomorphic males, largely retaining their larval body plan due to arrest in somatic development during metamorphosis. Although their development is being described, the molecular processes underlying *Osedax* males paedomorphism remain unclear. Here we investigate the gene expression patterns of the bone-eating worm *Osedax japonicus*. Taking advantage of an improved protocol of single individual transcriptome sequencing, we dissected the gene expression patterns during larval development (0-day post fertilization, 1 dpf, 2 dpf, 3 dpf, 4 dpf, 5, dpf and 6 dpf) and post metamorphosis (1 day, 1 week and 3 weeks post-metamorphosis) in males and females. We found differentially expressed conserved genes involved in organogenesis and axis patterning during development. We also compared paedomorphic dwarf males of *O. japonicus* to juveniles and adult females and unraveled gender specific expression patterns. Combining those genetic comparisons with *in situ* hybridization and HCR, we now aim to get a better understanding of the specific genes influencing the dimorphic development of *Osedax*, furthering our insights on paedomorphism and miniaturization.

FRIDAY, 11:15

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**(063) Axial differences in regeneration ability and identification of a putative stem cell niche in the annelid *Capitella teleta***

Elaine C. Seaver

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Annelids display a wide range of regeneration abilities, reproductive strategies and postembryonic development. *Capitella teleta* is an annelid that exhibits posterior regeneration, regenerates both somatic and reproductive tissues, and experiences environmentally induced sex change. Furthermore, *Capitella* has several favorable characteristics for *in vivo* studies of regeneration and stem cell biology, including availability of functional genomic tools, a stereotypic cleavage program and associated fate map, along with a sequenced genome. In this study, we examined the boundaries of posterior regeneration success in *C. teleta* at different stages of the life cycle and identified a putative stem cell niche. Transverse amputations were performed at various axial positions in adult animals and scored for reformation of somatic and gonad-containing segments. From these manipulations, we were able to localize the region that defines the difference between regeneration success and failure to a single segment. This region corresponds to the thoracic – abdominal boundary. Furthermore, the boundary between regeneration permissive and regeneration restrictive appears to shift during the life cycle since 2-week-old juveniles successfully regenerate segments following amputation at the thoracicabdominal boundary (regeneration restrictive in adults). Somatic tissue regeneration and regeneration of reproductive tissues require birth and patterning of new cells from resident adult stem cells, which reside either in specific locations within the body or can be more broadly distributed. We identified a cluster of undifferentiated cells suspended by mesenteries in the ventral coelomic cavity of thoracic segments 4 - 6 in *C. teleta*. Cells in this cluster express genes of the multipotency cell program such as *vasa*, *nanos*, *piwi*, *PL10* and *PCNA*.

Characterization of cell division profiles and expression patterns by in situ hybridization reveals heterogeneity among cells within this cell cluster. We characterized the maturation of this cluster during the life cycle and identified its progenitors in early-stage larvae. We suggest that this cluster is a stem cell niche and hypothesize that cells within the cluster can generate both somatic and germline descendants.

FRIDAY, 11:30

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**(106) Everlasting tail: organisation and regeneration of *pygospio elegans* (spionidae) nervous system**

Zinaida I. Starunova[1], Ksenia V. Shunkina[1], Elena L. Novikova[1,2] & Viktor V. Starunov[1]

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[2]*Saint-Petersburg State Universuty, Saint-Petersburg, Russia*

Annelids are almost ideal models to study regeneration mechanisms due to their diverse regenerative abilities even within the same family or genus. One of the key players in regulation of the regeneration process is the nervous system. Small spionid *Pygospio elegans* has remarkable capability of regenerating both body ends, further highlighting the potential of this species as a valuable research tool in regenerative studies.

Using histochemical method of glyoxylic acid histofluorescence and immunohistochemistry combined with confocal microscopy we studied the distribution of catecholamines (CA), serotonin, FMRFamide, histamine and gamma-aminobutyric acid in the nervous system of *Pygospio elegans,* and traced their redevelopment during reparative regeneration. All these neurotransmitters have specific patterns in central and peripheral nervous systems.

During regeneration process of *Pygospio elegans*, posterior end formation occurs sequentially, segment by segment, while at the anterior end, the head and 12 thoracic segments are formed simultaneously. The initiation of regeneration entails blastema formation, which takes place approximately one day post-operation. Notably, the restoration of nervous system components can be observed as early as the first day

of regeneration, with the presence of different neurotransmitters appearing at different stages throughout this process.

Different neurotransmitters have a clear sequence of appearance in the regenerate. Both regenerate ends of *Pygospio elegans* show an early presence of serotonin and FMRF-amide within the second day, followed by histamine-, octopamine-, GABA-positive nerve elements and catecholamines on days 3-4. Regeneration of the nervous system in the anterior and posterior ends of the body occurs at a similar rate.

Comparative analysis with other annelids and mollusks reveals that neurotransmitter distribution patterns exhibit general similarities, with differences potentially having a correlation with embryonic neuronal development. Our data show the importance of studying the distribution of various neurotransmitter in invertebrates, especially in comparative morphology and developmental biology.

The work was completed using equipment of the Core Facilities Centre “Taxon” (Zoological Institute RAS) and supported by the Russian Science Foundation grant no. 21-14-00304.

FRIDAY, 11:45

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**(043) New Insights into Annelid Chaetogenesis**

Ekin Tilic[1], Norio Miyamoto[2], Elaine Seaver[3], Thomas Bartolomaeus[4] & Katrine Worsaae[5]

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*[3]Whitney Laboratory for Marine Bioscience, University of Florida, St. Augustine, FL, United States*
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*[5]Department of Biology, University of Copenhagen, Denmark*

The chaetae of annelids display an incredible morphological diversity which is also reflected in the complexity of their formation. Chaetogenesis, is an intricate cellular process involving multiform and dynamic microvilli that resembles a biological 3D-printer. In the past two decades we have accumulated significant ultrastructural and morphological knowledge on annelid chaetogenesis. However, studies investigating the molecular machinery of chaetal development have been sparse. A solid morphological understanding and foundation is necessary to delve further into the genetic mechanisms underlying chaetogenesis. Therefore, we have investigated the chaetae of two established model systems in experimental developmental biology; *Platynereis dumerillii* and *Capitella teleta.* The formation of compound chaetae in *Platynereis*, in particular the development of the joint and ligament is the most complex chaetal formation described to date. In the larvae of *C. teleta* we have identified a gland associated with chaetal follicles. Such a gland not only appears to be missing in adults but is also unique for all annelids. The function of these glands still remains unknown. Lastly chaetal formation was investigated in *Osedax japonicus*. In most annelids, chaetogenesis is continuous, as chaetae get constantly replaced during the lifetime of an animal, making the ultrastructural characterization of this process often possible even from a single segment of an adult animal. However, the bone-devouring worm *Osedax* is exceptional in that it has a fixed set of chaetae that only emerge once during larval development. This provides a unique opportunity to explore the expression of genes involved in this process. In addition to a morphological characterization of chaetogenesis using serial TEM, we also show the differential expression of genes involved in this process, and their localized expression patterns (in-situ HCR) in *Osedax*.

FRIDAY, 12:00

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**(134) Insights into male paedomorphosis through postembryonic developmental studies of the sexually dimorphic *Osedax* (Siboglinidae, Annelida)**

Katrine Worsaae[1], Alice Rouan[1], Elaine Seaver[2], Norio Myiamoto[3] & Ekin Tilic[1,4]

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[4]*Senckenberg Research Institute and Natural History Museum Frankfurt, Germany*

Timing is crucial, especially during early development of animals. The theoretical evolutionary process termed progenesis is accepted as the prevailing evolutionary route to underdeveloped (paedomorphic) life forms with retained larval appearance, e.g., salamanders, most meiofaunal groups, and many dwarf males. The bone devouring *Osedax* is sexually highly dimorphic with macroscopic sedentary females rooted in whale bones and microscopic free-living males aggregating in female harems.

Herein, we describe the postembryonic development of *Osedax japonicus*, using traditional immunohistochemistry labelling and CLSM, and introduce a staging system for this organism that will also serve as a basis for future interpretation of molecular developmental patterns. Organogenetic processes, such as neurogenesis, myogenesis and ciliary patterning are described from the fertilized egg stage to the competent metatrochophore larva stage, 5 days post fertilization. The *Osedax japonicus* metatrochophore exhibit annelid larval characteristics such as paired nephridia, chaetae, a temporary gut, apical organ, and a central nervous system but also a unique sensory dorsal organ. Whereas the females lose their larval traits during metamorphosis and continue organogenesis for weeks after metamorphosis, males show a striking metamorphic arrest in neural and muscular development and only limited loss of larval characteristics. Our data hereby support male dwarfism in *Osedax* to be the outcome of an early and synchronous offset of somatic development, providing exceptional morphological documentation for progenesis.

FRIDAY, 12:15

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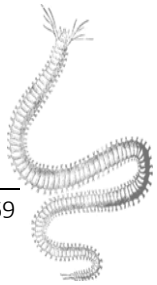

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## THEME: DEVELOPMENTAL MORPHOLOGY

### (062) From two segments and beyond: regeneration in *Syllis malaquini*

M. T. Aguado[1,2], Vanessa Spieß [1, 3], C. Helm[1, 4] & R.P. Ribeiro[5]

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Regeneration is the restoration of lost parts of the body, an ability that is widespread in polychaetes. Polychaetes regenerate extensive body regions, something widely exhibited by other lophotrochozoans, such as planarians. Due to the presence of pluripotent cells called neoblasts, planarians are known to regenerate their whole body, including from a single neoblast. Unlike planarians, polychaetes lack neoblasts and regenerated tissues come from differentiated cells that regress to a stemness stage and proliferate. Given that polychaetes' regeneration does not involve pluripotent cells, a minimum amount of tissue must provide cells for regeneration. To investigate the minimum tissue source required for regeneration, we performed amputation experiments in *Syllis malaquini*, a species of Syllidae capable of regenerating whole body from parts of the trunk. We performed amputations to isolate fragments consisting of one, two, and three segments from the intestinal trunk region. The body fragments with two and three segments successfully regenerated both anterior and posterior bodies. In contrast, one-segment fragments did not heal the wound and failed to regenerate. Next, we performed amputations of regions with structures of the foregut. In this case, we isolated fragments containing only pharynx, proventricle or ventricle with caeca. Our results showed that pharynx-only fragments regenerated the missing head anteriorly, the pygidium and the segment addition zone posteriorly. Caeca-only fragments regenerated head and tail, but segment addition was observed only anteriorly. Proventricle-only fragments had high mortality due to proventricle protrusion hindering wound healing. In addition, we generated data on the formation of blastema, a regenerative tissue formed over the wound. Our high-resolution SEM and cLSM images provided detailed coverage of the blastema region, revealing that this tissue encircles the digestive tube while allowing the mouth and anal openings to remain in contact with the exterior environment. Overall, we conclude that *S. malaquini* requires at least two segments to successfully regenerate the whole body and that this ability can differ depending on the isolated body regions. Further research is needed to identify and quantify the cell types present in the fragments longer than two segments that allow for successful regeneration in this species.

## THEME: ECOLOGY, BIODIVERSITY, BIOGEOGRAPHY

### (080) South-West African polychaete diversity and biogeography

Dylan Clarke[1], Mark Gibbons[2], Gordon Paterson[3], Wayne Florence[1]

[1]*Department of Research and Exhibitions, Iziko Museums of South Africa, Cape Town - dclarke@iziko.org.za*
[2]*Department of Biodiversity and Conservation Biology, University of the Western Cape, South Africa*
[3]*The Natural History Museum, London, United Kingdom*

This study explored the effects of depth and latitude on patterns of polychaete distribution and richness along the south-western coast of Africa from several baseline biological surveys, with a total of 3091 samples. It also examined whether in a selected group (polychaetes), the community analyses at the family-level and

genus-level serve as proxies for species-level patterns. A total of 399 species were positively identified, that occur in 61 families and 303 genera. The fauna was dominated by species in the families Syllidae, Spionidae, Terebellidae, Polynoidae, Cirratulidae and Phyllodocidae. The results indicated that there is clear geographic structure to the composition of polychaete assemblages in the SE Atlantic that is in broad agreement with the biomes proposed by Longhurst (1998) and Spalding et al. (2007), regardless of whether the data were analysed at the level of species, genus or family. There was a pattern of increasing richness from high to low latitudes and polychaete genus and family richness was higher in deeper water than shallow water sites within the defined Longhurst and Spalding biomes. The results here suggest that distribution patterns and diversity of the polychaete benthic fauna from the West African and Benguela continental margins remain relatively understudied, with low sampling effort: the majority of earlier studies focused on coastal areas, rather than deeper waters. There may also be a complex set of environmental factors that together shape the macro-benthic diversity and distribution along the South-West African coast. Most polychaete families are in need of global and regional revisions and species boundaries have to be established by means of integrated taxonomic work based on morphology and genetic analyses. This will aid in the re-establishment of geographical ranges of species in order to eliminate false conclusions about the distributions of species.

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**(128) Polychaete diversity in South African marine muds**

Silke Brandt[1] & Natasha Karenyi[1,2]

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*[2]Centre for Statistics in Ecology, Environment and Conservation, Department of Biological Sciences, University of Cape Town, Private Bag X3, Cape Town, South Africa.*

Marine muds have certain ecological traits and drivers which support unique communities, yet the muddy ecosystems on the South African south coast are poorly studied in terms of their invertebrate diversity, including polychaetes. This study collected grab samples from the critically endangered Agulhas muddy mid shelf to address this gap. Polychaetes generally dominate grab samples, but this pattern seemed to be even more apparent in marine muds where infauna abundance, biomass and diversity were almost entirely characterised by polychaetes. Onuphids, maldanids, and spionids were particularly dominant. Considerably high biomass of two endemic species were found: the maldanid *Asychis capensis* and the onuphid *Diopatra neopolitana capensis*. *A. capensis* is widespread on muds and is therefore a potential indicator species for mud ecosystem condition. The species are deposit feeders altering levels of dissolved oxygen and particulate organic matter in the sediment. Their bodies are encased in toughened mud tubes composed of stacked discs. These tubes may persist over many years which may indicate mud recession in certain areas when only the tubes are present. Quantifying diversity and monitoring ecosystem condition are considered priority research areas for mud conservation planning as these ecosystems are vulnerable to freshwater flow reduction, pollution, and certain fishing pressures. Understanding polychaete diversity will greatly contribute to the foundational biodiversity knowledge and functioning of these ecosystems and help identify potential indicator taxa to assess ecosystem health.

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**(143) Population structure and habitat preference of *Timarete ceciliae* (Annelida: Cirratulidae) at Praia da Penha, Northeastern Brazil**

Taiane Almeida[1] & Wagner Magalhães[1]

*[1]Universidade Federal da Bahia - taiane.almeida09@gmail.com; magalhaeswf@gmail.com*

Cirratulids are usually dominant in number of individuals in several soft-sediment habitats but there are very few reproductive and populational studies. The recently described species *Timarete ceciliae* is one of the most abundant polychaetes occurring intertidally at Praia da Penha in Todos-os-Santos Bay, northern Brazil. To understand its population structure and habitat preference, two sampling strategies were implemented:

30 individuals were randomly collected monthly for 12 months and 18 samples were collected in two microhabitats (2 replicates in 3 stations of bare sediment and the same number of samples for vegetated sediments). All collected cirratulids for the population structure study were measured for total length, number of chaetigers, width at chaetiger 10 and noted for sexually and asexually reproducing individuals. The studied species (and all other collected invertebrates) were more abundant in samples collected on vegetated sediments. The individuals collected during the summer months (December and January, 2021) were larger than those collected throughout the year. Very few females with intracelomic oocytes were collected during the studied months. Fifteen percent of all cirratulids collected were showing regeneration in anterior or posterior ends, indicating that this population may reproduce primarily asexually.

## THEME: ECONOMICALLY IMPORTANT SPECIES

### (001) A Rapid Assessment Survey of polydorid infestation on shellfish farms on Cape Cod and Nantucket Island

Andrew A. Davinack

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Shellfish farming has become a rapidly growing multibillion dollar commercial venture as the demand for cheap protein has increased in both developing and developed countries. However, several factors including climate change and disease pose a direct threat to this industry. In this study, we examined more than a hundred commercial shellfish, specifically scallops (*Argopecten irradians*) and oysters (*Crassostrea virginica*) for the presence of shell-boring polychaetes, which can significantly reduce growth rates of their molluscan hosts. The surveys were carried out in 2020 and 2021 at two major shellfishing localities in New England: Wellfleet Harbor on mainland Massachusetts (Cape Cod) and Nantucket Island which is located 50 km off the coast of the Cape. Using a combination of mtDNA barcoding and traditional morphological assessments, we found that *Polydora neocaeca* was by far the most dominant species found in both oysters and scallops (more than 95% of all worms examined) with *Polydora websteri* being the second, less prevalent shell-borer. Preliminary results showed that worm prevalence was low in both populations sampled, although intensity was high among select oysters from Wellfleet Harbor. A population genetic analysis found that individuals from Cape Cod, Nantucket and Rhode Island (type locality) all shared the common NE1 haplotype which was genetically separated from *P. neocaeca* haplotypes from South Africa and Japan. Genetic diversity among the New England population was higher than individuals from Japan indicating that the northeastern United States is probably the native range for this species.

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### (064) Biological characteristics of *Polydora websteri* (Polychaeta, Spionidae) inhabiting oyster shells (*Crassostrea gigas*) from northeastern Japan

Yuki Nagai[1], Ikumi Hamamatsu[1], Shota Kishi[1], Goh Nishitani[1] & Waka Sato-Okoshi[1]

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Polydorid species *Polydora websteri* was extracted monthly from wild oyster shells in Gamo Lagoon, Miyagi, Japan from 2018 to 2023. Its reproduction, larval development, and population dynamics were investigated. Up to 142 worms were found in a single oyster valve and many mud blisters were observed on the inner side of oyster shells. Females were observed to deposit a string of egg capsules from May to October during a period of seawater temperature above 15℃. The larvae developed inside the egg capsules for 1–2 weeks until hatched out under laboratory conditions of 20℃ in seawater temperature. The larval developmental mode of *P. websteri* was found to be poecilogony, and adelphophagic and planktotrophic larvae coexisted in the capsule at the timing of hatched out. Recruitment of young individuals increased from August to October

but was continuously observed to recruit also in other months. We also did molecular analysis to obtain 18S rRNA and COI gene sequences and compared them with other already published sequences for *P. websteri*.

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**(158) Wiggling money hidden in the 'safe'diment: Early evaluation of *Marphysa* species (Annelida: Eunicidae) with commercialisation prospective**

Che Engku Siti Mariam Che Engku Abdullah[1], Pat Hutchings[2], Afiq Durrani Mohd Fahmi[3], Izwandy Idris[1]

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Although publications concerning polychaete species and their potential applications as marine resources are plenty, many prospective polychaete species remain poorly studied in detail, including from the genus *Marphysa* (Annelida: Eunicidae). This study looks at the morphology of valid *Marphysa* species, and highlights those with potential human applications. Exploited annelids (mostly large adult size) are mainly used as fishing bait and diet for crustacean and finfish brood stocks. The present review reveals that only 27% of large-size *Marphysa* species are known for commercial application; meanwhile, the other 73% still need to be discovered for their wide potential application. Although a small percentage, the prospective species if utilised properly will bring significant improvement to the local economy.

## THEME: INVASIVE SPECIES

**(007) Understanding the history and impacts of a recent introduction: *Hermundura americana* (Pilargidae) in the Chesapeake Bay, USA**

Damhnait McHugh[1], Shirley Torres[1], Anthony J. Rodi[2], Roberto J. Llansó[3], & Daniel M. Dauer

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The pilargid polychaete, *Hermundura americana* (Hartman 1947) was previously known from the northern Gulf of Mexico, from western Florida to Texas. In 2009, *H. americana* was first reported in Chesapeake Bay at an industrial port on the Elizabeth River. In subsequent years, benthic surveys documented its spread throughout meso- and polyhaline regions of the James River, and in 2018 to the Potomac and Nanticoke rivers in Maryland. While the worms now reach densities of more than 1000/m$^2$ in some areas, no significant negative ecological effects have been documented. To examine the history of this recent introduction, we undertook a preliminary phylogeographic analysis of populations of *H. americana* from its original and introduced ranges. We used data from the mitochondrial gene cytochrome oxidase 1 (CO1) to confirm the species identity and to analyze population-level variation and patterns of diversity through haplotype networks. We found a single lineage representative of *H. americana* that shared haplotypes between both native and introduced ranges. The haplotype diversity for *H. americana* populations in both native and introduced localities are comparable to other marine populations. The pattern of haplotype distribution may indicate multiple introduction events, with unique haplotypes discovered within the Pagan River; however, additional sampling along the eastern coast of the United States is needed to determine if range expansion or introduction event(s) are responsible for the recent history of *H. americana* in the Chesapeake Bay.

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**(060) Explosion of exotic worms in Arcachon Bay (France) revealed by molecular tools.**

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Arcachon Bay is one of the major French oyster farming sites. Originally, oysters cultivated in the bay were the Portuguese cupped oysters *Crassostrea angulata* (Lamarck, 1819). However, in the early 1970s, a viral disease completely devastated the population and more than 1200 tons of the Pacific cupped oysters *Crassostrea gigas* (Thunberg, 1793) were then introduced from Japan to maintain the local industry. These oyster transfers were accompanied by a large amount of benthic invertebrates, attached to oysters or hitchhiked in or amongst oyster shells. With more than 120 exotic species reported, most of them with an Asiatic origin, Arcachon Bay is considered as a hotspot of introduced species in Europe. However, until 2014, only two exotic species were recorded in Arcachon Bay: *Ficopomatus enigmaticus* (Fauvel, 19323) and *Boccardia semibranchiata* Guérin, 1990. Recently, molecular analyses were carried out within the framework of the Future-OBS project (Augmented observatory for coastal socio-ecosystems) and the Marine Strategy Framework Directive (MSFD—Directive 2008/56/EC). These analyses supplemented by morphological observations permitted to detect the presence of ten other non-indigenous species of polychaetes in the bay. These species belong to spionids, terebellids, eunicids and sabellids. They have probably been present in the bay for several decades but have been confused with other European species. One of the objectives of these projects is to store these molecular data in GenBank, and to deposit corresponding vouchers in the Museum National d'Histoire Naturelle (MNHN-Paris) collection. These data will be essential for future metabarcoding analyses aimed at early detection of NIS in ports and aquaculture centers in Europe.

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**(094) New alien *Polydora* oysters' pests in the Mediterranean**

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The international trade of seafood is one of the main vectors for the introduction of alien species around the world. The introduction and movement of the Northwest Pacific oyster *Magallana gigas* (Thunberg, 1793) for aquaculture purposes in the Mediterranean has resulted in the invasion of large numbers of non-indigenous species. In 2020, we found many *Polydora* (Annelida: Spionidae) worms boring in the shells of farmed and wild Pacific oysters in various locations in the northern Adriatic Sea (Italy). Morphological analysis revealed two species: *Polydora websteri* Hartman in Loosanoff & Engle, 1943 and *P. haswelli* Blake & Kudenov, 1978, known pests of oysters recorded in many countries of the world. Molecular analysis of several gene fragments is currently underway to confirm the identity of these worms. Infestation with these polydorins reduces the commercial value of oysters and can be detrimental to aquaculture. *Polydora websteri* is native to the Asian Pacific region, while *P. haswelli* has been described from south-eastern Australia but is considered cryptogenic in that region. We report both species for the Mediterranean for the first time and

call for concern as further invasion by these worms could have serious ecological and economic consequences for the ecosystem and oyster farming in the Adriatic and the Mediterranean in general.

## THEME: PHYSIOLOGY AND ECOLOGY

### (023) Polychaetes and other invertebrates associated with rhodoliths in a newly discovered rhodolith bed on the northeast coast of Maine, USA

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Rhodoliths are three-dimensional nodules of unattached, non-geniculate red coralline algae found worldwide in marine environments from the Arctic to the tropics. Encompassing several orders, and hundreds of species, coralline algae exhibit growth morphologies which range from crustose forms that encrust rocks, to highly-branched fruticose forms (rhodoliths) that roll around in the currents. Rhodolith growth forms are determined by several physical parameters including waves, currents and sedimentation. Fruticose rhodoliths offer microhabitat shelters for diverse assemblages of fauna which nestle between branches or bore into the calcareous substrate. Many studies recognize rhodolith beds as biodiversity hotpots. Rhodolith beds and their associated macrofaunal communities have not yet been described for northwest Atlantic coasts south of Labrador and Newfoundland, Canada. A bed of rhodoliths (*Lithothamnion glaciale* Kjellman, 1883) was recently discovered in Pembroke, Maine (western North Atlantic, on the easternmost coast of USA) near the mouth of the Bay of Fundy. This study documents the macroinvertebrate community associated with about 500 rhodoliths that were collected on five occasions while wading through this rhodolith bed during several extreme low tides (2020-2022). Rhodolith diameters ranged from 2 to 5 cm. Polychaetes extracted from the rhodoliths included species representing 14 families: Amphinomidae, Ampharetidae, Capitellidae, Cirratulidae, Dorvilleidae, Lumbrinereidae, Nereididae, Oenonidae, Phyllodocidae, Polynoidae, Sabellidae, Spionidae, Terebellidae and Syllidae. Other macrofauna included species from 17 other invertebrate groups: Porifera, Anthozoa, Platyhelminthes, Nematoda, Nemertea, Sipuncula, Bivalvia, Brachiopoda, Gastropoda, Polyplacophora, Crustacea, Pycnogonida, Asteroidea, Ophiuoroidea, Echinoidea, Bryozoa and Tunicata. This investigation documents for the first time a highly diverse macroinfaunal community associated with a newly-discovered rhodolith bed on the northeast Maine coast. The study also highlights the potential of rhodoliths as population refugia for the macroinvertebrate fauna of the region.

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### (037) Utilization of terrigenous leaves by tube-bearing worm *Anchinothria cirrobranchiata* (Onuphidae) in the deep sea

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Deep-sea ecosystems are generally oligotrophic because they lack photosynthesizing producers. On deep-sea slopes near land, however, various terrestrial plant remains flow to and are deposited on near-shore deep bottoms. From a depth of 300 m off the Pacific coast of Owase, central Japan, an onuphid polychaete, *Anchinothria cirrobranchiata* (Annelida: Onuphidae), which lives in a dorsoventrally flattened portable tube are collected. The tubes were made of sand, as well as leaves and twigs of terrestrial evergreen trees. The leaves glued on the portable tubes were chartaceous, blackish and tough; they belonged mainly to two genera of Fagaceae, *Castanopsis* and *Quercus*, which are dominant components of coastal evergreen oak

forests. In an aquarium, the polychaetes fed on the leaves on their tubes, as well as autochthonous sedimented leaves, suggesting utilization of terrigenous plant litter as food. As to the evolution of *Anchinothria*, a molecular phylogenetic analysis suggests that *Anchinothria* is monophyletic with other Hyalinoeciinae (*Nothria*, *Leptoecia*, *Hyalinoecia*).

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**(042) Population dynamics of *Capitella* aff. *teleta* (Polychaeta, Capitellidae) in Gamo Lagoon, northeastern Japan, during a series of restoration works following the 2011 Great East Japan Earthquake and tsunami (from 2016 to 2020)**

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The population dynamics of the capitellid polychaete *Capitella* aff. *teleta* were studied in Gamo Lagoon, located in northeast Japan, for the subsequent 4 years from 2016, when a series of restoration works was conducted following the 2011 Great East Japan Earthquake and tsunami. *Capitella* aff. *teleta* was found to be distributed from the estuary side, where the levee was located, to the innermost part but was more abundant in the innermost part, which is rich in organic matter. In the lagoon, the daily maximum water level dropped from 2017 to 2018. Although the density decreased drastically for approximately one year under diurnal hypoxia and strongly reducing conditions during the period, small-sized new recruits were observed and the population recovered quickly after the daily maximum water level increased. In addition, population density tended to decrease toward 2020. In Gamo Lagoon, *C.* aff. *teleta* inhabiting the innermost part and estuary side of the lagoon contributed to maintaining the population by dispersing planktonic larvae between them. Thus, the water level had a significant effect on the maintenance of the *C.* aff. *teleta* population in the lagoon, and sufficiently high water levels enable the dispersion of planktonic larvae to help recover the population quickly, suggesting that it is important to keep the water area connected. We discuss how water levels and salinity affect population dynamics of *C.* aff. *teleta* in Gamo Lagoon.

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**(048) Long-term community dynamics of benthic polychaetes in the innermost part of Onagawa Bay, north-eastern Japan from 2007 to 2022**

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From July 2007 to December 2022, sampling was conducted once a month at St. 1, which is in the innermost part of Onagawa Bay. Water temperature, salinity, dissolved oxygen concentration and chlorophyll-*a* concentration for the bottom layer in the water column were determined using a CTD RINKO-Profiler. Sediment was collected using an Ekman-Birge grab. Macrobenthic organisms were sorted and fixed with 10% neutralized formalin, identified to the lowest possible taxonomic level, and density and biomass were calculated. A cluster analysis was performed on the composition of polychaete families that appeared in each month. Since the breakwater reconstruction work began, the dissolved oxygen concentration at St. 1 had gradually decreased; it reached an extremely low value of 1.58 mg/L in September 2017. Throughout the entire study period, polychaetes dominated the macrobenthos community. Before the disturbance, the families Cirratulidae and Magelonidae were dominant. For about two years after the disturbance, the families Capitellidae and Spionidae were dominant. From around April 2013, Maldanidae became dominant. The family composition seemed to be similar to that before the disturbance, dominated again by Cirratulidae and Magelonidae from December 2015. However, the density of polychaetes decreased sharply around September 2017, mainly in Cirratulidae and showed an increasing trend from around 2019. In May 2021, density reached the maximum value throughout the study period. While the present density of polychaetes is higher than that of before the disturbance, the biomass is not as high as expected. We discuss these changes in community structure using the obtained macrobenthos and water quality data.

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**(057) Feeding guilds composition of the polychaetes (Annelida) from the Gulf of California shelf, Mexican Pacific**

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In the Gulf of California, one of the most diverse world seas, several studies have been carried out on the taxonomy, abundance and diversity of the Annelidous polychaetes, but very little is known about their functional diversity and especially about their feeding guilds. Thus, the aim of this study was to describe and analyze their composition and trophic structure in the continental shelf of the gulf. Forty-one stations were sampled during the winter-spring season. A total of 254 species belonging to 41 families were identified among the 12,257 individuals collected. The polychaete species were classified into five feeding guilds and their importance was estimated with the trophic importance index ($T_i = \Sigma \ln (n_i+1)$). The detritivores, i.e. surface (28.47%) and subsurface (22.26%) deposit-feeders, were the dominant group of species, represented by the most abundant *Paraprionospio pinnata, Prionospio steenstrupi, Laeonereis cirrata, Aricidea (A.) simplex* and *Paralysippe annectens*. They were mainly distributed in the inner shelf, where the trophic heterogeneity increased: in the northern gulf, the eastern-central gulf and to the north of Concepción Bay on the western coasts. The carnivore species were less abundant (25.18%), represented by *Aglaophamus verrilli* and *Glycera papillata,* mainly located on the eastern coasts, around the middle gulf islands' archipelago. The omnivore polychaetes represented only 11.68% with an irregular distribution. The filter feeder species were not as important (4.74%) and practically disappeared at more than 70 m depth. The distribution and importance of each feeding guild was heterogeneous along the gulf, but depth was the most important factor defining their occurrence. A higher trophic complexity was found in stations with greater mud content.

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**(058) Biodiversity and polychaete benthic community structure in rocky intertidal pools of the northwestern coast of Baja California, Mexico**

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Biodiversity studies provide a fundamental tool in developing strategies for conservation research and management of the economic sustainability of coastal zones. Rocky intertidal habitats are extensive zones of great ecological importance. However, our general knowledge of the biodiversity of these communities is still incipient. The main end-product of this project will add knowledge of the Polychaetous annelid communities of some rocky intertidal habitats of the northwestern coasts of the Baja California peninsula. The samples were taken in January 2008 in three different localities: Bajamar (17°C; pH 8.3; salinity of 34 ppm), Ejido Eréndira (19°C; pH 8.3; salinity of 34 ppm) and Punta Baja (20°C; pH 7.8; salinity of 34.6 ppm). At each locality, four stations were randomly selected and sampled with a 12x12cm quadrat during the lowest low tide by scraping the rocky surface with a hammer and spatula, each with a replicate. All macrofauna collected was relaxed for 30 minutes in an $MgSO_4$ solution and then fixed in 10% borax-buffered formalin. In the tide pools of Bajamar the substrate was 100% rocky, mainly covered by calcareous red seaweeds (*Lithophyllum proboscideum; Corallina vancouveriensis* and *Bociella plumosa)*. In Punta Baja, the tide pools' substrate was 30% rocky and 70% sandy. with the dominant seaweed being *L. proboscideum* and

*Lithothamnium californicum*. In Ejido Eréndira, the tide pools found were composed of 40% to 100% rocky substrate with a dominance of *L. proboscideum*. A total of 6,251 polychaetes were collected and identified, belonging to 20 families, 46 genera and 51 species. The families best represented were Sabellariidae (4,043 ind.), Nereididae (764 ind.), Syllidae (497 ind.), Orbiniidae (239 ind.) and Sabellidae (225 ind.). All together, these families accounted for approximately 92% of the polychaetes collected. The most abundant species were *Phragmatopoma californica* (4,035 organisms), *Exogone lourei* (497 organisms), *Nereis mediator* (382 organisms) and *Naineris dendritica* (239 organisms). The tide pool with the highest diversity altogether was Ejido Eréndida and the lowest was Punta Baja. We discuss the different composition of these populations even if they belong to the same ecological ecosystem: the intertidal rocky pools.

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**(077) Bacteria inhabiting cuticle of two infaunal polychaete species from the White Sea**

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Annelids are one of the most abundant groups of invertebrates that live in the marine sediments. To identify the role of the microbiome community in the life of different annelids inhabiting the Arctic seas, we examined 8 species from 7 annelid families living in the vicinity of the N.A. Pertsov White Sea Station. By using transmission electron microscopy (TEM), bacteria were found in the cuticles of two annelid species inhabiting the subtidal and tidal zones of the White Sea. Using high-throughput sequencing of amplicons of variable regions of the 16S rRNA gene, the taxonomic affiliation of these microorganisms was determined. In the cuticle of *Dipolydora quadrilobata* (Spionidae), the gram-negative bacteria of the genera *Fulvivirga* and *Aliivibrio*, generally known as common inhabitants of the upper layers of the bottom sediments of the northern seas, were found. In the cuticle of *Leitoscoloplos acutus*, the bacteria belonging to uncultivated members of the *Leptospiraceae* and *Spirochaetaceae* families were identified. These microorganisms were not observed in the bottom sediments where the specimens of *L. acutus* and *D. quadrilobata* were collected, as well as in the microbiomes of *D. quadrilobate* tubes, suggesting these bacteria are specific associates of the bodies of these annelids. Physiological aspects of the interaction between bacteria and annelids remain unclear. In addition to *D.quadrilobata* and *L.acutus*, the cuticles of 6 more species of infaunal annelids from the families Travisiidae, Opheliidae, Spionidae, Cossuridae, Lubmrineridae, and Dorvilleidae were studied using TEM, but no bacterial cells were detected. The latter points to the specificity of the microbial associations of *Dipolydora quadrilobata* and *Leitoscoloplos acutus*, which strengthens the hypothesis of the symbiotic nature of their interactions.

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## *THEME: POLLUTION STUDIES*

**(022) Concentrations and Sources of Polycyclic Aromatic Hydrocarbons in Fecal Pellets of a *Marphysa* Species in the Yoro Tidal Flat, Japan**

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*Marphysa* sp. E *sensu* Abe *et al.* (2019) (Polychaeta, Eunicidae) found only in Tokyo Bay is a newly recognized species, thus their life cycle and ecology are not well studied. We previously reported that the concentrations of polycyclic aromatic hydrocarbons (PAHs) were approximately 10–100 times higher in the faecal pellets of the species in the Yoro tidal flat (Ichihara, Chiba, Japan) when compared to the sandy muds, and PAHs concentrations rapidly decreased by approximately 50% within 2 h after excretion. PAHs are released into the environment as a result of the incomplete combustion of fossil fuels, oil spills, and other human/natural activities. Some PAHs such as benzo[*a*]pyrene have toxic, mutagenic, and/or carcinogenic properties. We recently found that anoxic muds widely scattered throughout the Yoro tidal flat, contained 4–7 times greater concentrations of PAHs than the sandy muds. To investigate the sources of PAHs in faecal pellets of *Marphysa* species in the Yoro tidal flat, we measured PAHs concentrations, carbon and nitrogen stable isotope ratios ($\delta$13C and $\delta$15N), total organic carbon (TOC), and total nitrogen (TN) in sediments (sandy muds and anoxic muds), feces and tissue. The concentrations of 8 PAHs were measured by gas chromatography-mass spectrometry. $\delta$13C, $\delta$15N, TOC, and TN were determined using an elemental analyzer-isotope ratio mass spectrometry. Total PAH concentrations in anoxic muds and faeces were approximately 3–21 and 4–61 times higher respectively than those found in sandy mud. The PAHs concentrations and distributions were similar for anoxic mud and faeces. $\delta$13C and TOC/TN values for anoxic muds were consistent with those of faeces, and these values were in good agreement with those of terrestrial plants. Therefore, *Marphysa* species exposed to the anoxic muds contain high levels of PAHs presumably produced by the decomposition of terrestrial plants. The $\delta$13C and $\delta$15N values of the worm's body markedly differed from those of faeces and anoxic muds, thus the organic matter in the anoxic muds was not a primary source of nutrition for the worm.

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**(025) Degradation of Polycyclic Aromatic Hydrocarbons in Fecal Pellets of a *Marphysa* Species in the Yoro Tidal Flat, Japan**

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*Marphysa* species (Annelida, Eunicidae) known as 'Iwa-mushi' in Japan have five genetically separate clades which were tentatively designated as undetermined species from A to E (Abe *et al.*, 2019). In our previous study, we reported that the faecal pellets of the species, *Marphysa* sp. E *sensu* Abe *et al*. (2019), living in the Yoro tidal flat (inner part of Tokyo Bay) contained high levels of polycyclic aromatic hydrocarbons (PAHs), and the PAH concentrations rapidly decreased to 50% within 2 h. Since the species take in and excrete anoxic muds containing high levels of PAHs, it is suggested that PAHs in the faeces originate from these muds. On the other hand, the reason of the rapid degradation of PAHs in the faeces is unclear. In this study, we measured and compared the temporal changes in PAH concentrations in the faeces and anoxic muds in order to investigate whether the uptake of the anoxic muds by the *Marphysa* species is essential for the rapid decrease in PAHs in their faeces. Faecal pellets of the *Marphysa* species and anoxic muds were collected from the Yoro tidal flat (Ichihara, Chiba, Japan). Faecal pellets were collected immediately after excretion, and anoxic muds were collected by digging out the bottom sediment. Each sample was divided into two, one of which was quickly frozen with dry ice, and the other was left in the tidal flat for 2 h before freezing. After pretreatment of the samples, PAH concentrations were determined by a gas chromatograph-mass spectrometer. After leaving the faeces for 2 h, the PAH concentrations decreased compared to those in the

freshly excreted faeces. On the other hand, in the anoxic muds, no decrease in PAHs concentration was observed after 2 h. These results suggest that the degradation of PAHs in the faecal pellets of the *Marphysa* species may be attributed to faecal microorganisms and/or enzymes.

## THEME: REPRODUCTIVE BIOLOGY

### (041) First discovery of the epitokous metamorphosis in Spionidae

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Reproductive swarming and prior epitokous metamorphosis are known in several polychaete families such as Eunicidae, Glyceridae, Nereididae, Opheliidae, Paraonidae, Phyllodocidae, Scalibregmatidae, and Syllidae. However, in the family Spionidae, neither reproductive swarming nor epitokous metamorphosis has ever been known, and sexual reproduction occurs either by broadcast spawning, in which gametes are spawned directly into seawater, or by males transferring sperm, usually in spermatophores, to females, which store the sperm in seminal receptacles until fertilization and spawning, usually into egg capsules. In one spionid species, *Marenzelleria viridis*, nocturnal swimming behavior during the reproductive period has been reported, with ripe adults having been collected from the plankton at night especially during the ebb tide. This swimming behavior has been believed to be a mechanism of this estuarine species migrating passively with ebb tide currents to areas of higher salinity where fertilization and early development are possible prior to reproduction. Therefore, this swimming behavior is distinct from reproductive swarming, and no epitokous metamorphosis of this species has yet been observed. In November 2021, we deployed underwater night light traps at several fishing ports in Yakushima Island, southern Japan, and collected swimming individuals undergoing epitokous metamorphosis that appeared to belong to the family Spionidae. Based on DNA analysis of the 16S rRNA gene sequences of the specimen, we found that it matched the benthic form of *Prionospio variegata* collected on Izu Oshima Island, central Japan, and there were similarities in morphology as well. Therefore, the swimming individuals were identified as epitokes of *P. variegata*. Similar epitokous specimens were also collected by an underwater night light trap in Sesoko Island, Okinawa, southern Japan in 2014.

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### (142) Epitoke event of *Laeonereis* cf. *acuta* in the Pardo River estuary, Canavieiras, Bahia, northeastern Brazil

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Epitoky is a reproductive event that occurs when annelids undergo metamorphosis from an immature benthic individual to a pelagic reproductive individual. Male and female epitokes recognize each other through pheromones, with certain species showing pulses of bioluminescence. Epitoky occurs in many nereidid species as a way to increase chances of finding other conspecific for reproduction. The genus

*Laeonereis* Hartman, 1945 includes eight species, with the depositivore *L. acuta* (Treadwell, 1923) occurring widely along the Brazilian northeast coast. This work aims to describe an epitoke event detected on 3rd to 5th of August 2022 from the warning of local fishermen on the south coast of Bahia in the Extractive Reserve in Canavieiras – RESEX, a Brazilian protected area. Thirty-three epitoke polychaete individuals were collected in 1.5L of estuary water. The water was stored in plastic bags and frozen. In addition to the collection of polychaetes, some physicochemical parameters of the water were also measured in the Rio Pardo estuary during the event to determine pH (7.72), conductivity 286.2(µs/cm), and salinity (0.23). Collected material was sent to be deposited at the Collection of Aquatic Invertebrates of Southern Bahia (CIASB) and at the Rio de Janeiro State University (UERJ-Pol). Images of the event were broadcasted on television, but without studies or scientific documentation. Disclosures like this end up causing concern to the population, who believe that the water may be unfit for use and the worms could be parasitic. Based on the review of morphological characteristics, all identified individuals belonged to *Laeonereis acuta.* In addition to the body being full of gametes, it was possible to observe the hypertrophy of the prostomium, with the well-marked junction of the eyes, as well as hypertrophy of the parapodia and chaetae, and the posterior region lacking delimited rings. This is the first recorded and identified occurrence of epitoky reproductive event for the State of Bahia.

## THEME: SYSTEMATICS AND PHYLOGENETICS

### (034) Unveiling a scale worm species complex inhabiting the continental shelf down to the abyss

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The deep sea (>200m) is the largest and least explored biome on Earth, where little is known about the patterns and causation of biodiversity. It is generally accepted that there is bathymetric faunal zonation in the deep sea, but there is limited data illustrating this. Early studies (mid-1900s) estimated that deep-sea species have broad bathymetric ranges, but as new species are continually discovered it appears diversity is greater and bathymetric ranges are more restricted than originally described. In many cases, species perceived as having vast bathymetric ranges (i.e., >2000 m) are found to be a species complex, each with a restricted bathymetric distribution. We use molecular and morphological methods to investigate the diversity within a species complex of deep-sea scale worms (genus *Laetmonice*, family Aphroditidae), sampled at depths ranging from 200–5000 m. Specimens were collected during expeditions on the Australian Research Vessel *Investigator* from off the Southern, Eastern and Western continental margins of Australia, as well as the seamounts of the Indian Ocean Territories. DNA was sequenced from ~144 specimens and those that survived trawl sampling in good condition were examined for diagnostic morphological traits, particularly the different types of chaetae present. Phylogenetic methods reveal the presence of 13 distinct mitochondrial genetic lineages within this species complex, with the greatest species richness found between 2000 and 3000 m. Currently *Laetmonice* contains 28 valid species, however DNA sequence data only exists for six species. This study forms the basis for delimiting and describing new species of the genus *Laetmonice* that will provide an updated taxonomic scheme and it will advance our understanding of speciation along a depth gradient.

### (073) Swimming acrocirrids: phylogeny, species descriptions, and a model undergraduate training program

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Prior to 2007, all known acrocirrids were benthic, with the possible exception of *Chauvinelia* Laubier, 1974. A series of publication then detailed the discovery of seven new species of large, abundant, bentho- and holopelagic acrocirrids in the deep sea off Philippines, central California, and Oregon that included *Swima* Osborn et al., 2009 and *Teuthidodrilus* Osborn et al., 2010. All the new species were nested within the benthic acrocirrids despite significant morphological differences, including substantially shorter, broader bodies, numerous long chaetae, gelatinous sheathes, and variously modified head appendages and nuchal organs. Since that time, at least two additional benthopelagic species have been identified as new and additional members of the group have been observed in situ all over the world. The systematic positions of the new benthopelagic species are uncertain making further descriptions challenging. Genome skim data and the collection of one of the closely related, enigmatic genera, *Helmetophorus* Hartman, 1978, now make it possible to begin resolving these issues. In order to reconstruct the evolutionary history of the Acrocirridae, we compiled all publicly available genetic data for Acrocirridae, genome skimmed representatives of all available taxa, as well as representative flabelligerids (sister group). We found low but consistent support for the proposed "swimming clade" and establish that *Helmetophorus* indeed falls within that clade. We found strong support for monophyly of each of the proposed species, but insufficiently resolve relationships between each of the dramatically different species. The holopelagic genus *Swima,* which consists of three described species, was monophyletic in all analyses. These results suggest that significant diversity exists within the swimming clade that is not captured by our opportunistic sampling. We used this project to develop an undergraduate taxonomy training program in a partnership between the Smithsonian NMNH and the University of Dallas. Thus far, three students have participated for 1–4 semesters each and they have described three species based on imaging completed in the field and at NMNH. This type of program can serve as a model for taxonomic training and recruitment to organism-focused research at the undergraduate level.

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**(076) High diversity in the genera *Anobothrus* and *Amythasides* (Annelida, Ampharetidae) in the North Atlantic Ocean**

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*Anobothrus* is one of the largest genera in the family Ampharetidae comprising 23 species worldwide. At present, only 3 species are known from the North Atlantic and the Arctic. *Amythasides* is a monotypic genus with *A. macroglossus* described from shallow waters in Sweden. In this study, we analysed material from the Arctic and the Eastern Atlantic, from Norway to the Gulf of Guinea. We examined the morphology of the specimens using light and scanning electron microscopy and obtained data on two mitochondrial (COI and 16S) and one nuclear (28S) marker. SEM study of *A. macroglossus* revealed the presence of a ciliated band across dorsum of unciniger 8, similar to what has been considered an important taxonomical character defining the genus *Anobothrus*. Two additional species morphologically similar to *Amythasides macroglossus* were found in the material. Molecular phylogenentic analysis of the combined dataset recovered all three species of *Amythasides* as a monophyletic clade nested within *Anobothrus*. Here we propose synonymization of *Amythasides* with *Anobothrus* based on its phylogenetic placement and morphological details, including the presence of a single ciliated band on a posterior thoracic segment. In total, 12 undescribed species were found in the studied material. Three genetic linages were found within what was identified, based on morphology, as *Anobothrus laubieri*. The linages had different distribution, but no consistent morphological differences were observed. The *Anobothrus laubieri sensu stricto* name was attributed to the deepest lineage with the most northern distribution. The other two linages are described as new species.

**(081) The mitogenome of cave-dwelling polychaete *Laubierpholoe massiliana* (Annelida, Sigalionidae)**

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A new species of *Laubierpholoe, L.massiliana* Zhadan, 2023 (Annelida, Sigalionidae) was found in soft sediment of two submarine caves near Marseille, France. Molecular phylogenetic analysis using 18S rRNA and 28S rRNA sequences confirmed that the new species belongs to the genus *Laubierpholoe*. We were not able to amplify, and consequently, to sequence fragments of mitochondrial genes (CO1, 16S) of *L.massiliana*. To obtain these sequences, as well as to study the features of *L.massiliana* mitogenome, we attempted to sequence and assemble the mitochondrial genome of this species. The goal of this study is to know if the mitogenome of this cave species has peculiarities related with a cave life-style. Previously Gonzalez et al. (2021) studied the mitochondrial genomes of Polynoidae with different lifestyles and found similarities between cave and pelagic polynoids.

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**(098) Evolution of symbiosis between spoon worms (Annelida: Polychaeta: Thalassematidae) and their commensal bivalves**

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Symbiotic relationships play a crucial role in shaping marine biodiversity, and many annelids engage in such relationships as either symbionts or hosts. Echiurans, or spoon worms, are a group of marine annelids characterized by a sausage-shaped unsegmented trunk with an extensible scoop-like proboscis. They were previously treated as an independent phylum or (sub) class of Annelida, but are now classified as the annelid family Thalassematidae, which is sister to Capitellidae. Furthermore, this family was recently assigned to the class Polychaeta in Annelida. Thalassematids are known to harbor various host-specific symbionts, including polychaetes (e.g., polynoids and hesionids), mollusks, and crustaceans on their bodies and burrow walls. *Basterotia* bivalves (Galeommatoidea: Galeommatidae: Basterotiinae), which contain approximately 22 described species, are known as obligate commensals that exclusively inhabit thalassematid burrows. In this study, we investigated the species diversity, host specificity, and evolutionary pattern of this commensal bivalves. Our findings suggest that the bivalves diversified their habitat through host switching and host sharing, and that the ecological diversity of hosts promoted their morphological diversification.

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**(104) New phylogenetic hypothesis from mitochondrial genomes and evolution of gene order in Syllidae**

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Complete mitochondrial genomes of seven syllids (*Amblyosyllis clarae*, *Brachysyllis lagunae*, *Virchowia sp.*, *Trypanosyllis sp*., *Ramisyllis kingghidorahi* from Oki Island, *Syllis okadai* and *Megasyllis nipponica*) as well as incomplete, fragmented mitochondrial genomes of four syllids (*Haplosyllides sp*., *Syllis maganda*, *Megasyllis sp.* and *Eurysyllis tuberculata*) have been obtained using Illumina sequencing. Together with previous studied taxa, the analysed sequences represent most of the main lineages within the family Syllidae (*Anoplosyllinae, Eusyllinae, Autolytinae* and *Syllinae*). Additionally, *Sphaerodorum* sp. is analysed and included as outgroup

representing the first mt genome of *Sphaerodoridae* available to date. Genomic features, gene order and phylogenetic relationships are examined. Syllidae mitochondrial genomes are highly variable in their gene order, which is unusual for annelids. Considering genomic features, such as length, skewness, gene content, and codon bias, the most dissimilar to the rest of annelids are the genomes of the Syllinae taxa. The duplication of methionine tRNA's (trnM) known from previous studies, was detected in *Syllis okadai, Megasyllis nipponica, Megasyllis sp.* and *S. maganda*. The 13 protein coding genes, as well as the rRNA's and the nuclear rRNA genes 18S and 28S are used to perform phylogenetic analyses that mostly support the relationships within the family investigated by previous authors. The phylogenetic positioning of *A. clarae* and *B. lagunae* support a previous proposition in that they represent an additional independent group. The gene order in Syllidae shows very different patterns, with the most changes in the Syllinae. Two new mitochondrial gene order patterns were detected, which makes Syllidae and especially Syllinae the family with highest diversity in mitochondrial gene order patterns within Annelida. The Pleistoannelida gene order was found in the remaining syllids (*A. clarae, B. lagunae, Virchowia sp*.) and *Sphaerodorum sp*. The provided information supports Syllidae to not only have a great diversity in reproductive modes, but also in their mitochondrial gene order.

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**(136) Diversity and phylogeny of *Diurodrilus* (Annelida, Diurodrilidae) - Multiple new species but little morphological variation**

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Due to their lack of characteristic annelid traits such as chaetae, coelomic cavities or even segmentation, the origin of the meiofaunal Diurodrilidae were long debated. Now several phylogenomic studies have documented their affinity to Annelida, possibly as sister group to *Apharyngtus*. Being microscopic, rare, or patchy distributed, only one genus, *Diurodrilus*, and seven species have so far been described - though the family has been reported from most larger oceans (East and West Atlantic, The Pacific, Mediterranean Sea, Indian Ocean). Our multiple unpublished findings of diurodrilids during the last two decades has prepped the ground for a global phylogenetic analyses and systematic revision – expected to shed new light on the evolution of this enigmatic annelid family. This phylogenetic study using Maximum Likelihood and Bayesian Inference include 4 different genes markers (16S rRNA, 18S rRNA, 28S rRNA and COI) of specimens from 11 localities (Sweden, Australia, France, Canary Islands, Italy, Denmark, Faroe Island and Japan). Unlike the highly distinct genetic signatures found to characterize several potentially new species, these show only few and indistinct morphological differences (e.g., length of primary and secondary toes, length and presence of an anal cone, ciliary patterns) warranting further morphological analyses.

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**(097) New records of polychaetes from Tunisia, with special emphasis on the distribution of *Marphysa gaditana* (Annelida, Eunicidae)**

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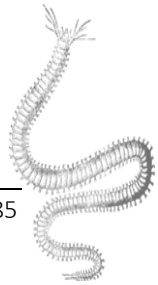

The present study aims at contributing to the inventory of Tunisian polychaetes. Our survey of the Radès area (Gulf of Tunisia, Western Mediterranean), already revealed the presence of a new species, *Trophoniella radesiensis* (Chaibi and Gillet, 2019) (Flabelligeridae), and two new reports for the Mediterranean, *Lepidonotus tenuisetosus* (Gravier, 1902) (Polynoidae) and *Marphysa chirigota* Martin, Gil and Zanol, 2020 (Eunicidae), which are here complemented with 11 new reports that include *Dorvillea rubrovittata* (Grube, 1855) (Dorveillidae); *Gallardonereis nonatoi* Ramos, 1976 (Lumbrineridae), *Perinereis rullieri* Pilato, 1974 (Nereididae), *Sphaerosyllis austriaca* Banse, 1959, *Syllis columbretensis* (Campoy, 1982) and *Syllis corallicola*, Verrill, 1900 (Syllidae), *Capitella teleta* Blake, Grassle and Eckelbarger, 2009 (Capitellidae), *Branchiomma boholense* (Grube, 1878) and *Branchiomma luctuosum* (Grube,1870) (Sabellidae), *Spirobranchus kraussii* (Baird, 1864) (Serpulidae), and *Thelepus setosus* (Quatrefages, 1866) (Terebellidae). Moreover, combining morphological and molecular (16S rDNA and Cytochrome Oxydase I) information, we (1) confirm the presence of *Marphysa gaditana* Martin, Gil and Zanol, 2020 in the Atlantic coasts of France (Arcachon Bay), (2) report its presence in the Mediterranean for the first time, and (3) discuss on the origin of its discontinuous distribution. Among the species newly reported in Tunisian waters, six are considered exotic (i.e., likely coming from the Indo-Pacific, via the Suez Canal, or from the Atlantic, via the Strait of Gibraltar) and eight are previously known Mediterranean species.

## THEME: TAXONOMY AND MORPHOLOGY

### (008) Redescription of *Scolelepis tridentata* (Southern, 1914) (Annelida: Spionidae), with description of a new species of *Scolelepis* from the Black Sea

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*Scolelepis* Blainville, 1828 is one of the most speciose and taxonomically difficult genera of spionid polychaetes. The genus is commonly divided into two subgenera. The subgenus *Scolelepis* Blainville, 1828 includes species with blunt or conical, uni-, bi- or tridentate hooded hooks with falcate or straight shafts and having smooth palpal sheaths, while the subgenus *Parascolelepis* Maciolek, 1987 includes species having sharp, multidentate hooks with curved shafts and with papillated palpal sheaths. In the Black Sea two species have been formerly reported as belonging to the subgenus *Parascolelepis* – *Scolelepis* (*Parascolelepis*) *tridentata* (Southern, 1914) and *S.* (*P.*) *cantabra* (Rioja, 1918) (both as either *Nerinides* or *Pseudomalacoceros*). Both species are quite rare in the Black Sea and when found are usually fragmentary. The examination of material in the collection of the "Grigore Antipa" National Museum of Natural History in Bucharest (Romania) labelled '*Nerinides cantabra*', revealed specimens belonging to two different species preserved in the same vial. One of them was identified as *Scolelepis cantabra*, while the second more resembled *S.* (*P.*) *tridentata*. To clarify the taxonomic identity of *Parascolelepis* from the Black Sea, the type series of *S.* (*P.*) *tridentata* and non-type specimens of *Scolelepis cantabra* were examined. The type material of *Scolelepis cantabra* is not known to exist. Nonetheless, based on date from the literature and personal observations, the latter taxon clearly belongs to the subgenus *Scolelepis* s. str. The examination of additional specimens received from the Ukrainian and Russian coasts of the Black Sea, identified as *Pseudomalacoceros tridentata* or as *Nerinides tridentata*, revealed that they differ from the nominal species in several characters and warrants designation as a new species.

**(010) Infauna communities and environmental drivers of the Namibian continental shelf**

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The Namibian continental shelf forms part of the Benguela upwelling system and features unique elements such as low oxygen waters, hydrogen sulphide eruptions, and fluvial inputs from the rivers. This makes it a valuable system to explore ecologically. However, infauna biodiversity on the Namibian continental shelf has not yet been studied comprehensively. Polychaetes are a significant component of benthic infaunal assemblages, and their diversity tends to directly impact the overall biodiversity patterns. This study aims to investigate infaunal biodiversity patterns on the Namibian continental shelf and their potential environmental drivers. Sediment samples will be collected at depths of 30 - 500 m using a Van Veen grab sampler, and species identification will be performed at the lowest possible taxonomic level. Multivariate analysis will be utilized to evaluate the infauna communities and ecosystem maps. The existing description of benthic infaunal patterns in South Africa will provide a reference point to further understand shelf biodiversity patterns in northern Benguela.

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**(028) B*occardia* and *Boccardiella* species (annelida: spionidae) in the Berg River Estuary, South Africa**

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The Berg River Estuary on the west coast of South Africa is one of the largest and most important estuaries in the country and was recently declared a Ramsar site. Ecological investigations conducted in the 1980s and 2000s reported a *Boccardia* sp. as one of the commonest taxa at sub- and intertidal stations experiencing mean salinities from < 9 up to 36 ppt. The identity of this species was never clarified, although Day (1955) reported *Boccardiella* (as *Boccardia*) cf. *ligerica* from low salinity water in this estuary. This study aimed to determine which *Boccardia* species were present in the estuary. Sediment cores were collected from 9 stations in May 2022, from the mouth (salinity 31.25 ppt) to 15 km upstream (salinity 20.85ppt). Sediment was sieved through 500 µm mesh, spionids were removed, anaesthetized in 7% $MgCl_2$ before fixing in 4% formalin in seawater for morphological examination and 96% ethanol for DNA sequencing (cytochrome oxidase I (COI) and cytochrome b (cyt b)). Two *Boccardia* spp (the alien *B. proboscidea* and *B. pseudonatrix*, a pest of cultured mollsucs) were collected in consolidated mudbanks only at the station closest to the mouth. This is the first report of *B. pseudonatrix* from sediment. A *Boccardiella* species was collected at stations further upriver where salinity ranged between 21.68 and 29.89 ppt. The *Boccardiella* species most closely resembled *B. limnicola*, originally described from Australia, by the presence of branchiae on chaetiger 5, the shape of the modified spines, and shape of the anterior body. Maximum Likelihood analyses retrieved *B.* cf. *limnicola* as an independent clade from other *Boccardiella* species, but without sequences for *B. limnicola* from Australia its identity could not be confirmed. None of the specimens had posterior modified spines that are characteristic of *B. ligerica*, and it is therefore uncertain if it is the species reported by John Day. Further research is required to confirm its identity. These results suggest that the *Boccardia* sp. collected in earlier studies may have comprised more than one, or all, of the species reported in this study.

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**(031) The French Museum cruises: the Ali Baba's Cave for polychaetologists**

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For almost 250 years, naturalists have been travelling the world to discover its flora and fauna. However, the race against time has begun to describe the millions of remaining species in the context of the sixth great extinction. In this framework, the French Muséum National d'Histoire Naturelle (MNHN) launched two important initiatives with the "Tropical Deep-Sea Benthos" program (since 1976, with the MUSORSTOM cruises) and the "Planet Reviewed" (since 2009) to document the biodiversity of deep-sea and costal habitats of tropical regions, mainly located in the South Pacific and South-West Indian Oceans (Vanuatu, Papua New-Guinea, New Caledonia, French Guyana, Waters Shoal and Saya de Malha). About 20% of the world's new marine species have been described from material collected during expeditions of the "Tropical Deep-Sea Benthos" program but only a few polychaetes, because of the lack of polychaete experts participating in these cruises. Fortunately, since 2010, worms have been carefully sorted on board and fixed in alcohol allowing molecular and morphological analyses. Thousands of specimens, belonging to dozens of new species, await the experts eyes to come out of anonymity and finally be described. The main families stored in the collection of MNHN are Eunicidae, Terebellidae, Polynoidae, Nereididae, Onuphiidae, Aphroditidae (mostly *Laetmonice*) and Amphinomidae. Dear colleagues, it's your turn to play, new species are waiting for you!

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**(045) Rooms without views: Description of two new species of *Chaetopterus* (Annelida: Chaetopteridae) from Vietnam hosting complex symbiotic communities**

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The genus *Chaetopterus* (Annelida: Chaetopteridae) includes relatively large animals (up to 20-25 cm in length) living in roughly U-shaped tubes embedded into soft sediments or attached to hard surfaces in shallow waters of temperate and tropical seas. Morphologically, they are highly adapted for feeding on plankton using complex mucus-net based mechanism and may be easily recognized by a body divided into three highly characteristic distinct regions. The genus has a complex history, as in late 19th and early 20th centuries, all previously described species were synonymized giving rise to a single "cosmopolitan" species, *C. variopedatus* (Renier, 1804), which was not proved to be a species complex until the late 20th century. Since then, two processes have been working in parallel, both far from being complete: (1) a complex series of resurrections of "old" species and (2) descriptions of new species, giving rise to the currently 23 known and accepted species. Within this framework, we are here (1) describing two new species *Chaetopterus* from Nha Trang Bay (Vietnam) harbouring two different and complex symbiotic communities, and (2) analysing their phylogenetic relationships with other species of the genus. The studied material includes 17 and 12 individuals of each new species, which are nearly syntopic and inhabit sandy bottoms 6 to 20 m deep. However, *Chaetopterus* sp . nov. 1 prefers slightly silty fine sand, while *Chaetopterus* sp. nov. 2 prefers coarser sand with mixed small rubble, coral and shell fragments. Both species inhabit U-shaped tubes, which are embedded 15 - 20 cm within the sediment. However, the silt-covered, parchment-like tubes of *Chaetopterus* sp. nov. 1 are 65.2 (44 – 81) cm long and have an iridescent silvery or golden inner lining with distinct transverse annulations, while the paper-like tubes of *Chaetopterus* sp. nov. 2 are 44.8 (23 – 58) cm long and have an external cover including sand and small coral and shell fragments and a semi-transparent whitish or brownish inner lining lacking distinct annulations. Both species also differ in the number of chaetigers of region A (9 and 9 – 13, respectively) and in the denticles of the neuropodial uncini of region C

(25-35 and 9, respectively), but the most remarkable feature distinguishing them is the composition of their symbiotic communities. The larger *Chaetopterus* sp. nov. 1 only hosted three species, the porcellanid crab *Eulenaios cometes* (Walker, 1887), the scaleworm *Ophthalmonoe pettiboneae* Petersen & Britayev, 1997 and the carapid fish *Onuxodon fowleri* (Smith, 1964). In contrast, the smaller *Chaetopterus* sp. nov. 2 hosts six symbiont species: the porcellanid crabs *Polyonyx hoek* Osawa & Ng, 2016 (the single previously known species) and *Polyonyx socialis* Werding et Hiller, 2019 (described from our samples), the nudibranch gastropod *Tenellia chaetopterana* Ekimova, Deart & Schepetov, 2017 (also described from our samples), and a pinnotherid crab (*Tetrias* sp.), a scaleworm (*Hololepidella* sp.) and a pecilostomatoid copepod that are still undescribed. Our phylogenetic analysis based on CO1 sequences supports the morphological and ecological inferences and confirms that the Vietnamese specimens belong to two new species of *Chaetopterus*.

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**(046) Taxonomic revision of Nereididae polychaete family in the Berg River Estuary**

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Nereididae is one of the most abundant and diverse polychaete families in many marine benthic habitats, including in estuaries. Consequently, in South Africa it is the second most important family requiring taxonomic revision. In the Berg River Estuary on the west coast of South Africa, three species of Nereididae were identified previously: *Simplisetia erythraeensis*, *Composetia Keiskama*, and *Perinereis latipalpa*. Similarly, three nereidid species were recently identified in the Knysna Estuary on the south coast. The most abundant and widespread species was identified as *Simplisetia erythraeensis* using Day (1967) but has since been confirmed as a new species. The current study 1) explores the diversity of nereidids in different parts of the Berg River Estuary, and 2) compares *S*. cf. *erythraeensis* in this estuary with those from the Knysna Estuary to determine whether the species are the same. Sediment cores were collected and sieved from 9 stations situated from the mouth to upper reaches in May 2022. Specimens were relaxed in 7% $MgCl_2$ in distilled water, for 30 minutes and individually fixed in 96 % ethanol or 4 % formalin in seawater. The same three species were found in the Berg River Estuary as before, with each species showing different spatial distributions within the estuary. *Composetia* cf. *keiskama* (n = 100) occupies the upper reaches of the estuary (salinity 20.85 to 21.68 ppt), *Simplisetia* cf. *erythraeensis* (n = 304) occupies the mid to lower reaches (salinity 27.35 to 30.61 ppt) but overlap in the mid reaches (salinity 26.53 ppt). *Perinereis latipalpa* (n = 6) occurred only at the site closest to the mouth (salinity 31.25 ppt). These data support previous studies showing the same trend in spatial distribution between the species, except that *S.* cf. *erythraeensis* also occurred in the upper reaches of the Berg River Estuary. *S*. cf. *erythraeensis* in the Knysna Estuary occurred in high densities across a wider salinity range from 20.2 to 38 ppt. Morphological and genetic data, testing whether *Simplisetia* cf. *erythraeensis* collected from both estuaries are the same species, will be presented.

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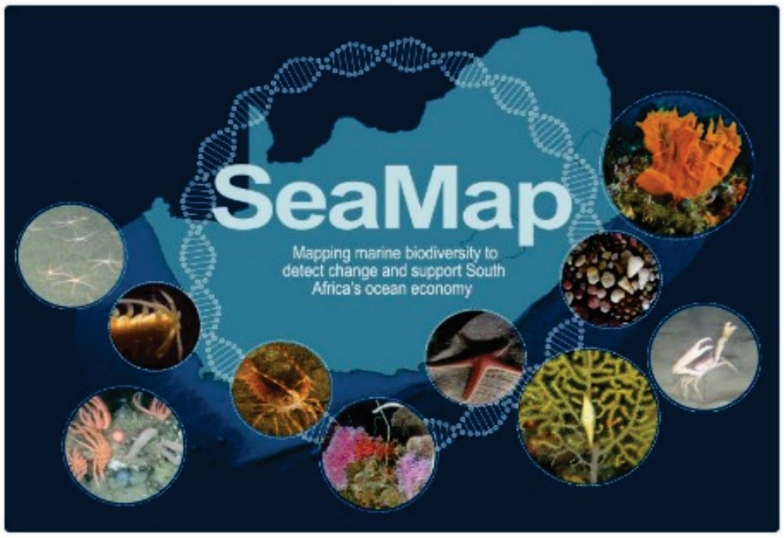
# SeaMap: Mapping marine biodiversity to detect change and support South Africa's ocean economy

**SeaMap is a brand new South African marine project, recently awarded to SAEON's Egagasini Node through the Foundational Biodiversity Information Programme (FBIP). The FBIP is funded through the Department of Science and Innovation (DSI), with the South African National Biodiversity Institute (SANBI) and the National Research Foundation (NRF) jointly managing the programme.**

The primary aim of FBIP projects is to generate, manage and disseminate foundational biodiversity information and knowledge to improve decision-making, service delivery and create new economic opportunities. More information about the FBIP can be found at www.fbip.co.za.

In alignment with this overarching aim, at the end of the three-year project (2022–2024), SeaMap aims to deliver South Africa's first data-driven marine ecosystem map derived from associated species occurrence and barcode records. This output will support marine biodiversity assessment, spatial planning, monitoring for change and development of the ocean economy.




Through the outputs that SeaMap will deliver, the project will unlock critical marine invertebrate data to contribute towards South Africa's first national data-driven marine ecosystem map, classification and assessment


Contact the SeaMap principal investigator, Dr Lara Atkinson, if you would like to find out more about the project

## Core focus

With a core focus on South Africa's offshore marine invertebrates, SeaMap will collate and serve 51 000 national invertebrate occurrence records, DNA barcodes for 250 invertebrate species (equating to ± 1 250 sequences), 150 associated species pages, 300 actinobacterial strain rRNA sequences and South African check lists for key invertebrate groups.

Several training and capacity building workshops will be held to support barcoding and data management and development of a Red Listing strategy for marine invertebrates. SeaMap will contribute towards international polychaete taxonomy training and in building capacity to advance science into policy.

To increase awareness of the need, value and importance of marine taxonomy in the younger generation, SeaMap will develop marine taxonomy lectures customised for South African ecosystems, targeting both high school learners and undergraduates and, for the younger enthusiasts, an illustrated children's story that integrates marine taxonomy concepts.

Throughout the three-year project there will be an emphasis on opportunities to engage students and emerging researchers to grow their skill sets; from how to optimise sampling for genetic opportunities, how to better manage one's data and how to 'make your science change the world' through empowering young researchers in how to integrate their findings into informing governance policies.

The SeaMap team includes 20 co-investigators from 13 South African institutes spanning the Western and Eastern Cape and KwaZulu-Natal. This ensures improved national coverage of our marine ecosystems consolidated under the SeaMap umbrella, resulting in better cohesion, information sharing and knowledge gained for all working in offshore ecosystems.

This ambitious and exciting project is just starting out and there is plenty scope for young researchers in the fields of foundational marine biodiversity and genetics to get involved. Please contact the project principal investigator, Dr Lara Atkinson, if you would like to find out more.

With a core focus on South Africa's offshore marine invertebrates, SeaMap will collate and serve 51 000 national invertebrate occurrence records, DNA barcodes for 250 invertebrate species (equating to ± 1 250 sequences), 150 associated species pages, 300 actinobacterial strain rRNA sequences and South African check lists for key invertebrate groups.

**(047) Untangling the Magelonidae of South Africa, the legacy of John Day**

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Until recently the Polychaeta of Southern Africa (Day, 1967), containing over 700 species, was considered an essential reference text for marine biologists. Unfortunately, we now know that many of the species in Day's work were inaccurately described contributing to an underestimation of South African bristleworm biodiversity that is characterized by more than 500 species. Researchers from Amgueddfa Cymru and Iziko Museums of South Africa aim to resolve the identification of highlighted Southern African species using extensive museum collections as part of a grant awarded by the Royal Society. The Magelonidae (Annelida: Polychaeta), is one of the top 20 families highlighted as requiring revision. Direct observation of magelonids in the Iziko Museums of South Africa collections is expected to reveal undescribed species, previously misidentified taxa, as well as facilitating improved descriptions of those already known.

**References**

Day, J.H., 1967. A monograph on the polychaete of southern Africa, Part I (Errantia) and Part II (Sedentaria). Trustees of the British Museum, Natural History, London, pp. 1-878.

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**(049) One species, two surprises! The wide distribution of *Marphysa mossambica* in the Indian Ocean and the presence of two new cryptic species in Australia**

Nicolas Lavesque[1], Guillemine Daffe[1], Flore Daramy[1], Chris Glasby[2,3], Beth Flaxman[3], Pat Hutchings[3]

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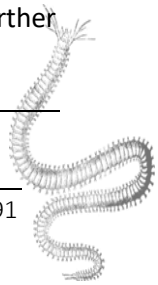
The famous *Marphysa sanguinea* (Montagu, 1813) has always been considered as a cosmopolitan species, present all over the world. The main reason is because this species is 'easy' to identify, no type material exists and the original description is very brief. The designation of a neotype by Hutchings and Karageorgopoulos (2003) has clarified the concept of the species and enabled taxonomists to describe dozens of new species worldwide.
With the exception of the exotic species *Marphysa victori* Lavesque, Daffe, Bonifácio & Hutchings, 2017 originating from Asia and introduced into France via oyster farming, most recent studies have concluded that *Marphysa* species have restricted geographical distributions and appear to demonstrate high fidelity to specific habitats such as mud, mangroves, seagrass beds.

It was therefore with surprise that we discovered the results of molecular analyses carried out on another so-called near-cosmopolitan species: *M. mossambica* (Peters, 1854). This species, described from Mozambique (East Africa), has been reported from Malaysia to China, as well as in northern Australia and India. Recently, we have been able to carry out molecular (COI) and morphological analyses on specimens collected in Kenya, relatively close to the type locality. Morphologically, the Kenyan material corresponds to the redescription of the type material of *M. mossambica* by Fauchald in 1987. Molecular and morphological comparisons with specimens from the Philippines and Malaysia prove that this species is indeed distributed on both sides of the Indian Ocean. However, analysis of newly collected material of *M.* cf. *mossambica* from northern and NE Australia reveal yet a further two undescribed species in this complex. This study further supports the need for both molecular and morphological data for describing species of *Marphysa*.



**(050) Investigating the taxonomic and molecular diversity of Sabellidae Latreille, 1825 (Annelida) in southern Africa**

Jayden Collison[1,2], Jyothi Kara[1], Maggie Reddy[2,3] & Dylan Clarke[1]

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Sabellidae, commonly referred to as feather duster worms due to their colourful radiolar crowns, are widely distributed across many major ocean basins. Some species are important bioeroders of coral substrates and indicators of ecosystem health. However, some species are invasive and obstruct intake pipe systems of aquaculture facilities and power stations, extensively alter ecosystems through rapid colonisation of substrate, are marine foulers affecting vessels and marine environmental structures, and they can reduce the production of aquaculture and commercial harvest. The first taxonomic revision on Sabellidae in southern Africa was carried out by Day in 1967 and recorded 37 species from southern Africa, of which 19 have type localities outside the region. The Sabellidae diversity in southern Africa is in need of urgent attention and has been ranked third among sedentary polychaetes on the taxonomic priorities list according to Simon *et al*. (2022). In this study we carried out a biodiversity assessment of the Sabellidae in southern Africa. Specimens were collected from three localities in False Bay (Western Cape) and Park Rynie (KwaZulu-Natal) from the intertidal including tidal pools, and from coral reefs via SCUBA. Preliminary morphological investigations revealed morpho-groups consistent with the morphology of *Sabellastarte sanctijosephi* and *Branchiomma capensis*. Preliminary genetic analyses using COI data on 7 specimens from 3 sites (Buffels Bay, Strand, and Gordons Bay) revealed that our morpho-groups are 22%, and 25% divergent from *Branchiomma boholense,* and *Bispira mancata,* respectively, and potentially represent a new undescribed species. Specimens from Park Rynie (KZN) were 82% similar to an undescribed species, *Sabellastarte* sp and may represent another new species. The present study aims to document the true indigenous diversity of sabellid polychaetes in southern Africa and ultimately contribute to a systematic reassessment of the diversity and distribution in this family. It will also contribute to the DNA barcoding reference library of polychaetes in southern Africa.

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**(051) Re-description of *Arabella iricolor* (Annelida: Oenonidae) and an evaluation of South African species**

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*Arabella iricolor* was described by Montagu in 1804 from the south coast of England. Since that time it has been recorded from the Atlantic, Pacific and Indian Oceans, from Canada in the north to South Africa and the Straits of Magellan in the south. The original description by Montagu does not provide detail on any of the chaetae or other morphological characters that are considered essential when appraising similar taxa today and therefore it is a challenge for anyone to accurately diagnose local species. A new description of *Arabella iricolor* from the type locality, providing the relevant details that would be expected in a modern description will be provided, along with reference sequences for both 16S and COI genes, to accurately define the taxon and allow comparison with other related taxa. In South Africa both *A. iricolor* and a subspecies, *A. iricolor caerulea*, are reported. These records will be re-evaluated in the light of the re-description of *Arabella iricolor* and new descriptions provided where relevant, along with equivalent molecular sequences for comparison.

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**(052) Onuphidae and Eunicidae (Eunicoidea) from the Falkland Islands region**

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Onuphidae and Eunicidae (Eunicoidea) around the Falkland Islands region have been reported on several times in the past by researchers such as Monro (1930, 1936), Hartmann-Schroder (1967, 1983), Orensanz (1990) and Neal et al. (2020). Changes in taxonomic names, re-identifications and numerous misidentifications, however, have made it a challenge to determine which species are actually known and which might be expected to occur. Here, we untangle the historic reports and, along with new observations on many of the specimens previously reported, provide a modern list of the known and expected taxa for the region. The new observations resulted in a re-description of *Kinbergonuphis dorsalis* (Ehlers, 1897), a new species of *Hyalinoecia* and a possible new species of *Marphysa*. In total, eight genera comprising eight taxa of Onuphidae and two of Eunicidae were confirmed and a further six taxa are considered to have potential to inhabit the region.

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**(054) Discovering *Solomononereis*: A interesting new species with unique reproductive morphology found in the Marshall Islands**

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As most of nereidids reach sexual maturity, they undergo a range of morphological and physiological changes for reproductive purposes, known as epitoky. These changes are focused on the prostomium, parapodia, and chaetae. However, identifying epitokes can be difficult, as they differ significantly from their nonreproductive counterparts, or atokes. Moreover, it is worth noting that the identification of epitokes can be especially challenging, as most generic and specific diagnoses are based solely on atoke morphology. The study of uncatalogued material in the National Museum of Natural History, Smithsonian Institution, revealed interesting epitokes from the Marshall Islands and shed new light on the reproductive transformations that occur in nereidids. These epitokes bear a striking resemblance to *Solomononereis* Gibbs, 1971 species, a nereidid genus featured by having partially rod-like paragnaths arranged in discrete groups in the maxillary ring only, prompting a comparison with the type and material of the type species of *Solomononereis*, *S. marauensis* Gibbs, 1971. The results of the study show high morphological resemblance in the prostomial, pharyngeal, parapodial, and chaetal characters among them, confirming that the epitokes belong to *Solomononereis* and a new species will be proposed. This discovery is noteworthy as it represents the first time that the epitokal morphology of this particular genus has been described. The changes that occur during epitoky in *Solomononereis* are most evident in the parapodial and chaetal transformations, which lead to a striking division of the body into three distinct regions. In the pre-natatory region, the chaetigers closely resemble those found in atokes. In the middle or natatory region, the parapodial ligules undergo a dramatic conversion into lamellar structures, while the atoke chaetae are replaced by chaetae with paddle-like blades. Finally, in the posterior or caudal region, the chaetigers are short, crowded and devoid of chaetae. It's worth noting that *Solomononereis* epitokes bear a high resemblance to *Ceratonereis* species, but they can be easily distinguished by the pharyngeal ornamentation. Additionally, this study reinforces the idea that epitokal morphology is not only useful for separating closely similar species but also as a valuable source of character for phylogenetic studies.

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**(059) Review of Arctic *Marenzelleria* (Annelida: Spionidae) with the first record of *M. wireni* for North America and comments on *Spio gorbunovi***

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Two species of *Marenzelleria* are widely known from the Eurasian Arctic seas, from the Barents Sea east to the Chukchi Sea: *M. arctia* (Chamberlin, 1920) and *M. wireni* Augener, 1913. *Marenzelleria* records from the North American Arctic to date include only the original description of *M. arctia* from the Beaufort Sea (Alaska, USA) and the report of *M. neglecta* Sikorski & Bick, 2004 from Tuktoyaktuk Harbor (Northwest Territories, Canada). In the present study, we review and map all records of *Marenzelleria* from Arctic waters and also report *M. wireni* for Arctic Canada (Koluktoo Bay, Baffin Is., Nunavut) and North America for the first time. The taxonomic status of *Spio gorbunovi* Averincev, 1990 has been clarified: the neotype of this species has been designated and the name has been synonymized with *M. wireni*. The importance of molecular data in the identification of *Marenzelleria* species is again confirmed, but the possible pitfalls of relying primarily if not solely on genetics for identification are also emphasized. Critical errors may occur (and be repeated) if identifications are based on sequences of specimens collected far from the type localities of the species in question.

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**(061) Integrative taxonomy of West African *Magelona* (Annelida, Magelonidae)**

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Benthic samples collected during several cruises from shelf areas along the West African coast from Morocco to Angola, have highlighted a huge diversity of magelonid species (over 20 species), many of which are undescribed. The majority of samples were taken as part of two large-scale projects in the region: the Canary Current Large Marine Ecosystem project (CCLME) and the Guinea Current Large Marine Ecosystem project (GCLME). Six magelonid species bearing thoracic pigmentation from this material were highlighted by Mortimer *et al.* (2021) including the description of five species new to science. This current paper is the next in the series describing three species with prostomia which are approximately as wide as long bearing prostomial horns, thoracic regions bearing superior dorsal lobes, and chaetigers eight and nine which are different in comparison to the preceding chaetigers.

**References**

K. Mortimer, J.A. Kongsrud, and E. Willassen, Integrative taxonomy of West African *Magelona* (Annelida: Magelonidae): species with thoracic pigmentation, *Zoological Journal of the Linnean Society*, Volume 194, Issue 4, April 2022, Pages 1134–1176, https://doi.org/10.1093/zoolinnean/zlab070

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**(067) Not one, but three indigenous species of *Gunnarea* Johannson, 1927 from South Africa - not so monospecific after all**

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*Guannarea gaimardi* (Quatrefages, 1927) is a reef-building Sabellarrid originally described from the Cape of Good Hope, South Africa. It is the only recognized species for this genus and has been reported from northern Namibia to southern Mozambique. It is commonly known as the coral- or Cape reefworm and is used as bait by subsistence and recreational fisherman. It has been ranked 1st on the priorities list of sedentary polychaetes that require urgent taxonomic revision, given its apparent wide distribution, use as bait, and a recent study using molecular and morphological data that revealed 2 lineages within the species, one along the west coast and one on the south coast. Resolving the taxonomy of these species therefore has important implications for its conservation and management. Additional sites were sampled along the west (*n* = 4), south (*n*= 1), and east coasts (*n*= 2) of South Africa. Preliminary morphological results using data from Simon et al. (2021) and the present study revealed that species conformed to the general description by Day (1967), nonetheless closer inspection revealed two morpho-groups, one found along the west coast, and one assigned to the south and east coast populations, confirming results from Simon et al. (2021). Interestingly in addition to the 2 lineages already detected by the earlier study, COI results indicate an additional lineage for the east coast. New specimens examined from west coast populations reinforces the decision by Simon et al. (2021) to designate this lineage as *G. gaimardi*. East coast populations are described as a new species as some differences were found, including the entire opercular disk with a small ventral notch. Since the south and east coast lineages are morphologically identical, and the south is only defined by 2 specimens (herein referred to as *Gunnarea* sp. 1), further specimens are required from here to identify any additional characters that can tease these two cryptic species apart.

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**(068) New species of *Scoloplos* (Annelida, Orbiniidae) from the Mediterranean Sea**

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During studies of soft sediments in two underwater marine caves near Marseille, France we found a tiny orbiniid species which we referred to a new species of the genus *Scoloplos* based on morphology and molecular data. Later we found a specimen of the same species in samples from Elba Island, Italy. The body width is up to 0.4 mm and the length is about 10 mm. It has pointed prostomium, 9-12 thoracic chaetigers, branchiae starting from the first abdominal segment, thoracic postchaetal neuropodial lobes mammiform with long podal papillae, no subpodal papillae, abdominal neuropodial lobes bilobed with short round inner lobe and longer outer one, abdominal notopodial lobes digitate, much shorter and thinner than branchiae, pygidium with two dorso-lateral cirri. Chaetae include crenulated capillaries in all rami, thoracic neuropodia also bear 1-3 thin strait or slightly curved, finely serrated, hooded uncini in ventral part, and abdominal notopodia bear forked chaetae with enlarged unequal tines. Some specimens have gametes in their body cavity. The new species differs from all other congeners recorded in the Mediterranean Sea by its minute size, small number of thoracic neuropodial uncini, shape of thoracic neuropodial lobes, and shape of abdominal parapodia. The similar small-sized species *Leitoscoloplos mediterranea* Çinar, Dagli & Erdogan-Dereli, 2022 was described recently, but it differs from the new species by the presence of subpodal papillae, absence of uncini and forked chaetae. Molecular data showed that the new species is a member of the *Scoloplos/Leitoscoloplos* clade.

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**(075) The Polychaete type collection at the Museum of Nature Hamburg**

Jenna M. Moore[1], Cristina Garilao[1], Mariam Duncker[1], Sophia Viziotis[1], Tom Kamswich[1], Eloina Küchler1 & Alexandra Kerbl[2]

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The Annelida collection of the Museum of Nature Hamburg holds type material for more than 1,200 polychaete species and subspecies in over 2,000 specimen lots. This enormous type collection reflects the life's work of several prominent polychaete researchers including Gesa Hartmann-Schröder, Hermann Augener, Ernst Ehlers, and Johann Wilhelm Michaelsen, as well as many contemporary taxonomists. Several historical expeditions are represented in the type collection, including the "Hamburger südwest-australische Forschungsreise" (1905), the "Deutsche Tiefsee-Expedition" (1898-1899), the "Hamburger Magalhaensische Sammelreise" (1892-1893) and the "Deutsche Südpolar-Expedition" (1901-1903). We review recent major efforts to digitize the polychaete type collection and make the data publicly accessible to the research community.

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**(082) Description of a new species of *Iphitime* from Californian coast**

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During a dock fouling survey conducted in August 2018, we encountered a rare species: an undescribed *Iphitime* with unusual characters. The survey was designed to track biodiversity and the records of invasive species introduced via ballast water or recreational boats in marinas. Ten sites were selected in Long Beach, California, and five PVC plates were deployed at 1 m depth. After three months the plates were retrieved and analyzed while the organisms were still alive. One specimen in good condition was found on a plate from Alamitos Bay Marina and photographed before preservation (SERC voucher 263280). Another specimen in worse condition was found off Calvert Island, British Columbia. This species is morphologically different from the other two species previously described from California: *Iphitime holobranchiata* Pilger, 1971 and *Iphitime loxorhynchi* Hartman, 1952. It is very distinctive due to three rows of round lobes located dorsolaterally and dorsally along the body. *Iphitime* contains seven described species; none have round dorsal lobes, and all are commensal with brachyurans or anomurans while this species appears to be free-living. One other undescribed species with three rows of rounded lobes and free-living is known only from photographs taken by Scott Johnson off Kwalajein Island in 2011. The genus *Iphitime* is currently considered valid although recent molecular studies place it within *Ophryotrocha* (Wiklund *et al.* 2012, Taboada *et al.* 2013). Finding this unique species in such an intensively sampled region opens more questions about how well biodiversity and invasive species are investigated. We provide here the description of this new species.

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**(083) Quantifying the changes in musculature during the epitokous transformation of a common nereidid (*Alitta succinea*)**

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*[2]University of Western Australia, School of Biological Sciences & UWA Ocean Institute, M092, Perth, WA 6009, Australia*
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Epitoky, the reproductive process utilized by some annelid taxa, can involve a series of morphological and anatomical transformations in preparation for changing from a crawling to a swimming lifestyle. In Nereididae, the external morphology of epitokes are characterized by the enlarging of posterior parapodia, production of natatory chaetae, and hypertrophy of the eyes. Internally, the gut undergoes a drastic atrophy, the musculature undergoes both hypertrophy and atrophy, and the body swells with gametes. Quantifications of the degree in which specific muscles atrophied or hypertrophied during this metamorphosis are scarce yet important for understanding muscular contribution to locomotion. To understand this relationship, we used micro-computed tomography to reconstruct the muscular arrangement in atokes, and female and male epitokes. From these reconstructions, we extracted the volume of oblique muscle bundles (OMBs) in anterior, posterior, and modified segments. Our findings indicate that relative to size, epitokes overall have less muscle mass than atokes, but there are strong regional differences. We found that in the anterior segments, epitokes have significantly lower OMB mass than atokes, likely from atrophy of crawling muscles. In their posterior segments, females and males have hypertrophied oblique muscles compared to atokes, with males to a higher degree than females. The large posterior muscles in epitokes indicate a major role in propelling the worm forward, potentially with more active parapodial movement than previously believed. Hypotheses for the evolution of a pelagic from a benthic lifestyle range from extending pelagic larval phases into adulthood, food limitations, predation, and even the persistence of an epitokal stage after shedding gametes. By investigating one approach to life in the water column, in this case nereidid epitoky, we gain a blueprint of adaptations that leads to success in the open water. Future work connecting the herein described morphological features with physiological, behavioral, and kinematic studies may lead to advances in studies on the evolution of open water annelids and polychaete swimming.

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**(086) On the taxonomy of Scalibregmatidae Malmgren, 1867 (Annelida: Polychaeta) from Campos and Santos basins (Brazilian southeast region)**

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Scalibregmatidae Malmgren, 1867 is a small family of polychaetes popularly known as “Balloon Worms”, comprising 68 valid species grouped in 14 genera. Until now, only two species had been formally reported in Brazilian waters: *Scalibregma inflatum* Rathke, 1843 and *Asclerocheilus tropicus* Blake, 1981. However, the occurrence of *S. inflatum* is related to a problematic record, and is regarded a cosmopolitan species. Material was collect from the Campos and Santos basins, thanks to “Santos Project – Environmental Characterization of the Santos Basin, coordinated by CENPES/PETROBRAS”. This work expands the current taxonomic knowledge of the family in the South Atlantic, presenting the first record of the genus *Pseudoscalibregma* Ashworth, 1901 and *Oligobregma* Blake & Kudenov, 1978 from Brazil. We also propose two new species within each genus: *Scalibregma* and *Asclerocheilus* Ashworth, 1901. In addition, we also propose one new species for *Pseudoscalibregma* and *Oligobregma*. We highlight that *Scalibregma* sp. nov. 1 is similar to *S. inflatum,* differing on the number and shape of spines and also the annulation of body segments and mouth’s

lips, while *Scalibregma* sp. nov. 2 is similar to *S. stenocerum* Bertelsen & Weston, 1980, but differ in body annulation pattern and by the presence of an interramal sense organ from chaetiger 1. *Asclerocheilus* sp. nov. 1 is similar to *A. ashworthi* Blake, 1981, differing on the shape of its Acicular Spines tips. *Asclerocheilus* sp. nov. 2 is unique among the congeners due to the prostomium and horns shape, annulation pattern, and acicular spines features. *Pseudoscalibregma* sp. nov. 1 is close to *P. usarpium* Blake, 1981, differing on parapodial cirri shape and size related to the parapodial chaetal lobe. Finally, *Oligobregma* sp. nov. 1 is similar to *O. notiale* Blake 1981, differing in body annulation and acicular spines features.

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**(087) *Leodamas* (Annelida, Orbiniidae) from the Arabian region**

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*Leodamas chevalieri* (Fauvel, 1902) is the only species of the genus recorded in the Arabian region including the Red Sea, the Gulf of Aden, the Arabian Sea, the Arabian Gulf and the Gulf of Oman. We investigated the specimens of *Leodamas* collected in the intertidal zones of Kuwait and Oman and compared them with the type and non-type material from Senegal (West Africa), the type locality of *L. chevalieri.* The methods included light and scanning electron microscopy and phylogenetic analyses of one mitochondrial (CO1) and one nuclear (ITS2) marker. Based on the molecular analysis, we revealed that at least two species inhabit both the Kuwait and Oman shores, and both of them differed from the specimens of *L. chevalieri* sampled at the type locality. One of these species was *L. gracilis* (Pillai, 1961) described from Sri Lanka, and our finding representing a new record of this species in the Arabian region. The second species was new to science, morphologically very similar to *L. chevalieri*, but differ from the latter in fine chaetal characters.

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**(088) On palaeozoic polychaete fossil diversity from Paraná Basin (Brazil)**

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Annelids are soft-bodied metazoans, a characteristic that makes their fossilization a difficult process in taphonomic terms. However, some of their sclerotized parts, such as the jaw apparatus, tubes and burrows are very important components of paleontological studies. In the light of their importance, this work aimed to access and synthesize the known fossil diversity of polychaetes from the Paraná basin, one of the most studied in South America. As result, 59 recorders were found for Devonian, Carboniferous, and Permian lithostratigraphic unities. Most of them are attributed to trace fossils. Leading to the conclusion that polychaetes are indeed a well-represented group in Paraná basin. Important ichnofabrics attributed to them were dominated by *Rosselia* isp. and *Planolites* isp., providing insights on depositional features and paleoecological aspects. All records of fossil body parts are attributable to Scolecodonts, specifically the Paulinitids. The Devonian record was the most numerous one, but the upper Palaeozoic unities presented scarcer registers. This pattern could be attributed to two main factors: i) the greater number of studies conducted on the basin's lower Palaeozoic portion and ii) its the gradual continentalization. We highlight the importance of the group for geological, palaeoecological and evolutionary studies and the current need of refinement on their identification.

**(089) New species of the family Pectinariidae (annelida) from the southeast and northeast region of Brazil**

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Pectinariidae Quatrefages, 1866 are characterized by having a body with a thorax, an abdomen, a scaphe, and the presence of chitinized paleae and ice-cream cone-shaped tubes built with sand grains. Currently, 144 species are known and arranged into five genera. This work presents two new species from southeast Brazil and a new species from northeast Brazil. Two of these species belong to the genus *Amphictene* Savigny 1822, and a third one to the genus *Pectinaria* Lamarck, 1818. The material was collected in different localities and depths from Port of Santos (São Paulo), Santos Basin (São Paulo/Rio de Janeiro), and the Piaui River estuary complex (Bahia/Sergipe), in sandy and muddy sediment, using Van Veen and Box Corer, at 6 to 25m deep. *Amphictene* sp. nov. 1 differs from its congeners by the presence of a triangular scaphe, triangular cirri located ventrolaterally in chaetiger 5, and an additional long cirrus in chaetiger 2. The other new species, *Amphictene* sp. nov. 2 has branched branchiae, forming two free branches from a single branch, the first longer than the second. The new species for *Pectinaria* Lamarck, 1818 differs from the two species occurring in Brazil: *Pectinaria nonatoi* Nogueira, Ribeiro, Carrerette & Hutchings, 2019 and *Pectinaria gouldii* Verrill, 1873. Although the four individuals from the new species of *Pectinaria* has been found in the same locality, they present divergences when referred to the shape of the scaphe, which can be oval, flattened, or wrinkled. The study on this family along the Brazilian coasts is still incipient, but emphasize the need for more taxonomic studies that can result in the description of more new species and new taxon occurrences.

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**(090) Two new species of the Genus *Bylgides chamberlin*, 1919 (polychaeta: polynoidae) from Brazil**

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Polynoidae Kinberg, 1856 is a extremely diverse polychaete family with 8 subfamilies, 238 genera and 2061 valid species. The genus *Bylgides*, in the subfamily Polynoinae, has 9 species currently accepted and they occur in the Kara Sea (Artic Sea) and the North Atlantic. This work describes two new *Bylgides* species along the Brazilian coast, from São Paulo and Sergipe respectively. *Bylgides* sp. nov. 1 differs from all species of the genus in having all notochaetae smooth, short-tipped neurochaetae, spots dark covering most of the prostomium, small projections lateral to the eyes, middle antenna and smooth palps, and nephridial papillae starting at segment 11. *Bylgides* sp. nov. 2 differs from its congeners by the arrangement of following characteristics: smooth elytra, short-tipped neurochaetae, spots dark covering most of the prostomium, and nephridial papillae starting at segment 12. In addition, an updated key to all species of this genus is proposed. Part of material analyzed in this study was collected from Santos Basin during "Santos Project – Environmental Characterization of the Santos Basin" coordinated by CENPES/PETROBRAS, and also from an estuarine complex between Sergipe and Bahia, collected by Erminda C. G. Couto.

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**(092) How complex is the *Naineris setosa* species complex? First integrative study of a presumed cosmopolitan and invasive annelid (Sedentaria: Orbiniidae)**

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The cosmopolitan *Naineris setosa* (Verril, 1900) is one of the most problematic species of *Naineris* Blainville, 1828. The species was first described in Bermuda. After that, several records expanded its distribution to Puerto Rico, Florida, the Gulf of México, Acapulco, Brazil, Belize, the Mediterranean Sea, Costa Rica, the Galápagos. Recently, we have found specimens morphologically identical to *N. setosa* in Australian museum collections, from Sydney. It is currently known that truly widespread annelids are rare; nevertheless, many species of *Naineris* are still treated as cosmopolitan in the literature, despite the absence of molecular support and comparative morphological studies. *Naineris setosa* is unique in lacking uncini and subuluncini in the thoracic neuropodia, which makes it similar to *Leitoscoloplos* Day, 1977 and *Scoloplella* Day, 1963, but with rounded prostomium as in all the species of *Naineris.* We performed a comparative study of the materials of *N. setosa* from the Pacific and the Atlantic Oceans and re-examined the syntype. Molecular analysis based on the two mitochondrial (COI and 16S) and one nuclear (28S) marker revealed the presence of a distinct species from the Northeast Pacific. All Atlantic records formed a single group, which, however, showed clear divergence in the mitochondrial markers for the populations along the Brazilian coast. Despite the morphological differences observed in South Atlantic material, and incongruence in species delimitation based on mitochondrial markers, we decided to be conservative and kept these differences as regional variations. We propose that the populations of *N. setosa* in the Atlantic Ocean show signs of early speciation with no clear isolation yet. In this work, we raise the number of species in the genus to 21 and restrict the distribution of *N. setosa* to the Atlantic coast. We also stressed that it is crucial to include both nuclear and mitochondrial molecular markers for species delimitation analysis to avoid over-splitting.

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**(093) The feeding apparatus of *Pholoe assimilis* (Annelida, Sigalionidae) not done then**

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*Pholoe* belongs to the Sigalionidae family. They are all predators and use an axial muscular pharynx with two pairs of jaws, but fine morphology of their feeding apparatus is poorly studied. Our research focused to the problem of morphological and functional structure of the feeding apparatus of *Pholoe assimilis* using light and scanning electron microscopy, microcomputed tomography and histological sections. Our result demonstrated that the pharynx is a flattened dorso-ventrally muscular cylinder about 1 mm long. At the distal end of the inverted pharynx there are 18 large terminal papillae and jaws. The jaw apparatus consists of two pairs of jaws, while each pair forms a single functional structure. Each jaw consists of three parts: a tooth, a wing and a body. The function of the tooth is to capture prey, the jaw canal passes through it for excretion of glands secret. Presumably the gland canal begins at the intersection of the wing and the body from the inside and comes to the surface near the tip of the tooth. The functional role of the wing and body is unknown; they are probably supporting structures for the tooth. An elemental analysis of the jaws showed that *Pholoe* jaws are not mineralized, they consist of scleroproteins and contain iodine. The obtained data on the histological structure showed that the pharynx is connected to the pharyngeal bag by bundles of radial fibers, covered with cuticle, its wall is formed by thick layers of radial and longitudinal muscles. There is a circular muscle at the base of the pharyngeal papillae, it is a sphincter that responsible for jaw's closing. There are two types of glands in the pharynx. The first one associated with the terminal papillae and is responsible for the secretion of mucus in them; the second one associated with jaws, and presumably secretes a venom. Jaw's glands are located on the medial surface of the wing of the jaw. Each jaw is associated with one gland.

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**(101) Morphology and new records of *Dipolydora capensis* (Day, 1955) and *Dipolydora goreensis* (Augener, 1918) (Annelida: Spionidae)**

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Spionidae Grube, 1850 is one of the four species rich families (together with Syllidae, Nereididae and Eunicidae) in southern Africa. These families comprise 25% of the species and 53–85% of unresolved cosmopolitans (Simon et al. 2022). Two spionid genera, *Dipolydora* Verrill, 1881 and *Prionospio* Malmgren, 1867, have been noted as priority taxa for future revision. In the present study, we refine the morphological characteristics of two species, *D. capensis* (Day, 1955) and *D. goreensis* (Augener, 1918), which have not been redescribed since the original description and are difficult to distinguish and identify. Additional details of the morphology of these species are provided based on the examination of type specimens. We also report *D. capensis* for the Arabian Gulf for the first time and provide some details of the biology of this species.

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**(102) A new record of *Leodice* Lamarck 1818 (Annelida, Eunicidae) from the Gulf of Mannar waters (India)**

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The species of the genus *Leodice* Lamarck, 1818 are distinguished by possessing at least one of the following characteristics: regularly articulated prostomial appendages, tridentate or bidentate compound falciger chaetae, or tridentate or bidentate light subacicular hooks. Presently, the genus *Leodice* Lamarck 1818 is recorded for the first time off the Gulf of Mannar (southeast India). Though it resembles *Leodice uschakovi* having the following characteristics: articulated peristomial cirri, starting chaetiger of branchiae, articulated notopodial cirri, and tridentate subacicular hook, there is a significant difference in the presence of tridentate compound falcigers only at the posterior chaetigers. To get more resolution, further investigations on the morphology, like in the shape of the branchiae and distribution of chaetae are needed to properly evaluate whether it is a new record in the world polychaete repository.

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**(114) Delineating boring and tube-dwelling species of the *Polydora ciliata* complex from the White Sea using morphological and molecular approach**

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The tribe Polydorini Benham, 1896 of the family Spionidae Grube, 1850 includes both boring and tube-dwelling polychaetes. Morphological differences between these forms are often minor or absent, which makes their identification difficult. *Polydora ciliata* Johnhston, 1838 has been considered one of the most common Polydorini species with a cosmopolitan distribution. It was first described as a free-living species, but subsequently a boring form morphologically similar to the species' original description was found. Eventually, the boring form began to be regarded as a basic one in this species. Currently, *Polydora ciliata* is considered a species complex including tube-dwelling and boring polydorids worldwide. The poor original description, the absence of type material, wide intraspecific variability and differences in lifestyle cause problems in the taxonomy of the *Polydora ciliata* species complex. The taxonomic relationship between boring and tube-dwelling representatives of the *P.* gr. *ciliata* complex from the White Sea are explored and discussed in the study. Both forms were previously identified as *Polydora* gr. *ciliata*. Analyses of the mitochondrial 16S rDNA sequences and nuclear 18S and 28S rDNA sequences showed that they form two close but clearly distinguished clades. Their pairwise average distances are within the range of the minimum

interspecific distances found in other Polydorini. The closest species to both forms of the White Sea *P*. gr. *ciliata* is the Pacific species *P. onagawaensis*. Morphological differences between the boring and tube-dwelling forms include the body color, the number of segments, the accessory structures of the falcate spines on the fifth segment, and the location of the glandular pouches on the ventral side of the body. Sibling boring and tube-dwelling forms belonging to *Polydora* gr. *ciliata* are found in many regions. Varying intraspecific and interspecific distances and often minor or absent morphological differences between them suggest that recent or contemporary speciation are common within the genus *Polydora*. The presence of minor but clearly distinguished morphological and genetic differences between the White Sea boring and tube-dwelling *P*. gr. *ciliata* allows us to consider them different species that have undergone recent speciation.

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**(115) First record of *Chaetopterus* Cuvier, 1830 (Annelida: Chaetopteridae) associated with aggregates of *Phyllochaetopterus* sp. tubes (Cagarras Archipelago, Rio de Janeiro, Brazil)**

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The genus *Chaetopterus* Cuvier, 1830 has approximately 20 valid species. For the Brazilian coast, until the early 20th century, there was only a record of *Chaetopterus pergamentaceus* Cuvier, 1830 [1]. However, some species in the genus, including *C. pergamentaceus*, were synonymized with *C. variopedatus* (Renier, 1804), and considered a species complex. Therefore, for the Brazilian coast, all records were regarded the same species, making it unknown which species are present in Brazil. The objective of this study is to identify and describe the *Chaetopterus* species present in the Cagarras Islands Archipelago, especially those found associated with aggregates of *Phyllochaetopterus sp.* tubes. This is the first record of this association and of the genus *Chaetopterus* for this location. The specimens have 9 chaetigers in tagma A, flip-like peristomium that does not cover the prostomium, a pair of conspicuous eyes, palps reaching A6, a ventral shield jug-shaped and a brown line separating it from the rest of the tagma, a dorsal region with light brown dots at the base of notopodia, 6-10 dark and light brown cutting chaetae, long and narrow notopodia of tagma C that inflates slightly towards the posterior region and short lateral neuropodial cirri. Based on morphology, the specimens differ from other species with lateral cirri in tagma C in the number of chaetigers of tagma A, specimen coloration, quantity, coloration and shape of cutting chaetae, shape and pigmentation of the peristomium, location of palps base, and shape of the notopodia of tagma A and C. The closest species, also found in a consolidated habitat, are *C. charlesdarwinii* Nishi, Hickman & Bailey-Brock, 2009, and *C. aduncus* Nishi, Hickman & Bailey-Brock, 2009, which differ from the specimens in the length and shape of tagma A, shape of the peristomium and prostomium, peristomium that covers the prostomium, dorsal bulbous inflation at the base of the notopodia, coloration and length of the palps, and quantity, coloration and shape of the cutting chaetae. The specimens may represent a possible new species for science; however, molecular and more detailed morphological analyses are necessary to confirm the identification.

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**(117) Lugworms (Arenicolidae, Annelida) in Norwegian waters - species characteristics and habitat preferences**

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Three species of Arenicolidae has been recorded from Norwegian waters. *Arenicola marina* Linnaeus, 1758, is a well-known shallow water species in north European waters, including the Norwegian coast and Svalbard. The relatively recently described *Arenicola defodiens* Cadman & Nelson-Smith 1993 is known from the British Isles to the Swedish west coast but has only been reported once in Norway. *Arenicolides ecaudata* Johnston, 1835, has only scattered records along the coast of Norway. The ring-formula is usually used as a key character to distinguish between species, but this character alone is insufficient for reliable species identifications. The specimen representing the only known record of *Arenicola defodiens* from Norwegian waters, as well as museum specimens first identified by us as *A. defodiens* based on the ring formula, was re-identified as *Arenicola marina* from more detailed morphological analysis. Our findings corroborate earlier reports of error rates in identification based on the ring formula. We tested robustness of characters to distinguish post-larval specimens of *Arenicolides ecaudata* and *Arenicola marina* from examining 296 specimens. Neuropodia was discovered to be efficient to distinguishing the species from post-larval specimens. Post-larva specimens of *A. ecaudata* and *A. marina* were examined for the development of branchia, and their appearance and development at different stages. Branchiae of *A. ecaudata* appear when specimens measure between 7-13 mm, while in *A. marina* they appear in specimens measuring between 3-5 mm. Our results are in-line with reports suggesting habitat shifts through life stages. We found adult *Arenicolides ecaudata* dominates the deep, while juveniles are mostly found in shallow waters among algae. In *Arenicola marina* the distribution is opposite, with adults in the shallows and juvenile specimens in deeper waters. *Arenicola marina* is documented in depths ranging to 140 m. DNA barcodes were successfully produced for *Arenicolides ecaudata* and *Arenicola marina*. In summary, when considering records of both juveniles and adults living in different habitats, we conclude that *Arenicolides ecaudata* is a more common species in Norwegian waters than previously documented in museum collections and literature. *Arenicola defodiens* has not yet been documented in Norwegian waters.

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**(125) Re-evaluation of the diversity of Eunicidae (Annelida, Eunicida) in Espírito Santo coast (Brazil)**

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Taxonomic revisions directly influence our knowledge about the diversity of known animal groups, thus aiding in the development of better conservation plans for threatened species and can also aid in environment monitoring projects. Eunicidae Berthold, 1827 is one of the most numerous families of the order Eunicida, containing 12 genera and 453 species. These taxa can be found in consolidated or unconsolidated substrate, or they live in symbiosis with other organisms. The work of Zanol *et al*. (2014) revalidated the genera *Leodice* Lamarck, 1818 and *Nicidion* Kinberg, 1865, both previously considered synonyms of *Eunice* Cuvier, 1817. To re-evaluate the diversity of Eunicidae in the region of Espírito Santo (Brazil), 196 specimens contained in 40 lots from the annelid collection of the Museu Nacional (one of the largest and oldest scientific institutions in Brazil) were analyzed, with the aid of a binocular stereomicroscope. The data found in the collection suggest that *Eunice* is more abundant, however, some specimens previously identified as *Eunice* were reidentified and placed in four other genera: *Leodice* (112 specimens), *Nicidion* (21 specimens), *Palola* Gray in Stair, 1847 (20 specimens), and *Lysidice* Lamarck, 1818 (11 specimens). Therefore, only 33 specimens remained identified as *Eunice*. The taxonomic changes are partly due to taxonomic revisions, considering that

the analyzed specimens were incorporated into the collection before 2014, before *Leodice* and *Nicidion* were revalidated. At present, the results indicate that *Leodice* represents the most abundant Eunicidae genus in Espírito Santo. The perspective is that more specimens will be reidentified to species level, allowing for a better understanding of the diversity of Eunicidae in Espírito Santo.

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**(129) Taxonomic review of the genus *Poecilochaetus* (Poecilochaetidae, Annelida) of Guanabara Bay, Rio de Janeiro, Brazil**

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The genus *Poecilochaetus* has 32 species, with a nearly worldwide distribution. It is characterized by amongst others the ampullaceous cirri and a projected cage of chaetae. Along the Brazilian coast, five species have already been recorded: *P. serpens* Allen 1904, *P. modestus* Rullier 1965, *P. australis* Nonato 1963, *P. perequensis* Santos & Mackie 2008 and *P. polycirratus* Santos & Mackie 2008. The last three have their type locality as Brazil. *Poecilochaetus perequensis* and *P. polycirratus* were described in the same locality in South Brazil. *Poecilochaetus* is the most abundant genus in the Guanabara Bay, Rio de Janeiro, Brazil. At first, only *P. australis* had been recorded but latter studies also registered *P. perequensis*. The objective of this work is to review the diversity of species of *Poecilochaetus* at Guanabara Bay. Until now, we have identified *P. australis* and another species, which is much less abundant and probably a new species. This new record differ from *P. australis* and *P. perequensis* in that specimens have median nuchal organs elongated at the base and trilobed at the distal region, in the shape of aristate chaetae, and in the absence of the chitinous plate on chaetiger nine. More detailed morphological analyses are ongoing to determine is this new record correspond to a new species.

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**(130) *Leodice* Lamarck, 1818 (Eunicidae, Annelida): new combinations and update bathymetric distribution**

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The genus *Leodice* Lamarck, 1818 was revalidated and amended to represent a clade that includes the type species, *Leodice antennata* Savigny in Lamarck, 1818. *Leodice* includes species with at least one of the exclusive features: 1- regularly articulated prostomial appendages or 2- light bidentate or tridentate subacicular hooks that it shares with *Eunice* Cuvier, 1817 and five prostomial appendages, a pair of peristomial cirri, and dark subacicular hooks. The objective of this study is to propose a list of new classifications for *Leodice* species that are still formally recognized as *Eunice* and to discuss their bathymetric distribution. The morphological data of the species of this study were obtained from specialized bibliographies, containing the original descriptions and redescriptions of the species that were identified. After reviewing the literature, 94 new combinations were proposed for the genus *Leodice*. The bathymetric range of the analyzed material was 3 – 1357 meters deep. Fourty nine taxa were considered *Leodice* because they have clear a tridentate subacicular hook. A light bidentate subacicular hooks place a further 35 species within *Leodice*, although some individuals did not have regular articulation in the prostomial appendages. Ten species were classified as *Leodice* by presenting dark bidentate subacicular hooks and regular articulations in the prostomial appendages. Previously only 34 species were considered *Leodice*. However, based on the new combinations generated in this work, *Leodice* includes at least 128 species. Funding: CAPES. FAPERJ proc. E-26/201.329/2021; proc. E-26/010.002252/2019.

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**(141) Taxonomic and ethnozoological aspects of two *Sipunculus* (annelida: sipunculidae) species from Bahia, Brazil**

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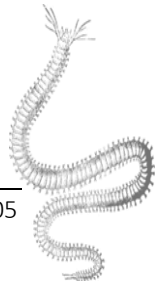

The genus *Sipunculus* includes 13 valid species but a long list of synonyms. It is a well-known genus because of the large size of its members and high abundance in muddy/sandy intertidal environments. Four *Sipunculus* species have been reported from southern Brazil: *S. nudus*, *S. phalloides*, *S. polymyotus*, and the endemic *S. marcusi.* They can be differentiated by the number of longitudinal muscle bands (LMB's), shape of cerebral process, and the position of nephridiopores in relation to anal aperture. Here we report for the first time on the occurrence of the *Sipunculus nudus* species complex and *S. polymyotus* in northern Brazil. The tow taxa co-occur on a tidal flat in Todos-os-Santos Bay. The studied population of *S. nudus* is very abundant and the collected individuals had a total length of 7.1-23.5 cm, 0.48-1.5 cm wide, 26-36 BML's and the shape of the cerebral process and other morphological/anatomical characteristics agreed with the other studied populations from southern Brazil. A single individual of *S. polymyotus* was collected measuring 30.5 cm long, 2.6 cm wide, 44 LMB's, and this individual had a fasciculate cerebral process. Fifteen fishermen were interviewed while collecting the worms to account for demographic characteristics, and to observe their sampling techniques and how they use the worms. All fishermen were men, with over 40 years of age, living in nearby neighborhoods and reported that they have collected and used *S. nudus* known as "bicho" (free translation: critter) or "minhocão" (free translation: large worm) as bait. They learned how to collect, process and use the worms as baits from their elders, indicating that this activity is ancestral. *Sipunculus polymyotus* is recognized by local fishermen but they usually return them to the sediment after collection because they think these usually larger individuals are the 'reproductor' and collection would affect local abundances.

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**(145) A glimpse into the diversity of the *Capitella* spp. complex in New Zealand**

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Species of the genus *Capitella* (Blainville, 1828) are often referred to as important environmental indicators. Recent publications have documented that the tolerance to different environmental stressors varies between *Capitella* species. Therefore, taxonomic descriptions for these species will provide valuable information for ecology, biomonitoring but also evolutionary biology studies. A study was conducted to provide morphological descriptions for 108 specimens of the genus *Capitella* found in New Zealand waters. Most samples were provided by the Cawthron Institute, Nelson, New Zealand, and obtained from marine soft sediment under salmon farms in the Marlborough Sounds region in 2021. Additional material of capitellids held by the National Institute of Water and Atmospheric Research (NIWA) were collected in 1978 from the Pāuatahanui Inlet, New Zealand. Specimens in this study were identified as *Capitella* cf. *giardi* (Mesnil, 1897), *C*. cf. *capitata* (Fabricius, 1780), *C*. cf. *minima* (Langerhans, 1880) and *C*. cf. *aberranta* (Hartman & Fauchald, 1971). *Capitella* sp. nov. 1 and *Capitella* sp. nov. 2 are newly described species. All observations were compared to Blake's (2009) description of the *Capitella capitata* neotypus, and to descriptions of sibling species found in the Pacific Ocean. Capitellids in this study differed from other Pacific *Capitella* species primarily in their genital character and dentition of hooded hooks. *Capitella* sp. nov. 1 was found in the Marlborough Sounds region. It has a rounded, triangular head region and the boundary between the prostomium and peristomium is indistinct. Capillary setae occur in neuro- and notopodia of setigers 1-7. Hooded hooks and capillary setae are present in neuropodia of setiger 8. Females have notopodial hooks and males have dorsal genital spines on setigers 8 and 9, indicating sexual dimorphism. *Capitella* sp. nov. 2 was identified in the collection from Pāuatahanui Inlet. Unlike *Capitella* sp. nov. 1, the second new species has capillary setae in neuro- and notopodia of setigers 1-4 and hooded hooks first appear on setiger 5. However, only juveniles of *Capitella* sp. nov. 2 were found and the arrangement of setae is hypothesised to change as individuals mature.

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**(146) What have we done? Five years of Polychaetology**

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This work aims at reviewing the history and topics of polychaete studies in the last 5 years – since the 2019, the year of the last IPC conference in Long-Beach, California. I have reviewed the database of "Web-of-Science" for all publications with the word "Polychaeta" mentioned in them, and analyzed them according to 19 categories, from "Taxonomy" to "Microbiome studies". Since 2018, 952 studies were published. The number of publication each year was between 212 and 248 (not including 2023, which just began). More than 700 institutions from 77 countries participated in these studies. The ten most prolific countries, that were led by Brazil, USA and Italy, accounted for more than 77% of publications. Taxonomic studies accounted for almost half of all publications (44%), not surprising because half of them documented the description of novel species. A fifth of the studies related to biodiversity, and included, checklists and studies on multitaxa monitoring etc. Five percent of the publications related to toxicology studies and a similar number of publications, mentioned Polychaeta in an incidental manner, usually at the class level and as part of a diet of another organism. The rest of the publications covered diverse topics such as anatomy, developmental biology, reproduction, physiology, paleontology, immunology, biochemistry and pharmacology, genetics and more. In summary, Polychaeta studies in the last five years are diverse and cover many aspects of biology and ecology. A great proportion of the studies is related to taxonomy, even in comparison to other groups – Sponges (23% taxonomy studies in the last 5 years), Tunicata (13%), Bryozoa (20%). This is possibly because of the rate of discovery of novel species (about 180 a year in 2017-2020), and the fact that there a possibly 10,000 species left to discover. I argue that in order to diversify Polychaetology, more emphasis should be given in future studies to neglected topics. Moreover, only 3% of the publications are from Africa, in spite of the large coastline of the latter. I urge to increase study effort in these parts of the world.

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**(149) A new species of *Erinaceusyllis* (annelida, syllidae) from the western Antarctic peninsula**

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Syllidae Grube, 1850 is one of the largest and most diverse families of polychaetes, with approximately 1100 valid described species, distributed in 79 genera and five subfamilies: Anoplosyllinae Aguado & San Martín, 2009, Autolytinae Langerhans, 1879, Eusyllinae Malaquin, 1893, Exogoninae Langerhans, 1879, and Syllinae Grube, 1850, in addition to some *incertae sedis* genera. Among them, the Exogoninae is a monophyletic group, however, some of its genera, such as *Erinaceusyllis* San Martín 2003, are not. This genus was erected by San Martín (2005) in the early 2000 and consists of several species previously described under *Sphaerosyllis* Claparède, 1863 that brood eggs dorsally by means of capillary notochaetae, in contrast with brooding ventrally as in specimens of *Sphaerosyllis sensu stricto*, as currently conceived. Despite its relative importance, the general knowledge on this family in Antarctica is scarce, since most of the research only included brief diagnosis of the species, with none or few illustrations of commonly used diagnostic characters. Only one species of *Erinaceusyllis* has been reported for the Antarctic Peninsula region so far: *E. perspicax* (Ehlers, 1908), previously known as *Sphaerosyllis perspicax*. In this study, we describe a new species of *Erinaceusyllis* from shallow waters of the region. Sediment collections were carried out in January 2016 during Operation Antártica (OPERANTAR) XXXIV at six oceanographic stations comprising coastal and oceanic waters of the Western Antarctic Peninsula, between depths of ca. 40 m to 400 m. The specimens were examined under stereomicroscope, compound light microscope and scanning electron microscope (SEM). Currently, the genus *Erinaceusyllis* comprises 20 valid species. *Erinaceusyllis* sp. nov. can be distinguished from its congeners by having blades of falcigers subbidentate and bidentate with a wide dorso-ventral

gradation in length (53-15 µm). The material herein analysed is deposited in the Annelid collection of the Zoology Museum (MZUSP), University of São Paulo (São Paulo, Brazil).

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**(150) Polychaete annelids collected by the *Terres Australes et Antarctique Françaises* (*TAAF MD55/Brésil*) expedition, with a focus on Nereididae Blainville, 1818 (Annelida, Phyllodocida)**

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The vastness of the Brazilian territorial sea, associated with the fact that Brazil is considered a megadiverse country, sharply contrasts with the low level of national knowledge regarding the deep sea. The latter habitat is extensive but fragile. Suffering from a relatively recent exploitation interest, e.g., in deep sea mining, many environments and species may become threatened without our knowledge of their existence. In order to diminish the knowledge gap, the present study aims to identify material from a largely unexplored collection of polychaetes, from the *Terres Australes et Antarctique Françaises* (TAAF) expedition, with the MD55 cruise aboard the R/V Marion Dufresne. Held in 1987, the cruise sampled stations off the states of Rio de Janeiro, Espírito Santo and Bahia, including canyons and abyssal plains, environments at depths rarely, if ever, studied in Brazil. With the material so far investigated (~90% of the total), 3,061 polychaetous annelids were identified, representing 33 families. The present study is focused on the family Nereididae, for which 151 individuals were found until now, and these include specimens of the genera *Ceratonereis* (3 morphospecies), *Neanthes* (1 morphospecies), *Nereis* (4 morphospecies) and *Platynereis* ( 1 morphospecies). Further analyses of this material are ongoing, specially using scanning electron microscopy and micro-computerized tomography, in order to help the confirmation to species level and the potential description of new species.

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**(152) Eunicidae from off Trindade and Martin Vaz Archipelago (Southwestern Atlantic, Brazil) sediment characteristics**

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The Trindade and Martin Vaz Archipelago (TMVA) is a group of oceanic islands located on the Southwestern Atlantic, about 1200 km from the coast of Brazil and about 4500 km from the African coast. The archipelago is volcanic in origin, formed 3.5 million years ago, and, therefore, never connected to the continental shelf. Given the historical and spatial isolation of TMVA, the biogeographical affinity of its fauna is an interesting research topic. Furthermore, since 2018, TMVA is a conservation unit, making it of uttermost importance to describe its biodiversity to better guide conservation efforts in the area. However, the marine fauna of TMVA remains understudied, including polychaetes. In this context, the present work aim to describe the fauna of Eunicidae of TMVA, and to discuss the biogeographical affinities of the species found here. We examined 443 specimens from the Marine Invertebrates Collection of the Zoology Museum, University of São Paulo, collected from the intertidal zone to 27 meters deep (during 2012 and 2013). The specimens were morphologically identified using common optical and scanning electron microscopes. Six morphotypes were identified, belonging to six genera: *Eunice* Cuvier, 1817, *Leodice* Lamarck, 1818, *Lysidice* Lamarck, 1818, *Marphysa* Quatrefages, 1866, *Nicidion* Kinberg, 1865, and *Palola* Gray in Stair, 1847. The morphotypes will be further identified, possibly resulting in the description of new endemic species. This is the first record of *Nicidion* and *Leodice* for the archipelago.

**(153) Sabellidae and Serpulidae from off Trindade and Martin Vaz Archipelago (Southwestern Atlantic, Brazil)**

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The Trindade and Martin Vaz Archipelago (TMVA) is the most isolated group of Brazilian oceanic islands, located at about 1200 km from the coast of Brazil. Even though TMVA was recently established as a conservation unit, the knowledge of its marine fauna is still scarce, with many groups lacking comprehensive taxonomic checklists. A better understanding of the marine biodiversity of TMVA is thus fundamental to better guide conservation actions in the area. Moreover, taxonomic knowledge is necessary to understand the biogeographical origins and connections of the marine fauna of TMVA. We here aim to investigate the fauna of Sabellidae and Serpulidae from TMVA. These taxa represent two families of polychaetes common found on benthic environments but no record of them exixt on the archipelago. The examined material was deposited on the Marine Invertebrates Collection of the Zoology Museum, University of São Paulo, and was collected from the intertidal zone to 30 meters deep (during 2012 and 2013). The specimens (16 sabellids, 115 serpulids) were morphologically identified using common optical and scanning eletron microscopy. One morphotype of sabellid was identified, belonging to the genus *Notaulax* Tauber, 1879; this morphotype will be further identified to specific level and may represent a new endemic species. Two species of serpulids were identified: *Pomatostegus stellatus* (Abildgaard, 1789), and *Spirobranchus giganteus* (Pallas, 1766). Both species are considered widespread in the Tropical Atlantic and these new records further expand their distribution.

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**(155) New aulophora belonging to the *Loimia / Lanice* group (polychaeta, terebellidae) from the southwest Atlantic with remarkably modified uncini**

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Aulophorae are planktonic larval or post-larval stages in some Terebellida (notably, terbellid genera *Lanice* and *Loimia* and pectinariid genus *Pectinaria*). They reside within a gelatinous tube and secrete mucous strands to increase buoyancy, and, hence, the duration of staying in the pelagic. Because *Lanice conchilega* (Pallas, 1766) is an important ecosystem engineer, it is more or less well-studied in many aspects, including larval development. Studies of auloporae in other species (except, perhaps, for *Loimia medusa* (Savigny, 1822)) are scarce, and their diversity is considered overlooked. During the 87 cruise of the R/V Akademik Mstislav Keldysh, unknown aulophorae were found in plankton samples obtained in the Southwest Atlantic. They are notable for their enlarged uncini with unusually long shafts giving them a spur-like appearance. One spur per parapodium is present in up to twelve (depending on size) posterior thoracic chaetigers. It occupies a separate position ventral to regular avicular uncini. Our specimens possess uncini in double rows arranged in a back-to-back position which is a distinguishing feature of the *Lanice* / *Loimia* group. Avicular uncini are characteristic of *Lanice*, whereas *Loimia* possesses pectinate uncini. However, juveniles of some *Loimia* species are known to bear the usual avicular uncini in the posterior abdomen. It might be assumed that pectinate uncini can replace avicular ones through developmental stages. Thus, avicular uncini in our specimens do not contradict their assignment either to *Lanice* or to *Loimia*, especially taking into account their strong modifications. Moreover, our aulophorae appear to be more developed than the described aulophorae of other species. Surprisingly, molecular data showed nearest K2-P distances of 1–3% for the D-

region of 28S, but 11–14% sequence divergene for 18S between our aulophorae and *Lanice* / *Loimia* available in the GenBank.

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**(157) Small yet meaningful - Potentially new species of *Galathowenia* Kirkegaard, 1959 and *Owenia* Delle Chiaje, 1844 (Annelida: Oweniidae) from Malaysia**

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Two potentially new oweniid species are described from the east coast of Peninsular Malaysia for the first time, namely *Galathowenia* cf. *annae* and *Owenia* cf. *bassensis*. These two species are found in the soft bottom of the breakwater area of Kuala Nerus, Terengganu, Malaysia. Both species are currently representing the smallest species ever recorded in the genera. They closely resembled *G. annae* and *O. bassensis* from Australia. However, *Galathowenia* cf. *annae* potentially represents new species as it differed from *G. annae* in terms of the presence of brownish eyespots, relative length of thoracic chaetiger (RLTC), location of pigmentation, longest chaetiger's position, and the number of pygidial lobes. Meanwhile, *Owenia* cf. *bassensis* differs from *O. bassensis* in terms of the number of tentacular crowns and type of ramification. These two species are the latest addition to Malaysia's annelid diversity lists. The spatiotemporal presence of these species may reflect the impacts of breakwater installation in the tropical region, which is subjected to rapid development in the coastal area.

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**- - END OF POSTER PRESENTATIONS - -**

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# Thank you for joining us for the 14th International Polychaete Conference 2023


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