

Gary Carvalho, reports on the FSBI sponsored session at the 9th World Fisheries Congress – Fish and Fisheries at the Food-Water-Energy Nexus held between 3-7 March 2024 in Seattle, Washington, USA



Kerry Naish

The session was on the *Evolutionary effects of species distribution shifts: building adaptive capacity for conservation and management* and was convened by Kerry Naish, Lorenz Hauser, and Daniel Schindler all at the School of Aquatic and Fishery Sciences, University of Washington.

Session Description

This session brought together geneticists, ecologists, and modelers focused on understanding and managing the evolutionary, genetic, and ecological processes that maintain adaptive capacity in fish populations under rapid



Lorenz Hauser

climate change. Our intent was to explore the pace and genetic consequences of distribution shifts, the role of phenotypic plasticity versus adaptation in influencing species responses, and the relevance of population portfolios for maintaining species. We also wanted to examine advances in management approaches that promote a diversity in evolutionary process, such as improving conditions for recruitment and connectivity, genetic rescue and assisted gene flow, habitat restoration and the establishment of habitat reserve networks. Throughout, our intent was to explore the integration of



Daniel Schindler

core evolutionary processes into supporting diverse population and habitat portfolios across the changing seascapes and landscapes, so that species and the human activities that depend on them have the capacity to respond adaptively to global change.

Two mid-career researchers, Ian Bradbury from Department of Fisheries and Oceans, Canada and Stephanie Carlson, University California Berkley, USA were invited with one early career researcher. The talks were given by the following people given with the titles of their talks. Many of the papers had other authors but ➤



Ian Bradbury

these have not been listed for the sake of space.

Papers presented

Ian Bradbury, Fisheries Oceans, Canada. Genomic-Based Predictions of Climate Change Impacts in Aquatic Species and the Genarcc Project.

Courtney Gardiner, Stellenbosch University, South Africa. Applying Genomic Tools and Distribution Models to Exploited Fishes in the Southeastern Atlantic.

Elizabeth Lee, Alaska Department of Fish and Game, USA. Genetic Examination of Pink Salmon Expansion in the North American Arctic.

Tasha Thompson, Wild Salmon Centre, USA. Range-wide Chinook Salmon Whole Genomes Reveal Broad Importance and Complexity of GREB1L.

Stephanie Carlson UC-Berkeley, USA. Flow-Phenology Mismatches Drive Reduction of Salmonid Fishes Near Their Southern Edge.

Erin Collins, Michigan State University, USA. Evaluating Intraspecific Diversity in Central Valley Chinook Salmon Over 20 Years.

John Morrongiello, University of Melbourne; Australia. Exploring Patterns in the Phenotypic Diversity of Individual Growth Across a Fish Species' Range.



Stephanie Carlson

Jessica Miller, Oregon State University, USA. The potential role of enhanced selective mortality during marine heatwaves.

Fabrice Teletchea, Laboratoire Interdisciplinaire des Environnements Continentaux France. Genetic Diversity and Structure of Brook Trout in Saint-Pierre and Miquelon.

Peter Westley, University of Alaska Fairbanks, USA. Collaborative Approaches to Ecological Investigation of Increasing Pacific Salmon in Arctic Alaska.

Alaia Morell, Puget Sound Institute, USA. Impacts of fish evolution in ecosystem projections under climate change.

Marine Beneat, IFREMER; France. Role of Functional Traits and Genetic Diversity Interaction, in Fish Population Resilience.

Gladys Nzeh, University of Ilorin, Nigeria. Management Approaches That Promote Evolutionary Process.

Haolin Yu, Institute of Oceanology, Chinese Academy of Sciences, China. Facilitating Species Distribution Adaption: Optimizing Artificial Reef Layouts for Hypoxia Mitigation.

A summary of the event

The invited speakers anchored the three core areas underlying the session theme. Ian Bradbury spoke on the use of genomic



Tara Marshall opening a plenary session at WFC 2024

-based approaches to predict species responses to climate change, providing a broad overview of a novel and growing research area to determine whether aquatic species have the adaptive capacity to adapt to warming trends. Stephanie Carlson led a core topic area on eco-evolutionary and phenotypic responses to warming by describing her work on species vulnerability at the trailing edge of their distribution. Finally, Peter Westly described how community-led research is being used to characterize the ecological and social impact of northward species distribution shifts, into the Arctic. The communities he described are impacted by changing ecological conditions and replacement of traditional fisheries by new species. These keynote addresses were each followed by contributed talks that addressed each of the core themes.

The session was introduced by describing the session aims and highlighting FSBI sponsorship. Gary Carvalho as FSBI representative warmly welcomed the speakers and thanked the session organisers. The standard of talks and the quality of science was very high, representing a broad range of techniques, topics and perspectives. Overall, our speakers represented seven countries (drawing speakers from Africa, Asia, Europe, North America, Europe and Australia), ➤

64% women and 36% men, and 50% Early Career Researchers. Our only regret is that pre-conference cancellations of contributed talks resulted in the reduction of four sections to three.

The session was also the culmination of a graduate seminar class at the University of Washington taught by Lorenz Hauser. Nine students spent the quarter discussing primary literature by the speakers and other scientists in the field and were then invited to the session. Feedback was generally very positive, as the session provided

students with an opportunity to interact with leading scientists in their field after getting comfortable with the subject area. Their registration fees were covered by sources other than FSBI funding.

Thanks to FSBI sponsorship, we were very pleased to offer a catered networking event after the formal program to all our speakers. This event was an unexpected highlight that recognized the valuable contribution of all our participants. Speakers and organizers spend several social hours together discussing their science, reinforcing professional

relationships, and exploring international collaborations. The FSBI representative provided several persuasive arguments for a special issue on the session theme – and we look forward to his leadership in organizing this work. We are very grateful to FSBI for the chance to organize this session and bring together many researchers working in a novel and impactful topic area.

The feedback after the social event was very positive which reinforced the feeling that the FSBI support was well spent.

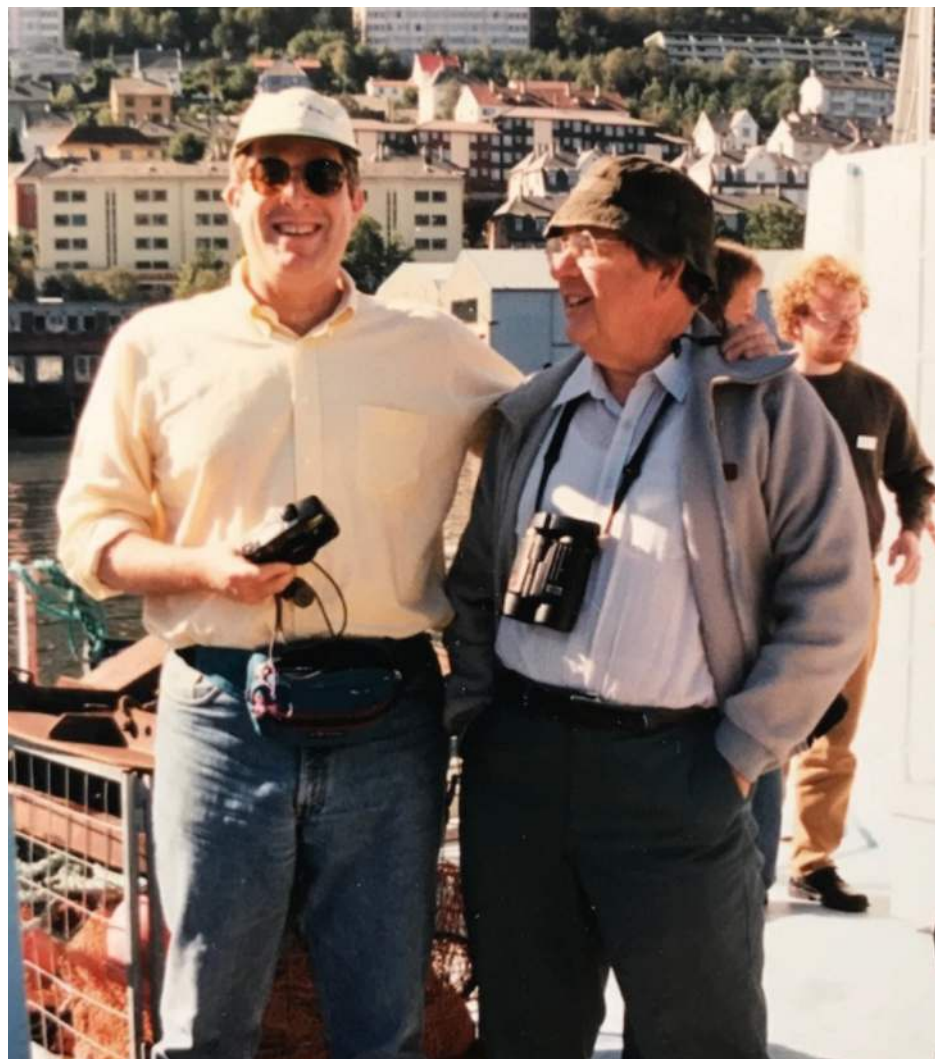
Editorial

In the 1980s when behavioural ecology was developing a strong theoretical toolbox based mostly on optimisation methods, many borrowed from economics, the publication in 1988 of Marc Mangel and Colin Clark's book *Dynamic Modeling in Behavioral Ecology* (Princeton University Press) showed the field a new approach. Most of the optimisation models such as optimal foraging theory, did not pay much attention to the internal state of the organism. Stochastic Dynamic Programming or SDP was different in that it did take the animal's internal state into account and allowed one to determine the optimal sequence of decisions an animal should make, given its present state, to achieve an optimal outcome. SDP models generate the optimal action while maximizing a metric of Darwinian fitness. In the context of the Agent Based Modelling methods described in Smaldino's book (see review), Railsback and Harvey in *Modeling Populations of Adaptive Individuals* (2020, Princeton University Press) try to get away from the organism having perfect information about the environment by adopting a 'myopic' strategy in which the organism knows the current environment, chooses the optimal action on the assumption that this will be the permanent state and acts as time moves

forward 1 unit, and then repeats the process.

You may be wondering what the relevance of all this is? My comments are stimulated by the

death in the middle of April of Colin Clark at the age of 93. Colin was by training a mathematician but possibly through is interest in birds (he could tell you at any ►



Marc Mangel (left) and Colin Clark on a bird watching trip, Bergen, Norway 1996.

one time exactly how many species he'd seen), he became involved in applying mathematical ideas to biology and to understanding the overfishing problem. His major contribution to this last issue was his book, published in 1976 entitled *Mathematical Bioeconomics. The Optimal Management of Renewable Resources*. (This appeared in 2nd and 3rd editions as well). This did not just deal with fisheries but the theory developed was instrumental in showing why fish stocks are overexploited. So long as the rate of return on money invested was greater than the intrinsic growth

rate of a fished population, it would be more rational to fish the stock to extinction and invest the money. Clearly there is more than economic considerations in fisheries but the basic economic viewpoint explains why it is so difficult to prevent over exploitation.

Colin Clark was based in the Department of Mathematics at the University of British Columbia, Canada. Marc Mangel was a PhD student with Don Ludwig and a research assistant for Colin, working on models of the tuna purse-seine fisheries in the mid and late 1970s, and it is clear that the collaboration started

then persisted throughout their respective careers. Both people illustrate the best of academic life where the focus is on developing ideas that are interesting and valuable for both their scientific fields and for the welfare of the world. Marc has been associated with the FSBI and has worked collaboratively with a number of members, for example, Neil Metcalfe.

Paul J B Hart
Leicester

Next deadline: 1st August 2024

Words matter

by *Journal of Fish Biology* Editor in Chief, Michel Kaiser



As Editor in Chief of the *Journal of Fish Biology* I am very focused on the quality of writing and language used in the papers we publish. Conveying our thoughts clearly is a critical part of the scientist's role as a communicator. Equally, how we communicate with colleagues is also important and has 'impact' on the person receiving that communication. One of the key issues I repeatedly stress to my editorial board is to communicate to authors in a manner in which you would wish to receive communications yourself. The other part of our role is to

'sensor' sometimes poorly chosen language used by reviewers. It often amazes me how some reviewers do not stop to think about the impact of the wording they have used in their review. If I look back across my own career, a kindly worded rejection which makes lots of constructive comments can be hugely beneficial if a little disappointing. However, a cruelly worded review which is dismissive, rude and personal can have a lasting negative impact for weeks. I have seen this play out worst with PhD students. That first paper experience is critical. If it is positive then you are spurred on to 'do it again'. If your first experience is negative you might think to yourself 'why am I putting myself through all of this grief?'. Students (and I'm sure many professionals) are often left with feelings of self-doubt and imposter syndrome, especially if there is an apparent independent confirmation of those feelings. Writing reviews of other people's research puts us in a privileged position of power. Both reviewers and editors need to use our 'power' thoughtfully and with humanity, however frustrating you might find that manuscript

glaring at you from your screen. Many years ago I had a friend who reared his own rare breed pigs. If he invited you to dinner he would put a picture on the table of your happy pork chop when it was wandering freely around his paddock. It certainly made you think before you tucked into your dinner. Papers become abstract works disassociated from the person that did the work. Next time you review a paper, try and picture the person that wrote it and reflect on their hopes and aspirations for their work.

Editor's note:

The recommendation that reviewers of papers should be considerate strikes a chord with me. When editing *Fish and Fisheries*, I once had to tactfully tell a reviewer that they needed in future to be less sarcastic in their comments. I have also been on the receiving end of a nasty review which more or less made me abandon the manuscript in question. Reviewers do a very important job and the majority are focussed on improving a manuscript rather than trying to find ways to rubbish it.

Holly Shiels, Hon President outlines the purpose of the FSBI Briefing Papers



I wanted to take the opportunity to remind the FSBI membership of our Briefing Papers. The goal of an FSBI Briefing Paper is to inform and promote discussion and debate on a topic in fish biology or fisheries science. The topic may be timely, controversial, or a matter poorly understood but needing clarification from experts. Some of the topics tackled in past Briefing Papers include ‘Nanotechnology in fisheries and aquaculture’, ‘The effects of fishing on biodiversity in the North Sea’, and ‘Marine Protected Areas’. Their aim is to present a detailed, authoritative peer-reviewed synthesis of a topic that is accessible to the general public, policy makers, and fish biologists. Many of our past Briefing Papers have attracted considerable interest and they are

an effective means of promoting scientifically informed public discussion about important and controversial topics in fish biology and fisheries science.

To encourage fish biologists and fisheries scientists to write a Briefing Paper, the FSBI provides financial support. FSBI members can apply for up to £5000 to support a paper’s development. The funds can be used to bring potential authors together for a meeting or a workshop to discuss ideas. Indeed, Briefing Papers are typically authored by multiple people, often with contrasting expertise in the area. Funds can also be used for technical support or to cover costs associated with gathering the information necessary to write the paper.

The form of the Briefing Paper is in two parts. The first part is a detailed review of the literature surrounding a topic. This will be published on the FSBI website as a Briefing Paper and is expected to form the backbone of a review paper submitted to the *Journal of Fish Biology*, where it will follow the normal peer-review process. If accepted, the paper will be made Open Access. Previous Briefing Paper reviews published in the

Journal of Fish Biology have been highly cited. For example, ‘Climate change and the fishes of Britain and Ireland¹’ and ‘An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes²’ have both been cited over 350 times.

The second part of the Briefing papers is a short (3-4 page), accessible, non-technical, summary of the field using plain but exact language. This ‘executive summary’ can be used to inform policy makers and the public about a topic. In recent years, they have taken the form of a parliamentary POST (Parliamentary Office of Science and Technology), which provides a template for relating succinct impartial research on a topic.

As a learned society of fish biologists and fisheries scientists, we have enormous capacity for informing public debate. There are many pressing topics in fish biology and fisheries science, and I encourage all members to consider an FSBI Briefing Paper as a way to communicate science with impact. If there is a topic that you feel is appropriate for a Briefing Paper then please, get in touch! In the first instance visit the Briefing Paper page on FSBI website where you will find more details and also examples of past papers. Through the website you can propose your idea or you can contact us directly at admin@fsbi.org.uk.

¹ Harrod C, Graham C, Mallela J. Climate change and the fishes of Britain and Ireland. *Journal of Fish Biology*. 2009; 74:1143-205.

² Popper AN, Hawkins AD. An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes. *Journal of Fish Biology*. 2019 May; 94(5):692-713.

Journal of Fish Biology (2009) **74**, 1143–1205
doi:10.1111/j.1095-8649.2009.02180.x, available online at <http://www.blackwell-synergy.com>

REVIEW PAPER

Implications of climate change for the fishes of the British Isles

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Holly Shiels (Hon President) and Ada Eslava report on their attendance at the Japanese Society of Fisheries Science spring meeting

The Japanese Society of Fisheries Science (JSFS) hosted the 2024 JSFS Spring Meeting from March 27th to 31st at the Tokyo University of Marine Science and Technology, Tokyo. Holly Shiels, Hon President of the Fisheries Society of the British Isles (FSBI), and Ada Eslava, the representative FSBI PhD student, attended the meeting.

The meeting, held in the last week of March 2024, brought together fish and fisheries scientists from around the world for an exciting two-day international session on the theme: *United Nations Sustainable Development Goals (SDGs) and Fisheries Science*. Fisheries science plays a crucial role in achieving many SDGs, including Goal 2 “Zero hunger” and Goal 14 “Life below water”. The topic felt extremely timely, bringing together local and international researchers with broad interests, including fish biology, the sustainable management of stocks, and the assessment of fish quality as food.

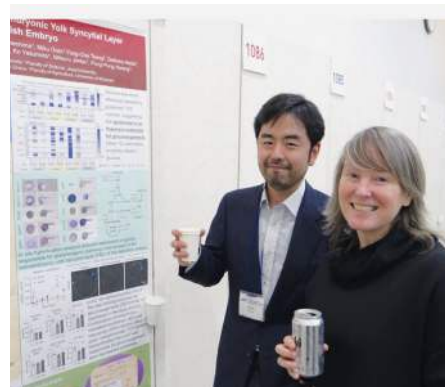
Holly opened the session with a reflection on the role of fish biology and fisheries science for achieving the UN SDGs. She explained how *“Understanding fish biology is essential for sustainable fisheries management. Knowing fish life histories, reproductive biology, and population dynamics for example, allows fish biologists and fisheries scientists to play a key role in developing management strategies and consumption strategies that ensure the long-term viability of fish stocks and our food resources.”*

One of the topics most widely discussed (associated with SDG 12 Responsible Consumption and Production) was the impact of microplastics and other anthropogenic pollutants

on aquatic life. The session highlighted the growing concern of fish, fisheries and food scientists about the issue of pollutants in marine and freshwater systems. This was also mirrored by talks linking land use with aquatic pollution (via SDG 15: Life on Land).

SDG 13 Climate Action allowed contributors to present solutions and ideas for ways forward. Here talks included remediation in wild and aquaculture systems and even a lecture from the President of the American Fisheries Society, Dr Cecil Jennings, on the impacts of climate change on salmonid distribution in the southern United States and how working with local angler groups was key for future management strategies.

In addition to this main event, there was a fantastic evening poster session earlier in the week where Holly and Ada had the pleasure of meeting our Japanese Society of Fisheries Scientist hosts for the first time, along with many students and early career researchers presenting their projects over delicious snacks (and sake! see photo1). Finally, the banquet provided an excellent opportunity for



Our host Dr Fumiya Furukawa, Kitasato University, School of Marine Biosciences, Japan, and Hon FSBI President Holly Shiels, University of Manchester, UK, at the ECR poster night. Photo Credit: Yumi Terashima

connecting with other attendees and culminated in a great evening joining the society’s journal council meeting at a traditional izakaya (Japanese pub).

Holly returned to the SDGs in her banquet speech and reflected on SDG 17: Partnerships for achieving the SD Goals. She remarked on the role learned societies like the FSBI play in advancing the UN SDGs. She thanked our hosts for putting together an event that fostered collaboration and discussion of solutions that enhance the resilience of fish and fisheries, and the sustainability of marine and freshwater ecosystems and their resources, for future generations.

Ada Eslava adds: *“The meeting provided an excellent platform to learn more about fisheries science, a field outside my main expertise. I thoroughly enjoyed attending and meeting researchers from diverse backgrounds who came together to address current challenges and work towards sustainable solutions in fisheries.”*



Ada Eslava, FSBI PhD student representative at the banquet with Prof Reiji Masuda, Field Science Education and Research Centre, Kyoto University (left), and Prof. Kenji Sato, Graduate School of Agriculture, Kyoto University (middle), who will chair the 2024 Autumn Meeting of the JSFS in Kyoto. Photo Credit: Yumi Terashima

Ada Eslava reports on the 2024 FSBI PhD Student Meeting



Student's group visiting the zoo photo with Jack Cooper, Maisie Evans, Claudio Silva Freitas, Mar Pineda, Ben Williams, Ada Eslava (left to right). Photo Credit: William Perry.

Early last April, the FSBI Students organised the first in-person FSBI PhD Student Meeting, which took place at the Zoological Society of London (ZSL). The meeting was attended by students Claudio Silva Freitas, Maisie Evans, Ben Williams (host), Mar Pineda, Jack Cooper, and Ada Eslava, along with the FSBI Social Media Coordinator, Will Perry.

The day began with a talk by David Curnick, head of The Ocean Predator Lab at ZSL and Ben's advisor. David gave insights into the numerous research projects undertaken at ZSL including his team's work investigating the conservation status of marine predators to inform management policies.

Throughout the day, students presented their projects and most recent studies. Maisie kicked off the morning session with her research on the link between shark bycatches in UK waters and their ecology and conservation. Jack followed with an overview of his project on global shark trait diversity change from the

Cretaceous to the present day, while Mar discussed the impact that different sampling methods used in the Amazonian ornamental fishing industry have on target species behaviour. Ben closed the morning session with a talk on the applications of AI in bioacoustics research aimed at improving the conservation of coral reef fish habitats.

After lunch, we enjoyed a mid-day break visiting the zoo and attended a private tour of the coral exhibit, where ZSL aquarists shared insights into coral reef research.

In the afternoon, Claudio presented his research on the effects of hybridisation on fish evolutionary biology, followed by Ada's talk on diversity



Machine learning workshop led by Ben Williams. Photo Credit: William Perry.

change observed in tropical fish assemblages experiencing recreational disturbance. Will concluded the presentations by outlining funding as well as engagement, particularly outreach, opportunities with the FSBI.

All these talks reflected the wide range of topics in fish and fisheries science that are covered by the society's studentships, but they also highlighted our shared interest in understanding how human-mediated activities shape the ecology, diversity, behaviour, and evolutionary trajectories of fish. Engaging discussions followed each presentation.

As the final activity, Ben Williams led an excellent introductory workshop on machine learning and its potential applications in fish research. The workshop included very

useful practical exercises that encouraged us to think about how we can benefit from using machine learning as a tool in our individual research projects.

We concluded a wonderful day with group photos, a visit to

the zoo's rainforest area, and, of course, a stop at a local pub! We look forward to the future annual editions of the meeting and to continue creating a student community with the support of the FSBI.



Group photo with Ada Eslava, Mar Pineda, Jack Cooper, Ben Williams, Claudio Silva Freitas, Maisie Evans & Will Perry (left to right). Photo Credit: William Perry.

For members who obtain a travel grant the FSBI is keen to broadcast what grant holders do with the money

The following is a suggested format for publicising visits made with the aid of FSBI Travel Grants.

We would love to feature your activities funded by the FSBI's charitable funds on our social media. Please fill in the following sections.

1. Twitter summary

Provide a brief summary of your conference experience which will be Tweeted from the FSBI's Twitter account. The summary should include Twitter handles of individuals and institutions involved, as well as relevant hashtags. The summary must not exceed 280 characters (including spaces) per Tweet, with a maximum of 5 Tweets (which will make up a thread). The summary must be written in the third person and in the past tense. Please also refer

to any media (photographs, videos, diagrams) you want uploaded with each of your tweets, these can then be submitted along with your report. The more images the better!

Tweet 1 – Incredibly grateful to @TheFSBI for providing the opportunity to present my research on #social networks and management of European eel at @bls8tokyo2024. Link to the paper can be found here <https://doi.org/10.1093/icesjms/fsae001>
@ZSLScience @ZSLMarine @LancsUniLEC @CefasGovUK

Tweet 2 (optional) –

Tweet 3 (optional) –

Tweet 4 (optional) –

Tweet 5 (optional) –

2. Optional multimedia content – If you would like to upload relevant multimedia content, please upload it alongside your report referencing the file name and provide a brief description of the multimedia (less than 20 words) here. Any multimedia provided may be shared on our social media platforms. Relevant multimedia can vary from photographs and videos taken during sampling to infographics or figures outlining results and concepts.
3. Would you like to be contacted about featuring in the 'Inside the FSBI' YouTube series? (YES)

Travel Grant Reports

Emily Phelps, who is at the University of East Anglia used a travel grant to attend the 57th Population Genetics Group at the University of St Andrews.

From January 8th to 10th, 2024, I attended the 57th Population Genetics Group meeting hosted by St Andrews University in Scotland, where I presented my work exploring the genetics of aposematic pigmentation in *Corydoras fulleri*. Population Genetics Group is an annual medium-sized conference in the UK, drawing primarily national and European researchers. The meeting fosters a supportive environment, particularly welcoming to early career researchers, facilitating presentation, feedback, and networking opportunities. Two of this year's plenary talks were directly relevant to two chapters of my PhD, on selection on meiosis in polyploids and sexually antagonistic genomic selection. Through other talks I learnt about new techniques to analyse genomic data, which have informed my current research, for example, using windowed PCA techniques to investigate genetic

structure within the genome and methods to identify polygenic adaptation. A further goal of mine in attending the meeting was to widen my professional network. I am reaching the end of my PhD and am looking for future research opportunities, preferably investigating environmental adaptation in teleosts. I successfully achieved this goal, establishing connections with two group leaders for potential future collaborations and opportunities.

Michał SKÓRA, Marie Skłodowska-Curie Research Fellow, Queen Mary, University of London,


used a travel grant to attend the Chum and Pink Salmon Symposium at the Annual Meeting of the Oregon Chapter of the American Fisheries Society, Bend, OR, USA, 26.02.–01.03.2023.

Michał gave a paper entitled *The pink salmon invasion of the North Atlantic*. Since 2017, Pacific pink salmon have been spreading rapidly around the North Atlantic. This invasion has generated much concern for the future of native Atlantic salmon and Arctic charr. I presented the history of the pink



salmon invasion of the North Atlantic and the results of my studies at Queen Mary University of London. Collaborators from many North Atlantic countries provided biological samples from >500 specimens. Stable isotope analysis was used to determine the marine feeding grounds of pink salmon, the extent of overlap with Atlantic salmon, and to predict the influence of future climate change. Riverine studies have proven that pink salmon are now successfully reproducing in Scotland and Iceland.



Corydoras fulleri is a rare species in the *Corydoras* genus, found in a small area in the Amazon catchment in Peru. 

The pink salmon invasion of the North Atlantic



Michał E. Skóra, J. Iwan Jones, Bryony Townhill, Gordon H. Copp

Colin Bean, Henrik H. Berntsen, Elena Couce, Gareth D. Davies, Kirstin Eliassen, Marko Freese, Guðni Guðbergsson, Paul Hopper, Rasmus B. Lauridsen, Shona Marshall, Michael Millane, Julius Nielsen, Sean Robertson, Finn Sivebæk, Øystein Skaala, Linda Söderberg, Eva B. Thorstad, Clive Trueman, Jamie Urquhart, Kjell Rong Utne, Alan Wells, Alan F. Youngson



This study was carried out under the PinkSIES project which received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101026030

For many in the audience it was the first time that they had heard about the pink salmon invasion of the North Atlantic. There was great interest in the speed of the invasion, determination of the distribution of the fish at sea, and the measures being taken to reduce their numbers. Attending the symposium allowed me to meet the scientists working on pink salmon in their native range as well as to discuss potential future collaboration.

Michael Williamson, based at the Institute of Zoology, London, was funded to present his research at the 8th International Biologging Symposium, hosted at the University of Tokyo, Japan.

This is an international conference that attracted a global audience of 300+ attendees discussing



biologging science and the use of miniaturised animal attached tags for logging data on animal movement, behaviour, physiology and the environment. It was a great opportunity for me to attend the biggest biologging and biotelemetry conference in the world, which is only held every three years, and present my research to some of the leading experts in this field.

I presented my work, entitled “Using high resolution acoustic telemetry and social networks to define European eel “aggregations“ which generated a lot of positive feedback, especially as the primary model species at this conference tend

to be marine mammals, seabirds and sharks. There was a lot of interest in biologging on eel species! In addition to presenting this research, attendance at this conference allowed me to liaise with collaborators based the Kobe University, University of St Andrews and Oregon State University, and discuss potential future research, funding and postdoctoral opportunities. It was a fantastic conference to attend and expanded my knowledge on behaviour and movement in both marine and terrestrial fauna, as well as providing ideas for future analytical methods for investigating fish behaviour.

Book Review

Modeling Social Behaviour. Mathematical and Agent-Based Models of Social Dynamics and Cultural Evolution.

Paul E Smaldino. Princeton University Press 2023. £50.00 pbk.

At first sight, this book might not seem relevant to fish biologists although fishery scientists might prick up their ears at the mention of modelling; I don't think fish are mentioned in this book. The nearest phenomenon that could be relevant is the flocking of birds, which is not much different from the schooling of fish. In ecology, mathematical modelling has a long history and in behavioural ecology, Marc Mangel and Colin Clark produced methods for modelling decision making in animals that became very popular in the late 1980s and the 1990s (see editorial). They introduced stochastic dynamic programming into the ecologist's toolbox which allowed one to determine the sequence of decisions which would lead to an optimal outcome. The method depended on computer simulation in a way that had not been prevalent earlier in ecological modelling which had mainly relied on differential equations to explore the dynamics of populations.

Many of us now have access to computing power that would

only have been a dream in the early days of my career. A laptop and even a smart phone has more computing power than early mainframe computers that filled a room. This has made it possible for individual or agent based (IBM/ABM) modelling to grow and become a valuable tool in the exploration of the consequences for populations of individual behaviour. An IBM model allows the modeller to include individual variability in behaviour, the effects of which can then be examined at the population level. A disadvantage is that the output can be difficult to understand and if many variables are included in the model the output can be diverse.

Smaldino's book is a well written and entertaining introduction to modelling concentrating on IBMs but also including some more traditional mathematical modelling. Sample programmes are included and all are written in NetLogo (<https://ccl.northwestern.edu/netlogo/>) which is a free language written specifically for the creation of individual based models. After the introduction and a chapter discussing the nature of models, the book continues with a chapter describing the basics of NetLogo. The language comes with a comprehensive guide to both programming in NetLogo and an

explanation of all the functions so Smaldino's introduction does not have to delve into all the subtleties of the language.

Once these preliminaries are dealt with the book continues with chapters on segregation in populations, contagion, opinion dynamics, cooperation, coordination in relation to norms, networks and maps. There is also a chapter discussing the scientific process and another on the relation between models and reality. Although much of the book is about human behaviour, the models are equally relevant to non-humans. From the point of view of fisheries management, the past ten years has seen a change of focus from concentrating just on the biological basis of sustainability to a closer examination of the interaction between the fish population or the ecosystem and human behaviour. In this context, the models outlined in this book are important.

Smaldino's focus in on students learning to build IBMs for the first time but for those working on fish behaviour or on aspects of fisheries management, the book is a great introduction to IBMs and should help to both increase the number of practitioners and to generate a greater understanding of what IBMs can achieve.

Paul J B Hart

Notice

Make your life better with an FSBI Training Grant

Training is essential for all stages of career development and the rapid development of technologies particularly in all methods from sampling to analysis make "keeping up" essential for researchers and practitioners, especially in the early years. The FSBI offers training grants of up to £1000/person open

to all its members, and now to all Institute of Fisheries Management students through the Joint IFM/FSBI studentship. The applications are competitive but generous and criteria are set out on the FSBI website, where you will easily find the application forms. There are three calls a year and next one ends on 1st October 2024. We want to help you and welcome applications; so why not take the opportunity,

submit the application form with a supporting reference letter through MySociety and get on that course that could change your life!

If you have queries about the application please contact Beth Glyn-Ramsden (theteam@fsbi.org) who handles FSBI's member-related business, or Dr Brian Hayden (brian.hayden@unb.ca) chair of the Training Grants Committee.

Notice

Advance notice of opportunities to become an FSBI Officer in 2024 and 2025

We are looking for a new Honorary Treasurer to join Council in July 2024, followed by a new Honorary Vice-President and a new Honorary Secretary to join in July 2025. As Officers of the Society, these positions play very active roles in delivering to FSBI's wide-ranging charitable objectives supporting fish biologists and fisheries science. We are publicising these opportunities now because all three current Officers are willing to describe in detail their duties to any interested individuals in advance of July 2024 and July 2025, at which times the final appointments will be made by election at those years' Annual General Meetings. If you are interested in or have any questions about any of these positions, in the first instance please contact the current Honorary Secretary Ian J. Winfield by email at secretary@fsbi.org.uk.

What are the benefits of being an FSBI member?

At this year's World Fisheries Congress in Seattle, members of the World Council of Fisheries Societies, such as the FSBI, were offered an opportunity to showcase their societies during the transition times between plenary sessions. Societies were invited to provide a two-minute video introducing themselves, their activities as well as information on upcoming meetings. The FSBI's video was described as particularly

captivating, and while readers of the newsletter probably have a good idea of what the FSBI is about, the video provides a reminder to members of the opportunities that are available to them, and why their support is so important. It also packages up all the benefits of being an FSBI member into an easily digestible format and is therefore a handy resource to provide inquisitive fishy people who are not yet members!

[Will Perry](#)



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