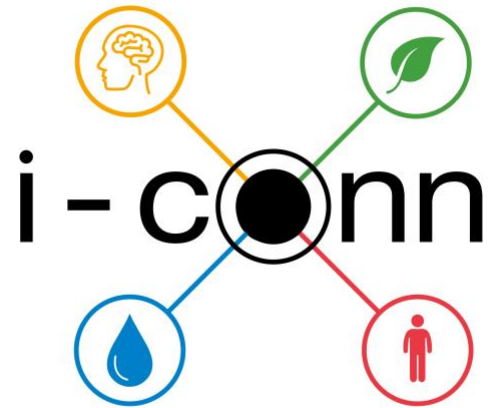


i-CONN Network



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Deliverable D6.9 Report
Communication, Dissemination
and Impact Activities.

i-CONN: Communication, dissemination and impact activities

Contents

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 - a) Website
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2. The ESRs report on their communication, dissemination and impact activities
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Network wide communication, dissemination and impact activities



Above: The front cover of the first 'Connectivity Times'.

Below: A screenshot of a journal articles written by Mel Guirro.

The i-CONN website has been the principal route to communicate our network-wide activities. The ESRs published four e-magazines – 'The Connectivity Times'

<https://iconn.network/newsletter/>. A different team of ESRs worked on each edition.

Articles included interviews and reports on meetings, seminars and workshops.

Additionally, the website hosted the ESRs' journals, with thirty three written articles across the individual ESR pages e.g.

https://iconn.network/early_stage_researchers/early-stage-researcher-6/

Curious About the Marie Curie PhD Fellowship?

Ho

Are you considering pursuing a PhD and wondering what the experience of a Marie Curie PhD fellowship might be like? I'm a Marie Skłodowska-Curie fellow for almost 3 years now and I can tell you what it feels like. When I talk to other PhD friends I have, I notice that the Marie Curie fellowship is famous for providing a great salary and financial support to do research. But this fellowship offers so much more.

First, the networking opportunities are tremendous. I had the chance to work with different

The ESRs explain their research in an accessible way via short videos that are posted on the i-CONN website: <https://iconn.network/vlogs/>

Prior to producing these videos, the ESRs received training in how to deliver a “3-minute-thesis”/TedX style presentation. Their presentations were filmed at the 2022 Annual Workshop.

Right: Julia Costescu explains about pollution in rivers.

Below: A screenshot of a Twitter post sent by Shubham Tiwari.



i-CONN also has its own Twitter/X account, with the ESRs responsible for tweeting on a rotating basis. The network has 160 followers and has been used to disseminate information about network wide activities such as meetings and training courses and to promote individual ESR activities such as the publication of papers.

The i-CONN seminar series <https://iconn.network/events/archive/> allowed us to invite a wide community of people to attend live online lectures from connectivity experts. The lectures were widely advertised including to the mailing list of the Institute of Hazard, Resilience and Risk, Durham University which reaches over 500 people worldwide. This seminar series was a response to the pandemic and allowed us to engage with the wider community/the public at a time when ‘traditional’ outreach activities were not possible as well as offering learning opportunities to our ESRs.

Our five network meetings all offered opportunities for the ESRs to practice giving research talks but as many of our meetings were attended by guest speakers or members of our Advisory Board, their research was communicated to an audience beyond the immediate i-CONN consortium.

The ESRs report on their communication, dissemination and impact activities

In this section the ESRs each report on their dissemination, communication, engagement and impact activities over the duration of i-CONN. A list of publications and pending publications is found in the final section.

*Cross-beneficiary activities are marked with an asterisk.

ESR1, Shubham Tiwari, Durham University, UK

Context

My PhD project focused on understanding connectivity patterns in dryland ecosystems. Over the last three and half years, I collaborated with freshwater ecologists, physicists, and neuroscientists to develop a better understanding of multidisciplinary applications of network science. This interdisciplinary approach helped advance connectivity research in drylands, and we were able to highlight some key connectivity patterns associated with the transition of global drylands.

Through outreach and engagement activities, I've had the opportunity to share my research with the wider community, including policymakers, land managers, and the general public. This has helped raise awareness about the importance of understanding and preserving the connectivity of dryland ecosystems.

Oral presentations

- *Level 1 and Level 3 postgraduate seminars at Durham University*
- *Oral presentation at the BSG (British Society for Geomorphology) annual meeting 2023, University of Edinburgh*

Poster Presentations

- *'Linear and non-linear connectivity measures and their validation through anatomy and recourse to raw signals', at the Online INDAM workshop Non-Invasive Mathematics, April 2021 (with Christodoulos Karittevlis, Michalis Papadopoulos, and Andreas A. Ioannides)**
- *'Assessment of fine sediment connectivity in agricultural hillslopes of the Fugnitz catchment, Lower Austria using sediment transport modelling and network analysis' (with John Perez, Laura Turnbull, John Wainwright, and Ronald Pöppel)**

Outreach/Engagement with the wider community, general public and children.

- *Article for a science magazine. 'Earth as a Complex System', Chrysalis*
- *Prepared and participated in a half day activity with Peases West Primary School, 18 children (aged 10-11 years).*
- *Talk about MSCA at IISER, Bhopal, India.*
- *Contributed to the COP26 School Project Durham:*
 - *Advising on and contributing to Education pack materials*
 - *Translating the materials*
 - *Outreach activities in schools or virtually with schools*
 - *Delivery of ECO2 COP virtual event (September to October)*

Potential Impact of work and interaction with policy makers

My research has potential impacts on environmental management and conservation efforts in dryland regions. By quantifying water-mediated connectivity patterns, we can identify critical nodes and processes that shape the structure and function of these ecosystems. This knowledge can inform sustainable land-use practices, restoration strategies, and policies aimed at mitigating the effects of climate change and human activities on these fragile environments. The network-based approach also has potential applications in other water-controlled ecosystems, such as wetlands, floodplains, and coastal areas.

- *Presentation at a multisectoral conference 'Understanding and Managing Connectivity' May 2022*
- *Our December 2022 field trip to a semiarid rangeland in the USA helped local ranchers develop a better understanding of water-erosion dynamics in the landscape and provided them with aerial imagery of their land.*

ESR2, Venetia Voutsas, Constructor University (previously Jacobs University), Germany

Context

My PhD work focuses on defining generic properties of relationships between structural and functional connectivity (SC/FC relationships, i.e. relationships between network architecture and dynamics) and methods for exploring them. Furthermore, in collaboration with Durham University we performed analysis on rainfall-runoff data in order to classify rainfall events and detect patterns of SC/FC relationships across the corresponding runoff events.

Oral presentations

- *I gave oral presentations about my work in two colloquiums, one at the University of Oldenburg and one at the European University Cyprus and in group workshops, organized by our group leader Prof. Dr. Marc-Thorsten Hütt.*

Poster Presentations

- *I presented a poster entitled “The attractor structure of functional connectivity in networks of coupled logistic maps” at NetSci 2023, in Vienna.*

Potential impact of work and interaction with policy makers

The theoretical part of my work aims to provide a framework about SC/FC relationships and inspiration for domain-specific strategies for complex system analyses. The core components of my work are primarily of interest to researchers, as they suggest how to organize observations that characterize the behavior of the systems and relate their structure to their function. In addition, we developed a data analysis tool, that can be used to enhance network visibility through dynamical observations and to determine invariant properties of the system.

The insights of the investigation about the relation between rainfall – runoff events could potentially be beneficial for water conservation and management of semiarid regions.

ESR3, Selim Haj Ali, Constructor University (previously Jacobs University), Germany

Context

I study the theoretical underpinnings of pattern formation on graphs. My core research project centers around Turing patterns on graphs. I also have a number of collaborations within the i-CONN network where we seek to understand the self-organised collective behaviour of real-world networked systems, including hillslope erosion dynamics (collaboration with researchers at Durham University) and multi-regional input-output databases (collaboration with researchers at MODUL University).

Oral presentations

- *NetSci 2023 “Inferring missing edges in a graph from observed collective patterns” (July 2023)*
- *Sunbelt 2024 “Preparing for decarbonisation? A vulnerability check of global economies in the face of fossil fuel supply constraints” (June 2024)**

Potential impact of work and interaction with policy makers

- *my study of Turing patterns on graphs will soon lead to another publication (expected submission June 2024). In this paper, we explain how Turing patterns can be predicted using graph theory, establishing a new-found link between graph topology and collective dynamics in the case of reaction-diffusion systems.*
- *My collaboration with MODUL (which I will be presenting at Sunbelt 2024) will also lead to a publication (expected submission July 2024) and the creation of an online interactive user interface that will allow researchers to easily create their own data visualisations to test hypotheses presented in the literature with the aim of better understanding the embedding of fossil fuels in the modern world economy. By extension, this can help inform policy makers on how to better navigate the post-carbon transition.**
- *My collaboration with Durham University aims to better understand the impact of shrub and grass encroachment on hillslope erosion, with the aim of better designing systemic interventions. This work is due for submission to a journal by October 2024.**

ESR4 Harald Waxenecker, Masaryk University, Czech Republic

I am conducting network analysis research focusing on elite networks and procurement corruption in Latin America. This involves examining the connections between influential actors and entities involved in corrupt practices within the region. Employing inferential network analysis techniques, I aim to model social micro-mechanisms and connectivity patterns within two-mode, multi-level, and longitudinal network datasets.

Oral presentations

- ***IX Congreso Centroamericano de Ciencias Políticas – REDCACIP (El Salvador) [Central American Congress of Political Science]: Economía de captura en Guatemala: desigualdad, excedentes y poder [Capture economy in Guatemala: inequality, profits and power] [El Salvador, online, September 2021]***
- ***11th World Environmental Education Congress – WEEC: Indigenous communities, [environmental] justice and learning processes in the case Berta Cáceres [Prague, CZ, online, March 2022]***
- ***Congress of the Latin American Studies Association – LASA: Socioeconomic polarization and rivalry among great powers. Presentation: Expert opinion in the case Berta Cáceres (Honduras) [San Francisco, USA, online, May 2022]***
- ***XXXIII Congreso Latinoamericano de Sociología – ALAS [XXXIII Latin American Congress for Sociology]: Linaje, empresas offshore y Estado: la elite guatemalteca [Kinship relations, offshore companies and State: the Guatemalan elite] [Mexico, online, August 2022]***
- ***First Chilean Social Network Conference – ChiSocNet: Élite económica guatemalteca: cohesión, influencia política y contratos [Guatemalan economic elite: cohesion, political influence and public procurement] [Santiago de Chile, online, January 2023]***
- ***SNA-Colloquium at Masaryk University: Construction, public procurement and local governments: A longitudinal network analysis of contracting dynamics in Guatemala***
- ***Colloquium “Society and networks”: International Networks for Social Network Analysis (INSNA) and the Department of International Relations and European Studies, Faculty for Social Studies, MUNI.***

SEMINAR SERIES ON

Corruption & Impunity

Session 1: "The Value of Network Analysis in International Peace-Building Operations"

This session will refer to the international mechanisms against corruption and impunity from the complex approach to discuss the need for strategies on criminal network control to ensure long-term results and lower illicit and criminal interactions in the countries.

OCTOBER 6TH, 2022 | 12 P.M. (EST)
11 A.M. (MX)

THIS EVENT IS VIRTUAL AND WILL BE
DELIVERED IN SPANISH

SPEAKERS:



Laura Zamudio-García
Universidad Iberoamericana
Mexico City



Jan Michele Simon
Max Planck Institute for the
Study of Crime, Security & Law



Harald Waxenecker
Masaryk University Czech
Republic

Presentation: Construction, public procurement, and local governments: a longitudinal network analysis of contracting dynamics in Guatemala [Masaryk University, CZ, January 2023]<https://twitter.com/PetrOcelik/>

- *General Conference, European Consortium for Political Research – ECPR: Family, business, and politics: mechanisms of tie formation in a multilayer network of Guatemalan elite [Prague, CZ, September 2023]*
- *URSI-Conference at the University of Groningen (RUG): Corruption dynamics in public procurement [Groningen, NL, November 2023]*

Above: Advert for a seminar series including a talk by Harald Waxenecker.

Outreach/Engagement with the wider community/public

- *Universidad de San Carlos de Guatemala – USAC. Presentation: Economía de captura en Guatemala: desigualdad, excedentes y poder [Capture economy in Guatemala: inequality, profits and power] [Guatemala, online, August 2021]*
- *Seminar series with civil society from Honduras, El Salvador and Guatemala, organized by CIPRODEH. Diálogo sobre redes de poder y corrupción [September 2021]*
- *Confronting social inequalities: perspectives about wealth and power. Centro Maria Sibylla Merian de Estudios Latinoamericanos Avanzados – CALAS. Presentation: El mercado público-privado de contrataciones en Guatemala: una cuestión de poder y riqueza [Public procurement in Guatemala: a question of power and wealth] [Quito, Ecuador, April, 2022]*
- *Network analysis course with the Autonomous University of Guerrero (UAGRO) in Mexico [Nov 2021]*

- **Seminar series: Corruption & Impunity** (ILAS Columbia University). Session 1 “The Value of Network Analysis in International Peace-Building Operations”. Presentation: *Análisis de redes: aportes y aprendizajes en el caso guatemalteco* [Network analysis: contributions and lessons in the case of Guatemala] [October 2022]

<https://twitter.com/ilunapla/status/1573362199552196610?s=20&t=NxCl-Ko3k0xac-JFzvwqzA>

<https://twitter.com/ILASColumbia/status/1576951606855274497?s=20&t=NxCl-Ko3k0xac-JFzvwqzA>

https://twitter.com/H_Waxecker/status/1574848510268215301?s=20&t=NxCl-Ko3k0xac-JFzvwqzA

YouTube <https://youtu.be/FUeq4y-Ahh4>

Around 300 persons watched the seminar live on Zoom, Facebook and Twitter.
- **Seminar series: Corruption & Impunity** (ILAS Columbia University): Session 4 “Control and prosecution of corruption within criminal networks”. Presentation: *Impunity and illicit networks in Guatemala* [February 2023]

<https://x.com/ILASColumbia/status/1576951606855274497?s=20>

<https://www.youtube.com/watch?v=wrV35YPtpRU>
- **Seminar series: Corruption & Impunity** (ILAS Columbia University): “When the justice system is insufficient: criminal strategies versus criminal networks”. Presentation: *Confronting illicit networks: insights from Guatemala* [February 2023]
- **Central American conference about power, corruption and impunity.** Heinrich Böll Stiftung (hbs) and University of Costa Rica (UCR). Presentation: *Redes y élites de poder* [Networks and powerful elites] [Costa Rica, June 2023]
- **¿Son o se hacen? Las élites empresariales ante las demandas ciudadanas.** Research Network Latin America, International Politics, University of Vienna. Commentary to the book, presented by Alejandro Pelfini (UBA, Argentina) [Vienna, Austria, January 2023]

<https://intpol.univie.ac.at/lateinamerika/son-o-se-hacen-las-elites-empresariales-chilenas-ante-las-demandas-ciudadanas/>

Potential impact of work and interaction with policy makers

My research contributes to anti-corruption efforts undertaken mainly by civil society, media, academia, and international cooperation entities. By investigating complex dynamics of illicit networks, my work provides insights that inform anti-corruption strategies and interventions. Particularly in Guatemala since January 2024, a new democratic government presents a window of opportunity for reform and accountability measures. In this specific context, my work informs policymakers and stakeholders to develop targeted strategies and interventions to strengthen governance, promote transparency, and combat corruption effectively.

- *Grupo de Donantes G13 [International cooperation and embassies in Guatemala]: Talk about “Capture economy and public procurement in Guatemala” (July 22nd, 2021) <https://www.g13.org.gt>*
- *Costa Rica/Guatemala (in person): Regional conference of human rights organizations, independent media and academia in Central America about power networks, corruption and impunity in the region. The event was supported by the Heinrich Böll Stiftung (hbs) and the University of Costa Rica (UCR): June 19-25th, 2022.*
- *Action Aid (Guatemala): ¿Cómo influyen las redes empresariales (palma) en las decisiones del Estado? [How do business networks (palm oil) influence State decisions?] - An invitation to comment on the study “Women’s rights violations in Dutch palm oil supply chains: the case of Guatemala” (May 28th, 2021) <https://actionaid.nl/2020/10/23/womens-rights-violations-in-dutch-palm-oil-supply-chains-the-case-of-guatemala/>*
- *Ciclos de Actualización para Periodistas – CAP [Seminar series for journalists]. “Poder local y redes clientelares” [local governance and clientelistic networks] [April 2023] <https://cicloscap.com/el-estado-como-botin/> <https://www.youtube.com/watch?v=Zl1o33Zdcag>*
- *Op-ed in Guatemala: Eliane Hauri Fuentes en Plaza Pública (November 2023) <https://www.plazapublica.com.gt/opinion/las-rapaces-elites-guatemaltecas>*

- *Víctor Ferrigno en La Hora (January 2024)*
<https://lahora.gt/opinion/vferrigno/2024/01/03/el-reto-de-la-desigualdad-para-el-nuevo-gobierno/>
- *Authored chapter in “Poderes Fáticos, captura del Estado, redes criminales y violencia en América Latina” (edited by Heinrich Böll Stiftung) about illicit networks in Latin America.*
https://www.dropbox.com/s/zol7xqxia5ldqmg/Poderes%20faticos_18%20nov.pdf?dl=0
- *German summary of the contributions in the book edited by Heinrich Böll Stiftung: "Faktische Mächte. Staatsvereiinnahmung, kriminelle Netzwerke und Gewalt in Lateinamerika"*
https://www.boell.de/sites/default/files/2023-09/e-paper-faktische-machte_barrierefrei.pdf
- *Member of “Elite Studies Working Group”*
<https://elitestudiesworkinggroup.wordpress.com/who-we-are/>
- *Member of working group “Élites económicas, Estado y desigualdades” [economic elites, state and inequalities], CLACSO [Latin American Council for Social Science]*
<https://www.clacso.org/elites-economicas-estado-y-desigualdad/>
- *Member of “Red Iniciativa Centroamérica” RedICA*
<https://fundacionetea.org/2022/09/26/la-red-iniciativa-centroamerica-red-ica-arranca-su-programa-colaborativo-de-investigacion-y-difusion-de-conocimiento-sobre-centroamerica/>

ESR5, Vinícius Lima, Aix-Marseille University, France

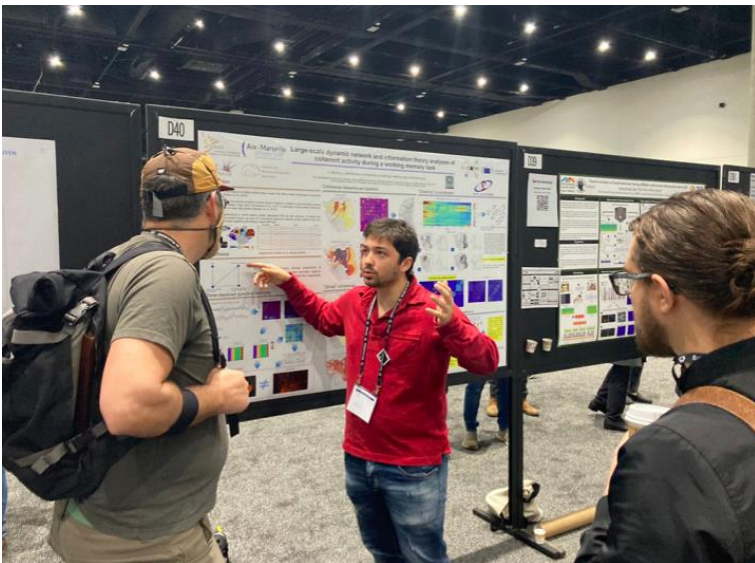
As a physicist studying the brain, the main goal of my work is to try to develop a deeper understanding of the computational principles of the central nervous system. This involves investigating how the activity of neurons and populations of neurons are related to different properties of the brain as memory.

Oral presentations

- *Invited presentation at the Dr. Andreas Kreiter lab meeting (University of Bremen).*
- *Invited presentation at the Dr. Kari Hoffman lab meeting (Vanderbilt University).*

Poster Presentations

- *Brain Criticality workshop, Bethesda, 07/11/2022-9/11/2022, 'Large-scale dynamic network and information theory analyses of coherent activity during a working memory task.'*
- *Society of Neuroscience, San Diego, 12/11/2022-16/11/2022, 'Large-scale dynamic network and information theory analyses of coherent activity during a working memory task.'*
- *Society of Neuroscience, Washington-DC, 11/11/2023-15/11/2023, 'Weak but coordinated inter-regional coherence is modulated by working memory content'.*
- *NetSci, Vienna, 10/07/2023-14/07/2023, 'Working memory content is encoded in transient functional network dynamics.'*
- *GDR NeuralNet, Marseille, 11/10/2023-13/10/2023, 'Working memory content is encoded in transient functional network dynamic.'*
- *Computational Neuroscience (CNS), Natal - Brazil, 20/07/2024-24/07/2024. I will submit an abstract.*



Left: Vinícius Lima discusses his research at a conference poster session.

Outreach/Engagement with the wider community, general public and children.

- *School outreach – By translating concepts from network theory into a ludic language to young students. We asked students to hold lines of wool between them to symbolise a connection (or interaction), and then used this activity to demonstrate how safety measures during the COVID-19 pandemic were effective in avoiding the spread of the virus.*

Potential impact of work and interaction with policy makers

Every interaction with the world requires that we keep a mental representation of the environment surrounding us. The ability to keep those representations is commonly referred to as working memory. My research aims to understand the computational principles of working memory, namely, which brain areas are involved, and by which mechanism those areas interact. By achieving a deeper understanding of those questions, we not only learn more about the workings of the brain, but also this could guide the development of treatments for patients with memory impairments.

ESR6, Mel Guirro, Durham University

This research project investigates the role of sediment connectivity in governing the spatial patterns and temporal dynamics of alluvial cover within mixed bedrock-alluvial fluvial systems, by exploring the interplay between channel morphology, sediment properties and hydrological processes in a river network scale.

Oral presentations

- *Level 1 postgraduate seminar at the Geography Department, Durham University, 2020: 'Scaling sediment connectivity of mixed bedrock-alluvial fluvial systems.'*
- *Level 3 postgraduate seminar at the Geography Department, Durham University, 2023: 'Controls on the spatial distribution of bedrock exposure in mixed bedrock and alluvial river system.'*
- *European Geoscience Union (EGU) General Assembly 2021: 'Analysis of geometric relationships of bedrock and alluvial channels: A comparison between rivers from the Scottish Highlands and San Gabriel Mountains (USA)'*
- *British Society of Geomorphology (BSG) Meeting on Understanding and Managing Connectivity in 2022: 'Spatial pattern analysis of sediment cover in mixed bedrock-alluvial river systems.'*
- *Workshop on bedrock river dynamics at Durham University in 2022: 'Spatial pattern analysis of sediment cover in mixed bedrock-alluvial river systems.'*

Poster Presentations

- *European Geoscience Union (EGU) General Assembly 2023: 'Exploring controls on the spatial distribution of bedrock exposure in mixed bedrock and alluvial river systems'.*
- *British Society of Geomorphology (BSG) Annual Meeting 2023: 'Investigating bedrock exposure controls in mixed bedrock-alluvial river systems'.*

Outreach/Engagement with the wider community, general public and children.

- *Prepared and participated in a half day activity with Peases West Primary School 18 children (aged 10-11 years).*
- *Linking Landlab components and creating a tutorial for sediment pulses in the NetworkSedimentTransporter model: <https://csdms.colorado.edu/wiki/Lab-0026>*

- Volunteered for the Paideia Project in Brazil, where I taught an introduction to Python programming to teenagers (aged 10-16 years) once a week since May 2022.

Potential impact of work and interaction with policy makers

The findings from this research on sediment dynamics carry significant implications for a range of stakeholders, including environmental scientists, policy makers, and land-use planners. These research results can enhance predictive models for riverine behaviour, particularly related to spatial and temporal changes of alluvial cover in mixed bedrock-alluvial fluvial systems. This is essential for effective flood risk management, water resource planning and ecological conservation. To disseminate these insights and support informed decision-making, a presentation was delivered to an interdisciplinary audience:

- *Presentation at a multisectoral conference 'Understanding and Managing Connectivity' May 2022: 'Spatial pattern analysis of sediment cover in mixed bedrock-alluvial river systems.'*
- *Presentation at a multisectoral conference 'Understanding and Managing Connectivity' May 2022*

ESR7, Michalis Papadopoulos, European University Cyprus

We are working with astrophysical data concerning galaxies. The energy emitted by galaxies is due to complex processes that require careful modeling and sensible assumptions. The derivation of the complete emitted spectrum can be done using a variety of models. For each of these model configurations we construct a network whose edges quantify similarity among the spectra of galaxies. By analyzing and comparing the derived networks, we offer a network-based way of quantifying the difference of various SED-fitting models.

Oral presentations

- *“A multi-model analysis of galaxy evolution: A Network Science approach”, 3-minute Lightning talk presentation in NetSci2023, 10-14 July 2023, Vienna*

Poster Presentations

- *“A Network Science approach for studying galaxy evolution”, presented in “Conference on Multiscale Physical and Biological Systems”, 22-26 November 2021, Cyprus*

Outreach/Engagement with the wider community, general public and children.



- *European Researcher Night 2020, poster “Interdisciplinary connectivity: Understanding and Managing Complex Systems using Connectivity Science”, Cyprus*
- *Delivered a session titled “Playing with Graphs” as part of the University’s outreach week for high school students, 22 June 2022*

- *European Researcher Night 2022, including participation in an interview about research (picture above), Marie-Curie funding and the Researcher's Night as an event.*
- <https://www.facebook.com/ResearchAndInnovationFoundationCy/videos/1467669320312069/>

Potential impact of work and interaction with policy makers

Our aim is to offer feedback on the Astrophysics community regarding the various SED-fitting models. We do this by contrasting the models in a high informative network that can be easily interpreted by all scientists, with no need for advanced knowledge on Network Science. A secondary goal of ours is exactly that, to showcase the adaptability and versatility of Network Science. The Astrophysics community is not very familiar with networks, compared to other scientific communities, and we believe that there can be applications that can utilize them.

ESR8, Sonia Recinos, University of Natural Resources and Life Sciences, BOKU, Austria

My research project examines how floodplain restoration measures affect the connectivity of habitats for aquatic invertebrates (benthic macroinvertebrates) in Austria's Donau-Auen National Park. We're using a network-based method called multilayer networks to see how changes in the floodplain affect the movement of these animals. We're also studying how different species' characteristics respond to these changes in the long term and what they tell us about the ecosystem function.

Oral presentations

- *Departmental Seminars: I presented my PhD research proposal and further advances at the Biogeochemistry and Ecohydrology of Riverine Landscapes (BIGER) working group of the Institute of Hydrobiology and Aquatic Ecosystem Management (IHG), at BOKU University, November 2020, April 2021, May 2021, May 2022, January 2023, July 2023, and October 2023*
- **Conference:** *IALE, European Landscape Ecology Congress, July 2022, 'Ecosystems as complex networks: Evaluation of network-based connectivity approaches within water-controlled systems.'* **Authors:** *Sonia Recinos, Shubham Tiwari, Laura Turnbull, Thomas Hein, John Wainwright, Andrea Funk*
Book of Abstracts: *ISBN: 978-83-61590-99-6 **
- **Conference:** *7th National Parks Austria Symposium, 2022, 'Assessing short-term mobility-dependent responses of benthic macroinvertebrates to restoration of connectivity at the Donau-Auen National Park'.* **Authors:** *Sonia Recinos, Andrea Funk, Thomas Hein, Shubham Tiwari **
Estimated number of participants: *around 150 to 200 attendees. <https://doi.org/10.25365/phaidra.355>*
- **Conference:** *IALE, World Landscape Ecology Congress, July 2023, 'Temporal changes in aquatic habitat connectivity for benthic macroinvertebrates induced by floodplain restoration measures in the Austrian Danube River'.* **Authors:** *Sonia Recinos, Andrea Funk, Thomas Hein, Shubham Tiwari **
Estimated number of participants: *around 400 attendees.*

Poster Presentation

- *Managing water and sediment (dis)connectivity in fluvial systems: some principles and applications, Ronald Pöppl, Sonia Recinos, John Perez, Andrea Funk, Thomas Hein, 44th IAD Conference 2023 Krems, Austria **

Potential impact of work and interaction with policy makers

The research project “A dynamic network analysis of social-ecological action situations in river governance of the Danube east of Vienna” is an outcome of Yanhua’s (ESR-9) secondment at BOKU. In this project, a network analysis is applied to evaluate the governance changes of a small-scale river-floodplain area, which is part of the Donau-Auen National Park located East of Vienna. I had the chance to join Yanhua in her exchanges with key actors, including one governmental institution, which was later on used for the evaluation of co-participation of key actors over time. In this project, my contribution (which is also linked to my core PhD research) focused on assessing the potential ecological changes driven by landscape structural changes. The results of this research, as well as my core PhD project (Ecological implications), can inform management of river-floodplain landscapes.

ESR9, Yanhua Shi, Masaryk University, Czech Republic

My works focuses on incorporating a network extension with the situation-centered institutional analysis to study polycentric environmental governance. Drawn on broader network approaches, I aim to theorize and empirically investigate (1) the social, ecological, and social-ecological processes that give rise to social-ecological phenomenon; (2) the biophysical, social and institutional drivers of collective actions in environmental governance. I am interested in how diverse institutional tools can be mobilized to create incentives for behaviours and actions that lead to sustainable governance of common pool resources. In particular, I look into two empirical case studies, including the deforestation risks related to the Indonesian palm oil industry and the governance of the Danube east of Vienna over time.

Oral presentations

- *'Comparing two network approaches of social network analysis and network of action situation in a global environmental governance context'*, organized by the New Institutional Economics (NIE) workshop in Potsdam at the Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB). 2021, Potsdam.
- *'A network approach to action situations governing social-ecological systems: a case study of the Indonesian palm oil industry'*, WINIR 2022 (WINIR Conference on Polycentric Governance). Online. https://winir.org/wp-content/uploads/2023/03/WINIR2022_Brochure_2022-09-05.pdf (page 32)
- *'An actor-situation-centred multilevel network analysis of Indonesian palm oil industry reveals power dynamics and intervention paths'*, ECPR 2023 (The European Consortium FOR Political Research). Prague, 2023. <https://ecpr.eu/Events/Event/PaperDetails/70276>
- *'A dynamic network analysis of social-ecological action situations in river governance of the Danube east of Vienna'*, presentation at the research series of Ostrom Workshop 2023. Bloomington, 2023. * https://www.youtube.com/watch?v=3oOtsaplrkY&ab_channel=OstromWorkshop
- Panel host of *'Situation-relational network analysis in social–ecological systems research'*, WOW7 (Workshop on the Ostrom Workshop), 2024. Within the panel, paper presentation of *'A dynamic network analysis of social–ecological action situations in studying the resource governance of the Danube east of Vienna'*. Bloomington, 2024 * (forthcoming; accepted). <https://wow.indiana.edu/index.html>
- *'Network configurations of linked action situations: Towards network archetypes of infrastructure, resource, and value chain governance'* (with supervisor Dr. Christian Kimmich), the 7th International Research Workshop on "Archetype Analysis in Sustainability Research", 2024. Washington DC, 2024

(forthcoming; abstract submitted, and waiting for the decision). <https://glp.earth/news-events/news/call-abstracts-7th-international-research-workshop-archetype-analysis>

Poster Presentation

- *'A network approach to action situations governing social-ecological systems: a case study of the Indonesian palm oil industry'*, EUSN 2021 (5th European Conference on Social Networks). Naples, 2021 <http://www.eusn2021.unina.it/>

Outreach/Engagement with the wider community, general public and children

- *Visiting scholar at the Ostrom Workshop, Indiana University Bloomington, USA. October – December 2023* <https://ostromworkshop.indiana.edu/about/collaborators/shi-yanhuaprofile.html>
- *One lecture in one course for undergraduates in my department. 'An institutional diagnose of collective actions in river governance: a case study of Danube east of Vienna'. Forthcoming (April 11, 2024)*

Potential impact of work and interaction with policy makers

My work draws on multiple disciplines, in particular network science, ecology and institutional analysis, to study polycentric governance of common pool resources. The interdisciplinary research is especially beneficial in understanding the processes and dynamics of the intertwined social-ecological systems, as well as diverse policy systems consisting of multiple actors, policy interests and interactions. For the broader scientific community (e.g., institutional analysts, ecologists, network analysts), the proposed network extension of the situation-centered institutional analysis provides a novel way of theorizing and empirically investigating key social and ecological processes of environmental governance. It takes account of the interconnections of multiple situations at operational, collective-choice, and constitutional level, as well as their dynamics with the biophysical world, in shaping the structure, functions, and outcomes of polycentric governance. Practically, the research outcomes could inform policy-makings in targeting on the rights incentives and actions of individuals and communities that give rise to more sustainable social and environmental outcomes.

- *Recent interdisciplinary collaboration with researchers from the field of environmental education in my department (Department of Environmental Studies, Masaryk University). 'A dynamic network analysis of the environmental education system in the Czech Republic from the polycentric governance perspective'.*

2024-2025. The project includes direct contact with the policy makers and NGOs in the field of environmental education in the Czech Republic.

- *Research output from the Danube project (river governance of Danube east of Vienna) is to be shared with actors from the relevant policy forum, who participated in the survey and interviews of the research.**

ESR10, John Perez, University of Vienna, Austria

The ESR 10 project looks at the role of connectivity science in managing human-impacted catchment systems. I employ different methodologies to assess sediment connectivity at different scales i.e., river reach, hillslope, sub-catchment/catchment; applied to a medium-sized agricultural catchment in Lower Austria that directly drains into a national park. We developed a new large-wood (dis)connectivity index as a rapid, ground-based screening tool to compare connectivity between catchments or between river reaches, as well as determine hotspots. We are using a combined process-based modelling and network analysis approach to quantify connectivity in agricultural hillslopes using graph theoretical metrics to determine hotspots and hot moments and compare land management practices/measures. A sediment fingerprinting approach is combined with network analysis and assessed along with process-based modeling to determine the contribution of different land-uses within a catchment to the sediments that reach the catchment outlet within the Thayatal National Park

Oral presentations

- *7th National Parks Austria Symposium for Research in Protected Areas, 2022, 'Identifying hot spots and hot moments of fine sediment connectivity on agricultural hillslopes of the Fugnitz catchment (Thayatal National Park region) using sediment transport modeling and network analysis'. Perez, J.E., Turnbull, L., Wainwright, J., Tiwari, S., and Poepl, R.E. 50 – 70 attendees.**
- *5th Geographie Werkstatt, 2022, Vienna, Austria, 'Hotspots and hot moments: the role of connectivity and resilience science for managing human-impacted catchment systems.' Perez, J.E., and Poepl, R.E. Poster session, 25 – 30 People*
- *44th IAD Conference February, 2023, Krems, Austria 'Managing water and sediment (dis)connectivity in fluvial systems: some principles and applications', Pöpl, R.E., Recinos, S., Perez, J.E., Funk, A., Hein, T.**
- *European Geosciences Union General Assembly, 2023, Vienna, Austria, 'How do Natural Water Retention Measures modify connectivity on agricultural hillslopes?' Perez, J.E., Pöpl, R.E., Turnbull, L., Tiwari, S., Wainwright, J. 100 people – 120 attendees**
- *IAG Regional Conference on Geomorphology, 2023, Cappadocia, Turkey, 'Targeting hotspots of fine-sediment connectivity in an agricultural hillslope of the Fugnitz Catchment (Austria) using a combined*

*process-based modelling and network analysis approach', Perez, J.E., Turnbull, L., Wainwright, J., Tiwari, S., Pöppl, R.E. 20 – 30 attendees**

Poster Presentations

- *10th IAG International Conference on Geomorphology, 12 – 16 September 2022, Coimbra, Portugal
Poster session, Perez, J.E., Turnbull, L., Wainwright, J., Tiwari, S., and Pöppl, R.E. Assessment of fine sediment connectivity in agricultural hillslopes of the Fugnitz catchment, Lower Austria using sediment transport modeling and network analysis. **

Outreach/Engagement with the wider community, general public and children.

- *Vienna International School of Earth and Space Sciences PhD Summer School (September 2022) PhD project and i-CONN introduced in a presentation to other PhD and MSc students. Audience: 15 people*
- *Earth Surface Dynamics Laboratory Course at UNIVIE (May – July 2022) Introduced the PhD Project and assisted in a field-based course for MSc students, designed in parallel to the objectives of the PhD project. Audience: 8 people*

Potential impact of work and interaction with policy makers

The use of network approaches in combination with existing methods that are used to infer sediment connectivity e.g. process-based modelling and sediment fingerprinting, contributes to the application of novel methods in analyzing the sediment cascade particularly for functional connectivity. The application of graph theory metrics has been rarely used in geomorphology, which could benefit from the tools already developed in other disciplines such those included within the i-CONN network, and thus presents new avenues for scientific research. The ESR 10 project also aimed to determine hotspots and hot moments of sediment connectivity which are useful for prioritization of land management measures adapted to targeted areas and can be used by catchment management practitioners. For example, the large-wood disconnectivity index can be readily adapted by catchment management practitioners for a rapid assessment of connectivity (and hotspots) between different segments of the river, or between different catchments. The application of novel approaches in assessing sediment connectivity in hillslopes and catchments i.e. graph theoretical metrics, is used here to compare the impacts of different land management (e.g. Natural Water Retention Measures) scenarios which could be beneficial for informing policy-making and place-based management.

- *Stakeholder consultation at Heufurth, Lower Austria (August 2022) Organised by members of the Human Impact and Connectivity sub working group at UNIVIE, a meeting was held with local farmers, representatives of the local administration and the national park to communicate the work that is being done at the Fugnitz Catchment. Audience: 15 – 20 people*

ESR11, Christodoulos Karittevlis, AAISCS, Cyprus

In the i-CONN project, my research centered on using connectivity techniques to quantify and understand how different brain regions communicate and interact. We applied connectivity metrics from information theory to measure interactions between subcortical and cortical regions using only raw data, avoiding complex source localization to solve the inverse problem. This approach allows us to estimate the communication between brain areas almost in real-time.

Oral presentations

- *On-line INDAM Non-Invasive Mathematics Workshop, 2021*
<https://www.youtube.com/watch?v=1ic1ejCkM&list=PLtZ3QQpk5u5ecYQC7OKoEgdMiNLt03EtF&index=30>, 45 participants.

In this workshop, I gave a talk about the use of spatial filtering together with combination of linear and non-linear connectivity metrics for the study of the functional connectivity between subcortical and cortical brain regions.

- *In person presentation at the Cyprus Rectors' Conference – 2nd Doctoral Colloquium, European University Cyprus – 4th February 2023*

In this workshop, I gave a presentation about my first project, 'Thalamo-Cortical Connectivity extracted from raw MEG/EEG signals elicited by median nerve stimulation'. Around 15 attendees in my presentation.

Outreach/Engagement with the wider community, general public and children.

- *Michalis Papadopoulos and Chris Karittevlis - European Researcher Night 2022, including participation in an interview about research, Marie-Curie funding and the Researcher's Night as an event. **
<https://www.facebook.com/ResearchAndInnovationFoundationCy/videos/1467669320312069/>
- *2 presentations in Schools, one in a Gymnasium and one in a Lyceum. I have talked to students about the importance of mathematics, physics, and programming for solving complex problems. I presented examples of real applications of connectivity science. Finally, I talked to students about my experience as*

an MSCA fellow and the benefits of participating in such a prestigious program. Thus, giving them some motivation and faith to chase their dreams and in the future to participate in such programs themselves.

Potential impact of work and interaction with policy makers

The methods we've developed could be used in real-time to identify biomarkers for neurological disorders and could be incorporated into brain-computer interfaces. Moreover, these connectivity methods are effective on raw signals and can be used in neurofeedback, where subjects receive feedback in real-time during brain recording sessions. This can help change habits or address psychological problems. If we can use these methods for real-time signal processing during EEG recordings, the possibilities are limitless. There's also significant potential for improving even more the methods and commercializing these methodologies into software toolbox for real-time EEG signal processing to assess brain communication.

ESR12, Mario Diaz, Modul University, Austria

My work is based on a thorough analysis of a threefold phenome that, although different in nature, share the same backbone. First, I analyze the systemic vulnerabilities of the global economy to fossil fuel shocks. Second, I investigate patterns of control and dependence of energy flows between countries in the context of the energy transition. Lastly, I analyze the discourse around the Hydrogen strategy in Europe and its implications for policy in the energy transition.

Oral presentations

- **Research Seminar Talks at Modul University Vienna about the i-CONN Project**
Critical Flows of Energy – The i-CONN Project, January 2021
- **Presentation at the European Society for Ecological Economics in Pisa, Italy**
Title: The European Hydrogen Strategy: The Discourse and Metabolic Power of the Incumbents, a case of transformismo, June 2022
- **Presentation at the Degrowth Conference in Zagreb, Croatia**
Discursive Power Struggles over the role of Hydrogen in the European energy transition, August 2023
- **Presentations at the Degrowth Conference in Zagreb, Croatia,**
Systemic vulnerability to fossil fuels – Too central to fail? September 2023
- **Talk at La Resistencia (Cultural Association) in Almeria, Spain**
Green Hydrogen in Europe. A false Promise? February 2024

Outreach/Engagement with the wider community, general public and children.

- **Article: “The Limits of Europe's Corporate-Led Hydrogen Project” (with Gabriela Cabaña) Green European Journal – Political Ecology <https://www.greeneuropeanjournal.eu/the-limits-of-europes-corporate-led-hydrogen-project/>**

Potential impact of work and interaction with policy makers

This research has the potential to inform policy in several ways:

- Unveiling sectoral vulnerabilities in the European economy (and elsewhere) in the context of a transition away from fossil fuels. This offers the opportunity to inform policy decisions to protect and avoid unnecessary sectoral disruptions that could cascade and affect livelihoods, consumers, or governments.
- By analysing relationships of energy dependence, policy makers in Europe can use this research to improve European energy security in the face of energy weaponization (as we have seen in the case of Russia using natural gas as a political and war weapon).
- Discourse creates common-senses, and these inform policy decisions, sometimes diverging from scientific consensus or precautionary principles. The analysis of the discourse struggles around Hydrogen policy can show which actors have been favoured (or disfavoured) in the construction of Hydrogen regulation. This research has the potential to create societal awareness about how the key role of discourse in the construction of legislative realities. In addition, it can point in several direction in which European citizens can leverage their voice and influence policy decisions.
- *Collaborated in report on Material Analysis of Hydrogen (Political perspective) Heinrich Böll Stiftung with CASA (Chile), in press.*

ESR13, Deborah Priß, Durham University, UK

The social, economic and political networks of past human societies can reveal important insights into how those societies functioned. Network science provides established theories, methods and tools that archaeologists can employ and adapt to represent and analyse past human networks, thereby formally integrating archaeological methods and theories. Although archaeological network research has become increasingly popular, there are only very few studies that use statistical models developed within the field of social network analysis to specifically investigate human relations.

One reason for this hesitation to use such models is the high and unknown amount of missing data in archaeological networks that exceeds the usual proportions of missing data in modern social networks, affecting the performance of those statistical models. We investigate one of the best-preserved ancient transport networks in the world, the hollow way system of Northern Mesopotamia. However, despite its exceptional preservation, there are still missing data, in the hollow way network as well as in the site record of the area. Hence, we implement two algorithmic procedures to 1) fill the gaps in the hollow way record and 2) predict potential locations of settlements to enhance the available data. We then implement a statistical social network model, the MCMC-MLE Temporal Exponential Random Graph Model (MTERGMs), to identify the tie-formation processes in the archaeological network. The hollow ways in the Khabur Valley serve as the edges of the network with the sites they connect as nodes. We trace the broad trajectories of settlement evolution and test assumptions about the relations between sites. We also add new insights and perspectives that can only be revealed by network approaches, such as the influence of existing relations on the formation of new ones.

Oral presentations

- *level 1 postgrad seminar, April 2021*
- *Talk at Trevelyan College, November 2021*
- *“Networks and Resilience: Using social network analysis and agent-based modelling to evaluate the significance of Mesopotamian hollow ways”, European Association of Archaeologists Annual Meeting, ELTE Faculty of Humanities Budapest, 31st August – 3rd September 2022*
- *“Networks and Resilience: Understanding the resilience of Mesopotamian settlement networks via Exponential Random Graph models and Agent-Based Modelling”, European Conference on Social Networks, University of Greenwich, 12th – 16th September 2022*
- *“Algorithms and Exponential Random Graph Models - How to make the most of incomplete archaeological data”, Computational Applications and Quantative Methods in Archaeology Annual Meeting 2023, RAI Amsterdam, 3rd – 6th April 2023*
- *Level 3 postgrad seminar, April 2023*
- *“Networks and Resilience - The impact of connectivity on ancient societies”, Computational and Digital Archaeology Laboratory, Cambridge, 15th May 2023*

- *“Where did they come from? Where did they go?”*, European Association of Archaeologists Annual Meeting, Queen’s University Belfast, 30st August – 2nd September 2023
- *“Where did they come from? Where did they go?”*, Computational Applications and Quantitative Methods in Archaeology (NL-FL & DE) ABM webcast, online, 13th October 2023

Outreach/Engagement with the wider community, general public and children.

- *Associate Editor and committee member for the Council for British Archaeology Yorkshire (2021 – 2023) and on the Editorial Board of Computational Applications in Archaeology (2023 – 2026).*
- *Prepared and participated in a half day activity with Peases West Primary School 18 children (aged 10-11 years).*
- *Supported the organisation of the Society for Medieval Archaeology Student Colloquium aimed at undergrads and PGs, in the Archaeology Department (November 2023).*
- *Member of archaeological community groups Council for British Archaeology Yorkshire and Altogether Archaeology.*

Potential impact of work and interaction with policy makers

This research will be an important contribution to Near Eastern archaeology and computational archaeology. The computational reconstruction of the hollow way system and the automatic prediction of archaeological sites based on the characteristics of the hollow ways is a method that has not been used before. Enhancing the archaeological record by reducing missing data is an ongoing effort in archaeology and this study will potentially have a high impact on the discipline.

Furthermore, ERGMs have only been used in four published but very preliminary studies in the discipline. It is the first time that ERGMs have been utilised in this research area and the first time that ERGMs and their temporal extensions have been extensively assessed and evaluated for their use and usefulness for archaeology. Hence, the implementation, evaluation and testing of the established theories in the research area with a formal statistical model is a new and innovative approach to the data that will hopefully be adapted by other researchers and for other regions.

ESR14, Marcel Mallow, University of Groningen, The Netherlands

My work is assessing i-CONN as a Transdisciplinary Research Network and examines how different (social) networks of relationships between its network members develop over time. My research aims to uncover network mechanisms that explain different trends in the co-evolution of network relations, such as advice-seeking and close collaboration, and point out specific network structures that tend to be more efficient at creating research outcomes.

I also propose an evaluative approach to Transdisciplinary Research that includes a self-developed longitudinal survey series. This novel evaluative approach aims to be more holistic than mainstream research evaluation as it also harnesses the learning potential stemming from constant self-reflection within the i-CONN research network.

My publications are making use of the longitudinal survey dataset collected during i-CONN for both above-outlined areas of work; i.e. network mechanism and research network evaluation.

Oral presentations

- *URSI PhD Conference Nov 28th 2023, University of Groningen, "Evaluating the contribution of Transdisciplinarity to Collaborative Research."*
<https://www.canva.com/design/DAFzfH04axw/l3yqiGA1jQXxhO90ACdC7Q/view#1>)
- *Submitted talk to INSNA Sunbelt 2024 conference, Edinburgh, Scotland (June 24th to 30th 2024)*
Title of talk: "Bridging the divide between Social Network Analysis and Network Science: Insights from the connectivity science training network i-CONN."

Poster Presentations

- *6th European Conference on Social Networks – EUSN2022 (12- 16 September 2022, Greenwich, London, UK) "The Network Dynamics of Transdisciplinary Knowledge Creation - A longitudinal study of social networks in research collaboration"*
https://twitter.com/network_iConn/status/1570395202124222467?s=20&t=hEl1hdsYF64MfE5aeMXylw
100 attendees at poster session.
<https://acrobat.adobe.com/link/track?uri=urn:aaid:scds:US:e7f33e0b-f652-3065-9a70-da7aad9666bf>)

Outreach/Engagement with the wider community, general public and children.

- *Co-Teaching course at the University of Groningen “Introduction to Networks and Surveys – Data Collection Methods for Social Network Research” (Oct 10th, 2023)*
 - *Topic: Network data collection methods (online survey approach)*
 - *Prepared teaching materials for 3 hour lecture*
 - *Prepared applied lab material to be worked through before the lecture hosted in BrightSpace and on GitHub (<https://marmall.github.io/NetworkApproaches/>)*

Potential impact of work and interaction with policy makers

The research into Transdisciplinary Collaboration Networks can inform science and innovation policies that aim to help address complex societal challenges and facilitate knowledge transfer. Furthermore, the research is also relevant to the private sector in that it can inform strategies for HR departments to assemble teams that transcend traditional departmental boundaries and foster a culture of cross-fertilization. Lastly, the research could be useful for building strong consortia in the international research landscape.

ESR15, Julia Costescu, University of Durham, UK

My PhD research focuses on pharmaceutical pollution in the North-East region of the UK, aiming to address existing gaps in understanding and inform monitoring and management strategies. The analysis drew upon both existing pharmaceutical data in the North-East and field data collected in the Aire catchment. Samples were collected during both low and high flow conditions to account for temporal variations and then used to create spatial snapshots of contamination with nine representative compounds. Through this work, I aimed to identify key factors influencing pollution levels and investigated how the underlying connectivity of the catchment system may determine observed patterns of contamination.

Oral presentations

- *level 1 Postgraduate conference 2021*
- *level 3 Postgraduate conference 2023*
- *BSG, 2022 "Understanding the connectivity of pharmaceutical pollution in river catchments".*
- *EGU, 2023 "Understanding the connectivity of pharmaceutical pollution in river catchments". <https://meetingorganizer.copernicus.org/EGU23/EGU23-17381.html>.*
- *Pharmaceutical Interest Group (PhIG) Business Meeting during SETAC, 2023 "Understanding the connectivity of pharmaceutical pollution in river catchments". <https://setac.confex.com/setac/europe2023/meetingapp.cgi/Paper/16331>*

Poster Presentations

- *SETAC, 2023 "Understanding the connectivity of pharmaceutical pollution in river catchments". <https://setac.confex.com/setac/europe2023/meetingapp.cgi/Paper/16331Outreach/>*

Outreach/Engagement with the wider community, general public and children.

- *Prepared and participated in a half day activity with Peases West Primary School 18 children (aged 10-11 years).*

Potential impact of work and interaction with policy makers

My work has been informed by extensive conversations with Damian Crilly, representing the Catchment Based Approach at the Environment Agency, and the outputs are intended to be circulated within the agency in order to contribute to the understanding of current status and potential mitigation measures for pharmaceutical

pollution. Other potential users that we have initiated conversations with include members of the Rivers Trusts Add and Catchment Sensitive Farming.

- *attendance at Catchment Data Forum, September 2022.*

Publications

ESR author names are in bold and purple. ‘*’ indicates a publication that includes ESRs from more than one Beneficiary.

Voges, N., **Lima**, V., Hausmann, J., Brovelli, A. and Battaglia, D., 2024. Decomposing neural circuit function into information processing primitives. *Journal of Neuroscience*, 44(2). <https://doi.org/10.1523/JNEUROSCI.0157-23.2023>

***Karittevlis**, C., **Papadopoulos**, M., **Lima**, V., Orphanides, G.A., **Tiwari**, S., Antonakakis, M., Lesta, V.P. and Ioannides, A.A., 2023. First activity and interactions in thalamus and cortex using raw single-trial EEG and MEG elicited by somatosensory stimulation. *Frontiers in Systems Neuroscience*, 17. <https://doi.org/10.3389/fnsys.2023.1305022>

Funk, A., Baldan, D., Bondar-Kunze, E., **Brizuela**, S.R., Kowal, J. and Hein, T., 2023. Connectivity as a driver of river-floodplain functioning: A dynamic, graph theoretic approach. *Ecological Indicators*, 154, p.110877. <https://doi.org/10.1016/j.ecolind.2023.110877>

[Re] Inter-areal Balanced Amplification Enhances Signal Propagation in a Large-Scale Circuit Model of the Primate Cortex, Vinicius **Lima**, Renan O. Shimoura, Nilton L. Kamiji, Demian Battaglia and Antonio C. Roque. ReScience C, DOI: 10.5281/zenodo.10257800

Waxenecker, Harald & Ocelík, Petr. (2023). Linaje, Empresas Offshore y Estado. Una Aproximación a la Élite de Poder en Guatemala en Siglo XXI [Lineage, Offshore Companies and State. An Approach to the Power Elite in Guatemala in the 21st Century]. In Nercesian, Inés, Robles-Rivera, Francisco, & Serna, Miguel (Eds.), *Las Tramas del Poder en América Latina. Élités y Privilegios*. [The Plots of Power in Latin America. Elites and Privileges] (pp. 53–81). CLACSO. <https://www.muni.cz/en/research/publications/2317597>

***Voutsas**, V., **Papadopoulos**, M., Papadopoulou Lesta, V. and Hütt, M.T., 2023. The attractor structure of functional connectivity in coupled logistic maps. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 33(8).

Mario Diaz, book chapter, "An overview of strategies for socio-ecological transformation in the field of energy" as part of the book "Degrowth and Strategy: how to bring about social-ecological transformation". The book can be downloaded for free [here](#). And the organization who organized it can be found [here](#). 2022.

Ali, S.H. and Hütt, M.T., 2022. Inferring missing edges in a graph from observed collective patterns. *Physical Review E*, 105(6), p.064610 <https://doi.org/10.1103/PhysRevE.105.064610>

*Voutsas, V., Battaglia, D., Bracken, L.J., Brovelli, A., Costescu, J., Diaz Munoz, M., Fath, B.D., Funk, A., Guirro, M., Hein, T. and Kerschner, C., 2021. Two classes of functional connectivity in dynamical processes in networks. *Journal of the Royal Society Interface*, 18(183), p.20210486. <https://doi.org/10.1098/rsif.2021.0486>

Papers in preparation:

- Channel and Sediment Controls on Alluvial Cover in Mixed Bedrock-Alluvial River Networks, Mel Guirro, Rebecca Hodge, Fiona Clubb and Laura Turnbull-Lloyd, expected submission date: June 2024, target journal: *JGR: Earth Surface*
- Máčka, Z., Holis, D., Korenová, S., Perez, J., Sulc Michalková, M., Pöpl, R.E. Controls on tributary-trunk sediment connectivity in forested high-gradient streams along an inter-dam reach of the Dyje River (Czechia-Austria). [Manuscript submitted for publication]
- *Brizuela, S. R., Funk, A., Tiwari, S., Baldan, D., & Hein, T. Multilayer Networks in Landscape Ecology: A Case Study to assess changes in aquatic habitat connectivity for flying and non-flying benthic macroinvertebrates in a Danube floodplain. **Journal: Landscape Ecology**
- *Tiwari, S., Brizuela, S. R., Hein, T., Turnbull, L., Wainwright, J., & Funk, A. (2023). Water-controlled ecosystems as complex networks: Evaluation of network-based approaches to quantify patterns of connectivity. *Ecohydrology*,
- Brizuela, S. R., Funk, A., & Hein, T. (2024). Ecosystem functional indicators based on macroinvertebrate community responses for evaluating rehabilitation of water-mediated connectivity in a river-floodplain landscape.
- *Priß, D., Wainwright, J., Lawrence, D., Turnbull, L., Prell, C., Karritevlis, C., Ioannides, A. "Filling the gaps - Computational approaches to incomplete archaeological networks."
- Priß, D., Prell, C., Lawrence, D., Turnbull, L., Wainwright, J. "The social behind the physical - Assessing tie formation processes of ancient route systems via MCMC-MLE Temporal Exponential Random Graph Models (MTERGMs)"
- Priß, D., Lawrence, D., Wainwright, J. Prell, C., Turnbull, L. "Reviving Ancient Trails - New Insights into the Khabur Valley's Prehistoric Hollow Ways"
- "Evaluating the contribution of Transdisciplinarity to Collaborative Research", Mallow, M., target journal: **Research Evaluation**, estimated submission by: **April 2024**

- The Network Dynamics of Transdisciplinary Knowledge Creation - A longitudinal study of social networks in research collaboration”, Marcel **Mallow**, target journal: **Social Networks / Network Science**, estimated submission by: **July 2024**.
- A paper about longitudinal procurement network in Guatemala in the journal Social Networks, Harald **Waxenecker** and Christina Prell
- **Harald Waxenecker**, A single-author book chapter about illicit networks in Guatemala’s Congress. The book is being edited by Dr. Omar Sanchez-Sibony from the Texas State University (USA).
- Harald **Waxenecker** An article about elite networks in Guatemala, based on 'interlocking directorates', using the Exponential Random Graph Model (ERGM) together with Dr. Petr Ocelík (MUNI) and Dr. Francisco Robles (University of Costa Rica). The submission is planned for the spring semester 2024.
- **Waxenecker**, about corruption risk in procurement networks, and its correlation to social and environmental issues. This is a joint project together with colleagues from MUNI, RUG and EUC, and the submission is planned for the spring semester 2024.
- The Primate Cortical LFP Exhibits Multiple Spectral and Temporal Gradients and Widespread Task-Dependence During Visual Short-Term Memory: Steven J. Hoffman, Nicholas M. Dotson, Vinicius **Lima**, Charles M. Gray