

Lucy Gwen Gillis

DOB: 21.10.1980

Citizenship: British (UK) and Irish (EU)

Work

Private

Leibniz Centre for Tropical Marine Research (ZMT)
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EDUCATION

2014 **PhD**, Are physical fluxes important in the tropical coastal seascape?
The Royal Netherlands Institute of Sea Research (NIOZ); Netherlands

2005 **MSc**, Marine Resource Development and Protection
Heriot-Watt University, Edinburgh, United Kingdom

2002 **BSc (Honors)** Geological Oceanographer
University of Wales, Bangor, United Kingdom

PROFESSIONAL APPOINTMENTS

2014-Ongoing, Mangrove Ecology Group, ZMT, Germany
Post-doctorate

2008-2009, The Marine Research Center, Landaa Giraavaru, Maldives
Marine Ecologist

2006-2007, The Center for Environmental Exploration, Gau, Fiji
Assistant Marine Research Coordinator

2005-2006, Durrell Wildlife Conservation Trust, St. Lucia, Caribbean
Field Conservationist

FUNDING

Third party funding

Total sum € 925 365.00

(excluding PADDLE where I was a minor-PI)

2018. **Gillis LG**, Wieczorek A, Pradhan H, Romagnoni G, Buselic Garber I and Courtene-Jones W. OYSTER Orienting Young ScienTists of EuromaRine. EuroMarine. € 5 000.00

2017. **Gillis LG** (PI), Balke T, Folkard A, Paul M, Lanzoni S, Lopez Lara J, Oyen Van T. HyWEges (hydrodynamics at coastal wetland edges). European Commission, Horizon2020 program Hydrolab, equivalent to € **700 000.00**

2017. Overall coordination: Marie Bonnin (IRD, F), Ekau, W, **Gillis LG**, Helfer V, Hornidge AK, Siriwardane R & Zimmer M (co-PI). PADDLE-Planning in a liquid world with tropical stakes: salutation from an EU-Africa-Brazil perspective. EU:RISE € **1723 500.00**

2016. **Gillis LG** (PI) and Zimmer M (co-PI). Exploring present and future carbon dynamics in connected mangrove forests and seagrass beds: How important is it? DFG Deutsche Forschungsgemeinschaft € **220 365.00**

Within institute funding

Total sum € 49 300.000

2017. Mann T (PI) and **Gillis LG** (co-PI). A comparison of sea-level reconstructions from intertidal mangrove sediments and coral microatolls (ZMT post doctorate core budget fund) € 9650

2016. Siriwardane-de Zoysa R (PI), **Gillis LG** (co-PI) and González Viana I (co-PI). CIRCULATIONS (Connectivities between Islands Alters Traveling Invasive Seagrasses) (ZMT post doctorate core budget fund) € 5000.

2016. Nordhaus I, Siriwardane-de Zoysa R (co-PI), **Gillis LG** (co-PI) and González Viana I (co-PI). Biodiversity, resources and perceptions: A comparison of mangrove forests in rural versus urban settings of Penang, Malaysia (BAKAU) ZMT Core budget project funding (ZMT post doctorate core budget fund) € 5000.

2015. **Gillis LG** (PI) and Herbeck L. Mangrove seedling response to temperature and nutrient stresses as a consequence of climate change and aquaculture development. ZMT Core budget project funding (Post doctorates) ZMT Core budget project funding (ZMT post doctorate core budget fund) € 4996.

2015. Neumann M and **Gillis LG** (co-PI). The biogeochemical function of coral mucus to connect key ecosystem engineers across the tropical seascape (MUCOS) (ZMT post doctorate core budget fund) € 10000.

2015. Oehler T and **Gillis LG** (co-PI). The role of bacteria in coastal wetland geomorphology: Are cable bacteria "at the root" of mangrove forest stabilization? ZMT Core budget project funding (ZMT post doctorate core budget fund) € 4674.

2014. **Gillis LG** (PI) and Höln S. Nutrient dynamics and connectivity of mangrove forests, seagrass beds and coral reefs in Chwaka Bay. ZMT Core budget project funding (ZMT post doctorate core budget fund) € 4998.

2014. Narayan G (PI) and **Gillis LG** (co-PI). The relationship between seawater

carbon chemistry (DIC) outwelling from mangrove forests and the potential for buffering against ocean acidification in the interlinked mangrove and seagrass ecosystems of tropical coastal Chwaka Bay, Zanzibar. (ZMT post doctorate core budget fund) € 4982

INVITED SPEAKER

2018, POGO Centre of Excellence, ZMT, Germany.

Opportunities for Protecting and Restoring Tropical Coastal Ecosystems by Utilizing an Physical Connectivity Approach

2018, “Connecting people with Nature” talk series, STNAPA, Bonaire
Are invasive species always negative?

2017, University of Amsterdam, Amsterdam, Netherlands
CASCADES (Carbon Networked Seagrass Ecosystems in a Changing Climate)

2016, Alfred-Wegener-Institut, Sylt, Germany
Bridging the gap from ecosystem-based management to landscape scale management for connected tropical marine ecosystems.

2016, Carey Institute of Ecosystem Studies, New York, USA
Bridging the gap from ecosystem-based management to landscape scale management for connected tropical marine ecosystems.

2013, Makassar State University, Makassar, Indonesia
Tiny is mighty: Seagrass bed influence of organic matter fluxes in the tropical coastal zone.

2013, Naturalis Biodiversity Center, Leiden Central, Netherlands
Do corals eat their veggies?

2012, Singapore Water Delft Alliance, Singapore
Potential for landscape-scale reciprocal facilitation among tropical marine ecosystems: A review.

CONFERENCES

2019, MARE X People and the Sea Conference, Amsterdam, Netherlands
Exploring how non-native seagrass species could provide essential ecosystems services: A perspective on the highly invasive seagrass *Halophila stipulacea* in the Caribbean Sea. Biological Invasions.

2019, Coastal Structures, Hannover, Germany
Opportunities for protecting and restoring coastal ecosystems by utilizing a physical connectivity approach

2019, International Long Term Ecological Research Network, Leipzig, Germany

Interactive effects of climate change and eutrophication on mangrove seedling growth and establishment.

2019, Hydrolab +, Bucharest, Romania

Plant effects on hydrodynamics and sedimentation at coastal wetland edges

2017, IUCN Mangrove Specialist Group, Bremen, Germany

Interactive effects of temperature and nutrients on mangrove seedling growth and morphology: What “stresses” mangrove seedlings?

2017, Coastal and Estuarine Research Federation, Rhode Island, USA

Deforested Mangroves Affect the Potential for Carbon Linkages between Connected Ecosystems.

2016, Mangrove Macrobenthos Meeting 4, St. Augustine, USA

Mangrove leaf transportation: do mimic *Avicennia* and *Rhizophora* roots retain or donate leaves?

2015, Tropentag, Berlin, Germany

Implications of the trapping efficiency of *Avicennia* and *Rhizophora* roots for particulate organic matter outwelling to seagrass beds and coral reefs.

2015, Annual Conference of the Society for Tropical Ecology, Zurich, Switzerland

Mind the Gap: Disjointed management in the tropical coastal seascape.

2014, COAST, Faro, Portugal

Potential for landscape-scale reciprocal facilitation among tropical marine ecosystems: A review.

2013, Coastal and Estuarine Research Federation, San Diego, USA

Toward understanding the roles of mangrove and seagrass particulate matter as a nitrogen source in tropical coastal ecosystems.

2013, International Association of Ecology, London, United Kingdom

Leaf transport in mimic mangrove forests and seagrass beds.

2012, Netherlands Annual Ecology Meeting, Lunteren, Netherlands

Potential for landscape-scale reciprocal facilitation among tropical marine ecosystems: A review.

TAUGHT COURSES

Lecturer at the Leibniz Centre for Tropical Marine Research 2018
International Masters and PhD students
Topic: **Scientific Writing**

Field Lecturer in the STNAPA program 2018
Caribbean Junior Rangers (11-18 years)
Tropic: **Tropical Seascape Connectivity and Invasive Species**

Lecturer in the International Graduate School for Marine Sciences 2017-Present
PhD program at the University of Bremen
International PhD students and Post-doctorates
Topic: **Marine Ecology**

Lecturer in the International Studies in Aquatic Tropical Ecology 2014- Present
Master program at the University of Bremen
International PhD students
Topic: **Physical and Chemical Processes in Mangrove Forests**

SUPERVISORY EXPERIENCE

PhD Students

Ongoing, Daniel Hortua, University of Bremen and ZMT, **co-supervisor**
Exploring present and future carbon dynamics in connected mangrove forests and seagrass beds: How important is it?

Ongoing, Ameena Haroon, University of Bremen and ZMT, **co-supervisor**
Ecosystem engineering crabs effects on sediment processes.

Ongoing, Paula Senff, University of Bremen and ZMT, **steering committee member**
Bioremediation in Coastal Aquaculture

Ongoing, Guilherme Abuchahla, University of Bremen and ZMT, **steering committee member**
Marine Spatial Planning in Mangrove Forest Ecosystems

MSc students

2018, Florian Senger, University of Groningen, **co-supervisor**
Changes in deforested areas in the upper catchment affects connected seagrass beds and mangrove forests.

2018, Sandra Kammann, University of Bochum, **co-supervisor**
Advantages and disadvantages of connectivity: Evaluation of ecosystem engineering traits for capturing particles.

2017, Dorian Bas, University of Amsterdam, **co-supervisor**
Extra stored carbon: Epiphytes of mangroves how much carbon do they have?

2017, Johann Stiepani, University of Bayreuth, **co-supervisor** and **external examiner**
Response of Brachyuran Communities to Urbanization in the Mangrove Forests of Penang, Malaysia.

2017, Amelia Sturgeon, University of Plymouth, **external examiner**
Impacts of urbanization on mangrove function: Assessing the relative abundance of

the commercially important *Scylla* in urban and peri-urban mangroves in Penang, Malaysia.

2016, Elise Snavely, VU Brussels, **day-to-day supervisor**

Effects of crab burrows on sediment characteristics in a *Cerriops tagal* dominated mangrove forest.

2013, Sam Lai, National University of Singapore, **co-supervisor**

First experimental evidence of corals feeding on seagrass matter.

2012, Tuan Will, Heriot-Watt University, **co-supervisor**

Antimicrobial properties of extracts from 2 species of scleractinian corals.

2011, Jan-Willem Wolters, Radboud University, **co-supervisor**

Land use effects on mangrove nutrient status in Phang-Nga Bay, Thailand.

REVIEWING

Grant and funding evaluation

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), National Geographic Society, EuroMarine, National Environment Research Council (NERC)

Scientific Publications

Limnology and Oceanography, Biogeosciences, Estuarine Coastal and Shelf Science, Marine Ecology Progress Series, Marine and Freshwater Research, Hydrologia, Estuaries and Coasts, Journal of Marine Systems, Marine Pollution Bulletin, Oceans and Coastal Management, Botanica Marina, Marine Pollution Bulletin, Forest Ecology and Management, Frontiers Marine Science

Review Editor

Frontiers in Marine Science

Committees

EuroMarine Young Scientists representative

SKILLS

GIS Programs: MapInfo, ArcView, Idrisi

Databases/Statistical Programs: Past, Access, SPSS, Minitab

Modeling: R, Matlab, introductory Delft3D, Python

Microsoft: Word, Excel, PowerPoint, Outlook

RESEARCH EXPERIENCE

2018 **HyWEdges**

Denmark

Using a large-scale flume (30 m²) to set-up a mimic forest with hydrodynamic measurements (ADV's, wave gauges, EMF's, pressure sensors) and sediment erosion bars to determine how forest density changes buffering capacity.

2018 **PADDLE**

Senegal

Mapping sediment changes along abiotic and biotic gradients, specifically concentrating on micro scale gas fluxes, sediment organic material and organic carbon.

2018 **CONNECTIVITIES**

Jamaica and Bonaire

We traced understudied material and knowledge flows between island spaces that influence why particular 'invasives' are prioritized over others. Using tools such as stakeholder mapping, ethnographic interviews, interactive workshops, community led transect walks and roundtable discussions.

2017 **PADDLE**

Brazil, France

Initial meetings for the interdisciplinary consortium on MSP in the tropics, highlighting opportunities and limits of tropical MSP and produced toolboxes for a broad range of stakeholders.

2017 **Carbon dynamics in connected coastal ecosystems**

Australia, Singapore, Tanzania and America

Using biogeochemical sampling techniques to globally understand blue carbon dynamics in connected and isolated landscapes, working strongly with local partners and institutes. Using chemical tracers (isotopes) with sediment traps and water sampling as well as measuring CO₂ sediment fluxes and forest characteristics (above and below ground biomass etc.). Additionally using long cores (30 cm) to measure soil organic carbon accumulation.

2017 **BAKAU**

Malaysia

We used an interdisciplinary approach integrating field surveys, analyses of satellite images and ethnographic interviews with stakeholders, to fill research gaps in wetland forest conditions, social meanings and uses along the urban-rural interface.

2016 **Micro-sensor profiles of gas fluxes in mono-species mangrove forest**

America

Determining patterns of pore-water oxygen and hydrogen sulfide concentrations in forest sediments using microsensor gas flux profiles.

2015 **Dissolved inorganic carbon dynamics in connected ecosystems**

Tanzania

Developed a carbon budget model concentrating on tidal fluxes of dissolved inorganic carbon (DIC) and CO₂ from connected forest wetland ecosystems characteristics (above and below ground biomass, density etc.) with coastal water.

2015 **The role of bacteria in coastal wetland geomorphology**

America

Using H₂S, pH, O₂ and temperature microsensors we determined the alteration in cable bacteria presence across an ecological gradient (mangrove forest, saltmarsh and mudflat).

2010-2014 **Physical fluxes in the coastal seascape**

Thailand and Singapore

Using biological tracers, hydrodynamic modeling, in-situ fieldwork, incubations and flume experiments to determining the movement of organic material and associated nutrients from upper catchment areas to connected coastal ecosystems.

PUBLICATIONS

ACCEPTED

Gillis LG, Snaveley E, Lovelock C, Zimmer M. Effects of crab burrows on sediment characteristics in a *Cerriops tagal* dominated mangrove forest. (2019) Estuarine, Coastal and Shelf Science 218: 334-339. doi.org/10.1016/j.ecss.2019.01.008. **Impact Factor 2.41**

González Viana I, Siriwardane-de Zoysa R, Damien, **Gillis LG** (2019) Exploring how non-native seagrass species could provide essential ecosystems services: A perspective on the highly invasive seagrass *Halophila stipulacea* in the Caribbean Sea. Biological Invasions. *To be assigned a volume*. doi.org/10.1007/s10530-019-01924-y **Impact Factor 3.05**

Le Minor M, Bartzke G, Zimmer M, Gillis LG, Helfer V, Huhn K (2018) Numerical modeling of hydraulics and sediment dynamics around mangrove seedlings: Implications for mangrove establishment and reforestation. Estuarine Coastal and Shelf Science 217:81-95. doi.org/10.1016/j.ecss.2018.10.019 **Impact Factor 2.41**

Siriwardane-Zoysa R, **Gillis LG**, Engel S, Viana-Gonzalez I (2018) Unwelcome guests: Stakeholder perspectives on non-native seagrasses and macroalgal 'nuisance' species in Bonaire. BioNews 18, DCNA.

Gillis LG, Jones CJ, Ziegler AD, van der Wal D, Breckbwooldt A, Bouma TB (2017) Opportunities for Protecting and Restoring Tropical Coastal Ecosystems by Utilizing a Physical Connectivity Approach. Frontiers in Marine Science 4 (374). doi.org/10.3389/fmars.2017.00374. **Impact Factor 2.89**

Gillis LG, Belshe FE, Narayan GR (2017) Deforested Mangroves Affect the Potential for Carbon Linkages between Connected Ecosystems. Estuaries and Coasts 40 (4): 1207-1213. doi.org/10.1007/s12237-017-0210-9. **Impact Factor 2.42**

- Belshe FE, Matteo MA, **Gillis LG**, Zimmer M, Teichberg M (2017) Muddy Waters: Unintentional consequences of blue carbon research obscure our understanding of organic carbon dynamics in seagrass ecosystems. *Frontiers in Marine Science* 4 (125). doi.org/10.3389/fmars.2017.00125. **Impact Factor 2.89**
- Gillis LG**, Belshe FE, Ziegler AD, Bouma TB (2017) Driving forces of organic carbon spatial distribution in the tropical seascape. *Journal of Sea Research* 120: 35-40. doi.org/10.1016/j.seares.2016.12.006. **Impact Factor 2.03**
- Gillis LG**, Paul M, Bouma TB (2017) No waves, no nutrients: How waves affect nutrient uptake in seagrass beds. *Frontiers in Marine Science* 4 (207). doi.org/10.3389/fmars.2017.00207. **Impact Factor 2.89**
- Quak MSA, Ziegler AD, Benner SG, Evans S, Todd PA, **Gillis LG**, Vongtanaboon S, Jachowski N, Bouma TJ (2016) Processes affecting the spatial distribution of seagrass meadow sedimentary material on Yao Yai Island, Thailand. *Estuarine, Coastal and Shelf Science* 182: 136-145. doi.org/10.1016/j.ecss.2016.09.018. **Impact Factor 2.41**
- Gillis LG**, Zimmer M, Bouma TB (2016) Mangrove leaf transportation: do mimic *Avicennia* and *Rhizophora* roots retain or donate leaves? *Marine Ecology Progress Series* 551:107-115. doi.org/10.3354/meps11734. **Impact Factor 2.28**
- Wolters JW, **Gillis LG**, Ziegler AD, van Katwijk MM, Bouma TB (2016) Land use effects on mangrove nutrient status in Phang-Nga Bay, Thailand. *Land Degradation and Development* 27 (1): 68-76. doi.org/10.1002/ldr.2430. **Impact Factor 7.27**
- Gillis LG**, Bouma TB, Ziegler AD, Cathalot C, Herman PMJ (2015) Particulate Matter in Mangrove Forests and Seagrass Beds as a Nitrogen Source in Tropical Coastal Ecosystems. *Biotropica* 47(3): 286-291. doi.org/10.1111/btp.12220. **Impact Factor 2.28**
- Paul M & **Gillis LG** (2015) Let it flow: How does an underlying current affect wave propagation over a natural seagrass meadow? *Marine Ecology Progress Series* 523: 57-70. doi.org/10.3354/meps11162. **Impact Factor 2.28**
- Gillis LG**, Bouma TB, Jones CG, van Katwijk MM, Nagelkerken I, Jeuken CJL, Herman PMJ, Ziegler AD (2014) Potential for landscape-scale reciprocal facilitation among tropical marine ecosystems: A review. *Marine Ecology Progress Series* 503:289-303. doi.org/10.3354/meps10716. **Impact Factor 2.28**

Gillis LG, Ziegler AD, van Oevelen D, Cathalot C, Herman PMJ, Bouma TB (2014) Tiny is mighty: Seagrass bed influence of organic matter fluxes in the tropical coastal zone. *PLoS One* 9 (11):e111847. doi: 10.1371/journal.pone.0111847. **Impact Factor 4.17**

Gillis LG, Bouma TB, Kiswara W, Ziegler AD, Herman PMJ (2014) Leaf transport in mimic mangrove forests and seagrass beds. *Marine Ecology Progress Series* 498:95-102. doi.org/10.3354/meps10615. **Impact Factor 2.28**

Lai S, **Gillis LG**, Mueller C, Bouma TB, Guest JR, Last KS, Zeigler A, Todd PA (2013) First experimental evidence of corals feeding on seagrass matter. *Coral Reefs* 32 (4): 1061-1064. doi.org/10.1007/s00338-013-1062-9. **Impact Factor 3.09**

INVITED TO SUBMIT

Cragg S, Friess D, **Gillis LG**, Trevathan-Tackett SM, Terrett OM, Watts JEM. Marine lignocellulose deconstruction drives a globally-significant carbon flux from vascular plant detritus. *Annual Review of Marine Science*. **Impact Factor 16.38.**

