Sophie Comer-Warner
Email: s.comer-warner@bham.ac.uk

Personal Summary

I am a Marie Skłodowska-Curie Individual Global Fellow at the University of Birmingham with the first two years hosted by McGill University, Canada, which is funded until December 2022. This fellowship investigates the effect of multiple environmental stressors resulting from global change on greenhouse gas emissions from salt marsh sediments, which aligns with my long-term research focus of constraining drivers of nutrient cycling and greenhouse gas emissions across a continuum of ecosystems from freshwater to coastal wetlands and estuaries. I was previously a post-doctoral researcher on an Institute for Global Innovation project, for which I wrote the successful funding application, illustrating the relevance of my work to the Institute for Global Innovation's Water Challenges theme and wider Global Challenges Research Fund priorities. My track record of conducting and disseminating high-quality research illustrates my excellent project management, ability to work in international, interdisciplinary teams and communication skills. I have progressed in a variety of project roles to now develop research proposals, supervise others and deliver expected outputs, demonstrating my leadership skills and ability to excel at new challenges and responsibilities. I have developed my teaching experience alongside my research and am able to effectively facilitate learning activities and train and supervise research students. I recognise the importance of taking an active role in the wider research group and department and have therefore, taken a number of service roles including postgraduate EDI committee member at McGill University and postdoctoral representative for the Postdoctoral/Early Researcher Career Development and Training Committee at the University of Birmingham.

Education

2014-2019

Awarded the Sir Oliver Lodge Prize for quality of Ph.D. thesis.

Ph.D. in Biogeochemistry, University of Birmingham. Ph.D.

Studentship funded through the Natural Environment Research Council with additional funding and supervision from the British Geological Survey. Fieldwork was conducted at the Birmingham Institute of Forest Research.

Title: Drivers of Microbial Metabolism, Nutrient Cycling and Greenhouse Gas Production in Agricultural Streambed Sediments.

Supervisors: Prof. Stefan Krause and Prof. Daren Gooddy.

Modules: Introduction to learning and teaching in higher education for postgraduates, Introduction to assessment and feedback for postgraduates.

2012-2013

Taught Masters (M.Sc.) in Oceanography, University of Southampton. Grade: **Merit**.

Research Title: The Comparison of Iron Speciation and Transport between Two Hydrothermal Vent Fields.

Supervisors: Prof. Rachel Mills and Dr. Will Homoky.

2006-2010

Master of Chemistry Degree, University of Sheffield. Grade: **First Class**.

Research Title: Developing *in vivo* and *in vitro* assays of O^6-methylguanine-DNA methyltransferase.

Included one year of study abroad (2008-09) at University of Maryland, USA, *Research title:* Investigating ionic liquids as greener and safer solvents.

Professional Experience

Jan 2020 funded to Dec 2022: European Commission Marie Skłodowska-Curie Individual Global Fellow, University of Birmingham and McGill University, Canada

Mar-Nov 2019: Institute for Global Innovation Postdoctoral Researcher, University of Birmingham in partnership with Vietnam National University, Hanoi and Can Tho University, Vietnam

Mar 2018-2019: Ph.D. Research secondment at the United States Geological Survey, Virginia, USA

Mar-Sept 2014: Science Programme Officer at Natural Environment Research Council, UK

Participation in International, Multidisciplinary Research Projects

August 2017

Collaborator on an international, multidisciplinary experiment at the Krycklan Study Catchment, Sweden, investigating the effect of varying flow regimes on stream metabolism, nutrient cycling and greenhouse gas production in a boreal stream. Participating institutions include Umea University, Sweden, and Swedish University of Agricultural Sciences. Funded by NERC, CENTA and EU.

June 2015

Collaborator on an international, multidisciplinary experiment at the Urban River Laboratory, Spain, investigating nutrient cycling in urban rivers. Participating institutions include Blanes Centre for Advanced Studies, Spain, Naturalea, Spain, Michigan State University, USA and Leibniz-Institute of Freshwater Ecology and

Inland Fisheries, Germany. Funded by NERC, CENTA and the Leverhulme Trust.

Funding and Awards

2021	Poster Prize, 13th International Symposium on Biogeochemistry of Wetlands
2019	European Commission Marie Skłodowska-Curie Individual Fellowship (€276,498)
2019	Sir Oliver Lodge PhD Prize, University of Birmingham
2019	Institute for Global Innovation, project number 2018 (£39,200)
2016	NERC Life Sciences Mass Spectrometry Facility Award (£8,736)
2015	NERC Isotope Geoscience Laboratory Facilities Award (£58,600)
2012	Society for Underwater Technology M.Sc. Scholarship (£4,000)
2012	University of Southampton M.Sc. Scholarship (£5,400)

Publications

Comer-Warner, S. A., Nguyen, A. T. Q., Nguyen, M. N., Wang, M., Turner, A., Le, H., Sgouridis, F., Krause, S., Kettridge, N., Nguyen, N., Hamilton, R. L. and Ullah, S. (2021) Restoration impacts on rates of denitrification and greenhouse gas fluxes from tropical coastal wetlands. *Science of the Total Environment.*

Comer-Warner, S. A., Blaen, P., Brekenfeld, N., Gooddy, D. C., Lovell, C., Khamis, K., Bryden, A. and Krause, S. (2021) Advection not dispersion and transient storage controls streambed nutrient and greenhouse gas concentrations. *Frontiers in Water, section Water and Critical Zone*.

Published

Khamis, K., Blaen, P., Hannah, D. M., **Comer-Warner, S**., MacKenzie, A. R. and Krause, S. (2021) High-frequency monitoring reveals multiple frequencies of nitrogen and carbon mass balance dynamics in a headwater stream. *Frontiers in Water, section Water and Critical Zone*.

MacKenzie, A. R., Krause, S., Hart, K. M., Thomas, R. M., Blaen, P. J., Hamilton, R. L., Curioni, G., Quick, S. E., Kourmouli, A., Hannah, D. M., **Comer-Warner, S. A**., Brekenfeld, N., Ullah, S. and Press, M. C. (2021) BIFoR FACE: Water-soil-vegetation-atmosphere data from a temperate deciduous forest catchment, including under elevated CO_2. *Hydrological Processes.*

Comer-Warner, S., Gooddy, D. C., Ullah, S., Glover, L., Kettridge, N., Wexler, S. K., Kaiser, J. and Krause, S. (2020*)* Seasonal variability of sediment controls of nitrogen cycling in an agricultural stream. *Biogeochemistry*.

Comer-Warner, S. *et al*. (2020) The method controls the story - Sampling method impacts on the detection of pore-water nitrogen concentrations in streambeds. *Science of the Total Environment.*

Comer-Warner, S., Gooddy, D. C., Ullah, S., Glover, L., Percival, A., Kettridge, N. and Krause, S. (2019) Seasonal variability of sediment controls of carbon cycling in an agricultural stream. *Science of the Total Environment.*

Romeijn, P., **Comer-Warner, S. A.**, Ullah, S., Hannah, D. M. and Krause, S. (2019) Streambed organic matter controls on carbon dioxide and methane emissions from streams. *Environmental Science and Technol*ogy.

Qui, H., Blaen, P., **Comer-Warner, S**., Hannah, D. M., Krause, S. and Phanikumar, M. S. (2019) Evaluating a coupled phenology – surface energy balance model to understand stream – subsurface temperature dynamics in a mixed-use farmland catchment. *Water Resources Research*.

Lough, A., Homoky, W. B., Connelly, D. P., **Comer-Warner, S. A.**, Nakamura, K., Abyaneh, M. K., Kaulich, B. and Mills, R. A. (2019) Soluble iron conservation and colloidal iron dynamics in a hydrothermal plume. *Chemical Geology*.

Comer-Warner, S., Romeijn, P., Gooddy, D. C., Ullah, S., Kettridge, N., Marchant, B., Hannah, D. M. and Krause, S. *et al*. (2018) Thermal sensitivity of CO_2 and CH_4 emissions varies with streambed sediment properties. *Nature Communications*.

Blaen, P., Brekenfeld, N., **Comer-Warner, S**. and Krause, S. (2017) Multitracer field fluorometry: Accounting for temperature and turbidity variability during stream tracer tests. *Water Resources Research.*

Blaen, P., Khamis, K., Lloyd, C., **Comer-Warner, S.**, Ciocca, F., Thomas, R. M., MacKenzie, A. R. and Krause, S. (2017) High-frequency monitoring of catchment nutrient exports reveals highly variable storm event responses and dynamic source zone activation. *JGR: Biogeosciences*.

Comer-Warner, S., Krause, S., Goody, D. C., Bennett, S. A., Wexler, S. K. and Kaiser, J. (2017) Opening opportunities for high-resolution isotope analysis - quantification of $\delta^{15}N_{NO3}$ and $\delta^{18}O_{NO3}$ in Diffusive Equilibrium in Thin–film passive samplers. *Analytical Chemistry.*

Lough, A., Klar, J. K., Homoky, W. B., **Comer-Warner, S. A**., Milton, J. A., Connelly, D. P., James, R. H. and Mills, R. A. (2017) Opposing authigenic controls on the isotope signature of dissolved iron in hydrothermal plumes. *Geochimica et Cosmochimica Acta*.

Presentations – presenter is denoted in bold

Invited Seminars

Scientific Queeries Seminar, University of Alberta, March 2021
River Basin Processes and Management Seminar, Department of Geography, University of Leeds, March 2021
Departmental Seminar, University of Birmingham, March 2020

Oral Presentations

Invited

Comer-Warner, S. *et al.* Closing the climate-hydrology feedback loop: Variations in greenhouse gas fluxes resulting from changes in catchment hydrology due to human-induced climate change. **EGU General Assembly 2021**, Virtual

Comer-Warner, S. *et al*. Greenhouse gas fluxes and nitrogen processing in tropical coastal wetlands: The role of land-use change and restoration. **III Peruvian Wetlands Congress 2021**, Virtual

Comer-Warner, S. *et al*. Physical, biogeochemical and hydrological controls of streambed nutrient cycling and greenhouse gas production. **AGU Fall Meeting 2020**, Virtual

Other

Comer-Warner, S. *et al.* Sea level rise but not invasive vegetation affects CH_4 fluxes from salt marsh soils. Atlantic Canada Coastal and Estuarine Science Society Conference 2021, Virtual

Comer-Warner, S. *et al.* Greenhouse gas fluxes and nitrogen processing in tropical coastal wetlands: The role of land-use change and restoration. EGU General Assembly 2021, Virtual

Comer-Warner, S. *et al*. The impacts of restoration and land-use on nitrogen biogeochemistry and greenhouse gas fluxes in tropical coastal wetlands. 13th International Symposium on Biogeochemistry of Wetlands 2021, Virtual

Comer-Warner, S. et al. How will sea level rise impact greenhouse gas fluxes from salt marsh soils? SWS 2020, Virtual

Brekenfeld, N. *et al*. A comparison of field techniques for the analysis of groundwater-surface-water interactions: Porewater sampling and hyporheic temperature and EC time series. EGU 2020, Virtual.

Brekenfeld, N. *et al*. The hyporheic zone as a hotspot of C-cycling in a small, boreal stream: Lessons learnt from experimental flow manipulations. AGU Fall Meeting 2019, Washington D.C., USA

Brekenfeld, N. *et al*. The effect of contrasting discharges on the metabolic activity of a small boreal stream. EGU General Assembly 2018, Vienna, Austria

Krause, S. *et al*. Quantifying microbial metabolic activity by the Resazurin/Resorufin smart tracer system from plot to catchment scales. EGU General Assembly 2018, Vienna, Austria

Comer-Warner, S. *et al*. Drivers of microbial metabolic activity, biogeochemical cycling and associated greenhouse gas production in streambed sediments. AGU Fall Meeting 2017, New Orleans, USA

Comer-Warner, S. *et al*. Temperature and organic matter controls on hyporheic greenhouse gas production.

HydroEco 2017, Birmingham, UK

Comer-Warner, S. *et al*. Temperature and organic matter controls on hyporheic greenhouse gas production. AGU Fall Meeting 2016, San Francisco, USA

Poster Presentations

Comer-Warner, S., Ampuero Reyes, W., Ullah, S., Krause, S. and Chmura, G. How will sea level rise and invasive vegetation impact greenhouse gas fluxes from salt marsh soils? 13th International Symposium on Biogeochemistry of Wetlands 2021, Virtual, ***Poster Award Prize Winner***

Comer-Warner, S., Ampuero Reyes, W., Ullah, S., Krause, S. and Chmura, G. How will sea level rise impact greenhouse gas fluxes from salt marsh soils? AGU Fall Meeting 2020, Virtual

Krause, S. *et al*. Combining sensor network innovations with adaptive modelling approaches for identifying non-linear dynamics in hydrological and biogeochemical responses to global environmental change at the Birmingham Institute of Forest Research. AGU Fall Meeting 2019, San Francisco, USA

Brekenfeld, N. *et al*. Measurement of Hyporheic Flowpaths and Residence Times at High Spatial and Temporal Resolution: A Field Application of a Newly Developed, Small and Inexpensive Electrical Conductivity Sensor. AGU Fall Meeting 2019, San Francisco, USA

Comer-Warner, S. *et al*. Thermal sensitivity of CO_2 and CH_4 emissions varies with streambed sediment properties. AGU Fall Meeting 2018, Washington D.C., USA.

Brekenfeld, N. *et al*. Stream channel characteristics and discharge mutually affect metabolic activity in a first-order boreal stream. EGU General Assembly 2018, Vienna, Austria

Kaiser, J. *et al*. A high-resolution passive sampling technique for nitrate isotopologues using thin-film gels. EGU General Assembly 2018, Vienna, Austria

Comer-Warner, S. *et al*. Novel high-resolution nitrate isotope method for determination of nutrient fate in aquatic systems. HydroEco 2017, Birmingham, UK

Blaen, P. *et al*. Temperature and turbidity effects on *in-situ* field fluorometer measurements of conservative (Uranine) and reactive (Resazurin and Resorufin) stream tracers. EGU General Assembly 2017, Vienna, Austria

Comer-Warner, S. *et al*. Novel high-resolution nitrate isotope method for determination of nutrient fate in aquatic systems. AGU Fall Meeting 2016, San Francisco, USA

Krause, S. *et al*. Streambed sediment controls on hyporheic greenhouse gas production – a microcosm experiment. EGU General Assembly 2016, Vienna, Austria

Romeijn, P. *et al*. Streambed sediment controls on hyporheic greenhouse gas production – a microcosm experiment. AGU Fall Meeting 2015, San Francisco, USA

Media

https://www.bbc.com/future/article/20210323-climate-change-the-rivers-that-breathe-greenhouse-gases

Teaching and Supervision Activities

2020-21	Guest lecturer for undergraduate (Geog 205) and graduate (Geog 505) courses at McGill University, including in-person and online teaching, and writing exam questions.
2016-2019	Mentoring Ph.D. students on field and laboratory techniques, experimental design, conference presentation preparation and editing manuscripts
2016-2019	Training Ph.D. students on laboratory equipment, such as, colorimetric continuous flow analysers and gas chromatographs
2016, 2019-20	Supervision of M.Sc. and B.Sc. students, providing training on field techniques (*in-situ* fluorometers, dye tracers), laboratory techniques (gas chromatograph, soil slurry incubations, soil analyses), and analytical chemistry theory. Proofreading student dissertations.

2015-2017 Demonstrating and Marking/Teaching Assistant

Administrative Roles

2020-Present Postgraduate EDI committee member (McGill University)
2020- Present Departmental Post-Doctoral Representative (McGill University)
2020-2021 Postdoctoral Representative for the Postdoctoral/Early Researcher Career Development And Training Committee (University of Birmingham)
2015-2017 Environment, Health and Safety Advisory Committee Student Representative
2015 CENTA Conference Organiser and Chair
2015 Public Engagement at the University of Birmingham's Community Day

Technical Skills

- **Chemical Analysis**: Experience in using a wide range of analytical techniques and improving user protocols on machines including gas chromatography, colorimetric continuous flow analysers, nitrate isotope sample processing and preparation, ion chromatography, scanning electron microscopy. Experience maintaining and training on colorimetric continuous flow analysers and gas chromatographs.
- **Experimental Design**: Experience designing experiments to investigate biogeochemistry including laboratory proof-of-concept experiments for new sampling methodologies, laboratory microcosm experiments and *in-situ* field experiments.
- **Project Management**: Throughout my post-doctoral research fellowships and Ph.D. project I have managed the projects including research, administration and finances.
- **Statistical Analysis**: Experience with a range of statistics including significance tests and linear and non-linear modelling.