

# Alexander G. Hurley

POST-DOCTORAL RESEARCHER

Berlin, DE

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## Goal

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Ultimately, I wish to enable evidence-based decision-making in socio-ecological systems. This I hope to achieve following my interests in ecohydrology, dendroecology and open science, ideally set in an innovative, collaborative and inter-disciplinary research environment.

## Key Achievements

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- I designed and executed research to identify tree growth sensitivity to climate change and urbanization, which will inform green space management in Berlin to ensure the provision of ecosystem services.
- I contributed to the reclamation of large open-pit mines (Oil Sands, Alberta, Canada) by developing and executing novel research on ecohydrological wetland-forest interactions in natural Aspen-forested catchments. This research constitutes the main body of work for my doctoral thesis and was part of the "Hydrology, Ecology And Disturbance in the Western Boreal Forest" projects (HEAD3).
- I lead and contribute to efforts of promoting open and reproducible science, as well as computer literacy, driven by a passion for developing open evidence bases. I do so through my personal web site and an open-science initiative (DEEP), developing software, delivering high-quality workshops and seminars, and academic publishing. For example, I jointly authored a review on the current and future use of R in hydrology, which is to date one of the most downloaded articles in *Hydrology and Earth System Sciences*.

## Employment and research experience

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### Helmholtz Centre Potsdam - GFZ German Research Centre for Geosciences

Potsdam

POST-DOCTORAL RESEARCHER

2019 - 2021

- Original research on urban tree growth and heat in the Helmholtz Initiative for Climate Change Adaptation and Mitigation preparing two articles, one software and contribution to a briefing report

### University of Birmingham

Birmingham

TEACHING ASSOCIATE

2015 - 2019

- Wetland Environments (BSc, 25908), Biodiversity and Conservation Management (BSc, 27192), Climate change in the Earth System (BSc, 30021), Environmental Analysis and Modelling (MSc, PhD 29284), Air Quality Data Analysis and Interpretation (MSc, PhD 28981), Statistics Helpdesk (BSc)

### Leibniz-Institut für Gewässerökologie und Binnenfischerei

Berlin

RESEARCH INTERN

2013 - 2013

- GROUNDWATER-SURFACE WATER EXCHANGE. Assists in data collection (sediment heat pulse, surface water temperature), analyses and visualization of temperature tracer experiments.

### Universität Bayreuth

Bayreuth

RESEARCH ASSISTANT

2011 - 2013

- ECOSYSTEM FUNCTION UNDER EXTREME METEOROLOGICAL EVENTS. Sampling, maintenance, construction, data administration, induction of new assistants for long-term ecological experiment.

### Universität Bayreuth

Bayreuth

RESEARCH ASSISTANT

2010 - 2011

- CARBON CYCLING IN AGRICULTURAL SOILS. sample collection, preparation and fatty acid extraction.

## Education

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### University of Birmingham

Birmingham

PHD

2015 - 2020

#### • Thesis:

The function of forested swamps in the Boreal Plain: climate and storage shape ecohydrological interactions.  
*N. Kettridge, S. Krause (UoB)*

## University of East Anglia

APPLIED ECOLOGY, EMMC MSc (DISTINCTION)

- **Thesis:**

Simulating real world ecosystems: how does carnivore functional diversity affect ecosystem functioning?

*M. Harfoot* (UNITED NATIONS EP WCMC), *D. Purves* (MICROSOFT RESEARCH), *R. Davies* (UEA)

- **Modules:**

Modelling Environmental Processes (developed 2-D advection-diffusion model in MatLab),

Catchment Water Resources (wrote HBV Rainfall-Runoff model in R applying Monte-Carlo and GLUE),

Multivariate Statistics

## Universidade de Coimbra

APPLIED ECOLOGY, EMMC MSc (DISTINCTION)

- **Modules:**

Biodiversity Management and Conservation (network analyses, population dynamics),

Environmental Management (nutrient cycling), Modelling complex Ecological Systems

## Universidad San Francisco de Quito

APPLIED ECOLOGY, EMMC MSc (DISTINCTION)

- **Modules:**

Water Resource Management of Andean Highlands

## University of Poitiers

APPLIED ECOLOGY, EMMC MSc (DISTINCTION)

- **Modules:**

Biostatistics

## Universität Bayreuth

BSc GEOÖKOLOGIE

- **Thesis:**

Mudpots as proxies for volatile metalloid emissions in the Yellowstone NP.

*B. Planer-Friedrich*, *J. Arndt* (UBT)

- **Modules:**

Ecological Modelling, Statistics in R, Multivariate Statistics in R, Environmental Biogeochemistry, Hydrology,

Hydrochemistry, Soil Science, Meteorology, Climatology, Microbiology, Mathematics for Natural Sciences 101/102, Physics 101

## Awards

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2017 British Ecological Society Training and Travel Grant

2016 Alpkit Personal Development Grant

2014 Merit Grant for Outstanding Academic Achievement (Portuguese Government)

2013 Erasmus Mundus scholarship of the European Commission for Master's of Excellence

## Skills

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**Quantitative** (examples: [https://github.com/the-Hull/code\\_portfolio](https://github.com/the-Hull/code_portfolio))

- Data processing, analyses, and frequentist statistics (advanced: R; intermediate: Excel, basic: MATLAB) with hierarchical models (GAMMs)
- numerical model development and (sensitivity) analyses of outputs (advanced: R, basic: F#, MatLab)
- GIS, spatial analyses (ESRI ARCMAP, R)
- R Software and web development (SHINY),
- Version control (GIT, GITHUB), continuous integration (TRAVISCI, CIRCLECI, GITHUB ACTIONS),
- Reproducible and open science (R, RMARKDOWN, DRAKE, TARGETS, RENV, GITHUB)
- Data(base) management (advanced: R; basic: MS ACCESS, SQL),
- $\text{\LaTeX}$ , OVERLEAF, MS OFFICE, RMARKDOWN (R), BLOGDOWN (R), XARINGAN (R)
- PYTHON: basic data manipulation, and computer vision tasks in JUPYTER NOTEBOOKS

### General

- Excellent written and oral communication to experts and lay people
- Project management and workshop organization
- Collaborative project execution and code development
- Knowledge management (ZOTERO, ONENOTE), issue tracking (GITHUB)
- German and English native speaker
- Other: Driving License, Outdoor First Aid, Wildlife Awareness Training

## Activities

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- Supervision: 1 research assistant (2017, University of Alberta, CA); remote field work for 8 under-graduate and 1 post-graduate dissertations (2016 - 2017, University of Birmingham); 1 under-graduate professional development internship (2016, University of Birmingham); co-supervised 1 post-graduate dissertation (2020, GFZ and Humboldt Uni. Berlin)
- Co-organized "A Comprehensive Toolbox for Tree Physiological Data Processing in R; ESA Annual Meeting, Virtual (2021) Materials: <https://deep-tools.netlify.app/docs-workshops/esa-workshop2021/>
- GFZ Post-Doctoral Researcher Representative (2021)
- Co-chaired topic group at QNet Workshop (2020). <https://qwa-net.com/workshops-2/>
- Co-founded DEEP Platform for outreach and teaching (2020). <https://deep-tools.netlify.app/>
- Co-organized "Advanced Analyses of Tree Physiological Time Series in R and PhytoSim; ESA Annual Meeting, Virtual (2020) Materials: <https://deep-tools.netlify.app/docs-workshops/esa-workshop2020/>
- Main-convener of "Using R in Hydrology" EGU AGM Shourt-Course; Vienna, Austria (2019) Materials: [https://github.com/hydrosoc/rhydro\\_EGU19](https://github.com/hydrosoc/rhydro_EGU19), DOI: <http://doi.org/10.5281/zenodo.3236979>
- Co-convener of "Using R in Hydrology" EGU AGM Shourt-Course; Vienna, Austria. (2018) Materials: [https://github.com/hydrosoc/rhydro\\_EGU18](https://github.com/hydrosoc/rhydro_EGU18), DOI: <http://doi.org/10.5281/zenodo.2554009>
- Course Representative on Post-Graduate Taught Affairs Committee (2014)
- OpenNASA Datanaut Citizen Data Scientist / Volunteer (2018 - present)
- FishAct (frm. The Black Fish) Social Media Coordinater Germany (2014 - 2015)

## Software

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- Alexander Hurley *et al.* (2021). **ROAR**: Reproducible and Organized Assimilation Routines. R package version 0.0.900 <https://github.com/the-hull/ROAR>
- Alexander Hurley *et al.* (2020). **datacleanr**: Interactive and Reproducible Data Cleaning. R package version 1.0.3. <https://the-hull.github.io/datacleanr/>
- Richard L. Peters *et al.* (2020). **TREX**: Assimilate, process and analyse thermal dissipation sap flow data. R package version 1.0.0. <https://the-hull.github.io/TREX/>
- Alexander Hurley (2019). **lib2bib**: easily cite and acknowledge open-source R software. R package version 0.0.900. <https://the-hull.github.io/lib2bib/index.html>
- Richard L. Peters *et al.* (2018). **RAPTOR**: Row and Position Tracheid organizer in R. <https://doi.org/10.1016/j.dendro.2017.10.003>. (Contributed to code refactoring, continuous integration and testing)
- Alexander Hurley (2017). **BIFoR Data and Outreach Platform**: R SHINY portal prototype. <https://aglhurley.shinyapps.io/bifor/>

## Seminars, workshop contributions and outreach

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- 2021 Time series data processing (U Helsinki, Finland)
- 2021 Reproducible processing of ecophysiological time series data (ESA, Virtual)
- 2020 Wetland functioning in the sub-humid Boreal Plains (GFZ, Potsdam, Germany)
- 2020 Online toolbox for data analyses (Quantitative Wood Anatomy Network Workshop, Virtual)
- 2019 Obtaining, cleaning and visualizing hydrological data with R (EGU, Vienna, Austria)
- 2019 Staying up-to date: automating tasks from downloading data to reporting (EGU, Vienna, Austria)
- 2018 Processing, modelling and visualizing hydrological data in R (EGU, Vienna, Austria)
- 2018 Intro to version control and project management with git, GitHub and RStudio (UoB, Birmingham, UK)
- 2016 Introduction to analyses and data management with R (UoB, Birmingham, UK)
- 2016 Graduation Ceremony Address - International Master's in Applied Ecology (UoP, Poitiers, France)

## Publications and conference contributions

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I have authored four publications (equal contribution, co-authored) in scientific journals relevant to my research foci and representing my dedication to open science, which were done without my PhD promoters. Six manuscripts are currently in preparation for publication, of which two are under review.

### PRE-PUBLICATION

1. HURLEY, A., Kettridge, N., Devito, K., Hokanson, K., Heinrich, I., & Krause, S. (n.d.). Swamp micro-climate limits understory evapotranspiration promoting persistence in the sub-humid Boreal Plain. *In Prep.: Hydrological Processes.*

2. HURLEY, A., Peters, R. L., Pappas, C., Steger, D., & Heinrich, I. (2021). Addressing the need for interactive, efficient and reproducible data processing in ecology with the datacleanr R package. *In Review: PLOS One*.
3. HURLEY, A., & Heinrich, I. (n.d.). Assessing the impact of urban heating on tree growth in Berlin with open inventory data. *In Prep.: Urban Forestry & Urban Greening*.
4. Klesse, S., Babst, F., Peters, R. L., HURLEY, A., Pappas, C., & Evans, M. E. K. (n.d.). Missing the forest for the trees - on the significance of drought legacy effects in tree-ring research. *In Prep.: Global Change Biology*.
5. Pappas, C., Nicolas Belanger, Gabriel Bastien-Beaudet, Catherine Couture, Loic Orangeville, Louis Duchesne, Fabio Gennaretti, Daniel Houle, HURLEY, A., Stefan Klesse, Simon Lebel Desrosiers, Miguel Montoro Girona, Richard L. P., Karel St-Amand, & Daniel Kneeshaw. (2021). Xylem porosity shapes tree species sapwood allometry and thermal conductivity. *In Review: Agricultural and Forest Meteorology*.
6. Steger, D., Peters, R. L., Blume, T., HURLEY, A., Balanzategui, D., Balting, D., & Heinrich, I. (n.d.). Relevance of internal water status when assessing inter- and intraspecific variability in crown conductance regulation. *In Prep.: New Phytologist*.

#### PEER-REVIEWED JOURNALS

1. Balanzategui, D., Nordhaus, H., Heinrich, I., Biondi, F., Miley, N., HURLEY, A. G., & Ziaco, E. (2021). Wood anatomy of Douglas-fir in eastern arizon and its relationship with pacific basin climate. *Accepted: Frontiers in Plant Science*.
2. Peters, R. L., Balanzategui, D., HURLEY, A. G., von Arx, G., Prendin, A. L., Cuny, H. E., Bjoerklund, J., Frank, D. C., & Fonti, P. (2018). RAPTOR: Row and position tracheid organizer in R. *Dendrochronologia*, 47, 10–16.
3. Peters, R. L., Pappas, C., HURLEY, A. G., Poyatos, R., Flo, V., Zweifel, R., Goossens, W., & Steppe, K. (2021). Assimilate, process and analyse thermal dissipation sap flow data using the TREX r package. *Methods in Ecology and Evolution*, 12(2), 342–350. <https://doi.org/10.1111/2041-210X.13524>. <https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/2041-210X.13524>
4. Slater, L. J., Thirel, G., Harrigan, S., Delaigue, O., HURLEY, A., Khouakhi, A., Prosdoci, I., Vitolo, C., & Smith, K. (2019). Using R in hydrology: A review of recent developments and future directions. *Hydrology and Earth System Sciences*, 23(7), 2939–2963. <https://doi.org/10.5194/hess-23-2939-2019>

#### CONFERENCE PAPERS / PRESENTATIONS

1. Balanzategui, D., Heussner, K.-U., Wazny, T., Helle, G., Peters, R. L., HURLEY, A. G., & Heinrich, I. (2017). *Wood anatomical parameters of lowland European oak and Scots pine as proxies for climate reconstructions*. TRACE.
2. Balanzategui, D., HURLEY, A. G., Peters, R. L., Kuznetsova, V., Heinrich, I., & Helle, G. (2018). *Climate response of Scots pine tracheid cells across the European-Eurasian maritime-continental climate gradient*. TRACE.
3. HURLEY, A., Kettridge, N., Devito, K., Hokanson, K., & Krause, S. (2017). A concept of ephemeral wetlands as water-transmitting landscape units in Canada's Western Boreal Plain. *EGU General Assembly Conference Abstracts*, 19, 13113.
4. HURLEY, A., Kettridge, N., Devito, K., Hokanson, K., Leonard, R., Krause, S., & Waddington, J. M. (2017). Spatio-temporal dynamics of evapotranspiration from forested, ephemeral wetlands and its implication for hydrologic connectivity in the Western Boreal Plain in Alberta, Canada. *EGU General Assembly Conference Abstracts*, 19, 13592.
5. HURLEY, A., Kettridge, N., Devito, K., Hokanson, K., Leonard, R., Heinrich, I., Balanzategui, D., & Krause, S. (2018). Assessing the ecohydrological role of cryptic, forested wetlands in the Boreal Plain (Canada): Local-scale effects with a potential regional impact. *EGU General Assembly Conference Abstracts*, 20, 16349.
6. HURLEY, A., Kettridge, N., Waddington, J., Devito, K., Hokanson, K., & Krause, S. (2018). Estimating sub-canopy evapotranspiration and resistances from small-scale, forested wetlands in the sub-humid Boreal Plain. *EGU General Assembly Conference Abstracts*, 20, 15944.
7. HURLEY, A., Devito, K. J., Hokanson, K. J., Mendoza, C. A., & Kettridge, N. (2019). Dynamic connectivity within small, forested wetlands impacts runoff generation in Aspen-dominated catchments of the sub-humid Boreal Plain (Canada). *EGU General Assembly Conference Abstracts*, 21, 14785.
8. HURLEY, A., Richard L. P., Pappas, C., Steger, D., & Heinrich, I. (2020). Addressing the need for interactive, efficient and reproducible data processing in ecology with the datacleanr R package. *Festival of Ecology*. British Ecological Society, AGM.

9. Kettridge, N., Emma Shuttleworth, Jonay Neris, Stefan Doerr, Christina Satin, Claire Belcher, Gareth Clay, Danny Croghan, Krause, S., HURLEY, A., Kieran Khamis, Angeliki Kourmouli, Samantha Leader, & Sami Ullah. (2019). The impact of wildfire on contaminated moorland catchment water quality. *EGU General Assembly Conference Abstracts*, 21, 7772.
10. Probert, S., Kettridge, N., Devito, K., & HURLEY, A. (2017). Ecohydrology of the wetland-forestland interface: Hydrophobicity in leaf litter and its potential effect on surface evaporation. *EGU General Assembly Conference Abstracts*, 19, 8445.