John L. Godlee

Contact Information

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Education

Sep 2017 - August 2021
PhD: Atmospheric and Environmental Sciences | University of Edinburgh
Thesis: Biodiversity-Ecosystem Function Relationships in Southern African Woodlands
Used the SEOSAW plot network for a regional-scale study of the interaction of tree diversity, canopy structure, woody biomass, environmental processes, and disturbance regime across southern Africa. Terrestrial LiDAR of tree canopy structure in Angola and Tanzania to investigate neighbourhood community composition and ecosystem structure. Used MODIS data and plot data from the Zambian Integrated Land Use Assessment to investigate how species composition and species diversity affects land-surface phenology. I manage 15 permanent woodland monitoring plots in Bicuar National Park, Angola.

Sep 2012 - Jun 2016
BSc Hons (First): Ecological and Environmental Sciences | University of Edinburgh
Dissertation: Forest structure along an Amazon-Andes elevation gradient drives tree seedling trait acclimation.

Sep 2009 - Jul 2011
A-Levels | Queen Elizabeth Sixth Form College, County Durham
Geology (A*), Geography (A), Biology (A)

Publications

Godlee J. L. .... in revision May 2021. Structural diversity and tree density drives variation in the biodiversity-ecosystem function relationship of woodlands and savannas. *New Phytologist*.

Godlee J. L., Gonçalves, F. M., Tchamba J. J., Chisingui A. V., Muledi J. I., Shutcha M. N., Ryan C. M., Brade T. K., Dexter K. G.. 2020. Diversity and structure of an arid woodland in southwest Angola, with comparison to the wider miombo ecoregion. *Diversity*.
DOI: 10.3390/d12040140

SEOSAW partnership, incl. **Godlee J. L.**. 2020. A network to understand the changing socio-ecology of the southern African woodlands (SEOSAW): Challenges, benefits, and methods. *Plants People Planet*.
DOI: 10.1002/ppp3.10168

Panzou G. J. L. ... **Godlee J. L.** .... 2020. Pantropical variability in tree crown allometry. *Global Ecolgy and Biogeography*.
DOI: 10.1111/geb.13231

Daskalova G., Myers-Smith I., **Godlee J. L.**. 2020. Rare and common vertebrates span a wide spectrum of population trends. *Nature Communications*.
DOI: 10.1038/s41467-020-17779-0

Rowland L., da Costa, A. C. L., Oliveira A. A. R., Oliveira R. S., Bittencourt P. L., Costa P. B., Gilles A. L., Sosa A. I., Coughlin I., **Godlee J. L.**, Vasconcelos S. S., Junior J. A. S., Ferreira L. V., Mencuccini M., Meir P.. 2018. Drought stress and tree size determine stem CO_2 efflux in a tropical forest. *New Phytologist*.
DOI: 10.1111/nph.15024

Esquivel-Muelbert A. ... **Godlee J. L.** .... in prep. May 2021. Bridging scales in monitoring global tree mortality globally. *Nature Communications*.

Tchamba J. J., **Godlee J. L.**, Chisingui A. V., Luís J. C., Rafael M. F., Gonçalves F. M.. in revision May 2021. Tree species diversity and composition of the woodlands in the municipality of Chipindo, Huìla, Angola.. *African Journal of Ecology*.

Godlee J. L., Stone P., Nichol C., Meir P.. in prep. May 2021. Variation in forest canopy structure along an Andean elevation gradient causes species-specific stress responses in tree seedlings.. *Plant Biology*.

Godlee J. L., Cavers S.. in prep. May 2021. Geographically and genetically distinct populations of scots pine (*Pinus sylvestris*) differ in resistance to damage by the large pine weevil (*Hylobius abietis*): a common garden translocation study. *Agricultural and Forest Entomology*.

Research profile

My research interests lie in the complex interactions between ecological communities and their environment, and how this determines ecosystem structure. Through my PhD I have particularly developed an interest in how community composition influences ecosystem function. My thesis focusses on tree species diversity in southern African savannas and its multiple effects on canopy structure, phenology, biomass accumulation, and disturbance regime.

My PhD project straddles multiple spatial scales. I answer macro-ecological biodiversity-ecosystem function questions by integrating large collaborative plot datasets and remote sensing products, but have also conducted my own plot-based field campaigns to investigate canopy structure and diversity patterns both in Angola and Tanzania. I have a strong data science background, with broad skills in ecological data analysis, which combine with my extensive theoretical knowledge of dry tropical ecosystems to produce ambitious projects with high-impact and novel research outcomes.

My research skills are broad, ranging from phylogenetics and pest resistance in Scots Pine, to fire disturbance and tree mortality dynamics in Congolese Savanna, to terrestrial LiDAR of savanna tree canopies, to global investigation of species population trends with respect to rarity. My varied previous research experience places me well to conduct collaborative whole-system science which incorporates cutting edge methodologies.

I have a deep interest in developing rigorous and accessible field protocols for phyto-demographic plot data. Through my research assistant position with SEOSAW and in constructing permanent survey plots in Angola, I am keenly aware of the value of a precise and considered field methodology that is well documented, easily accessible and built for collaboration, to ensure that data has a legacy befitting the effort expended to collect it.

I support the development of effective teaching in higher education and aim to remain active within the academic teaching community as I progress through my career. Particularly I am interested in teaching research design and data analysis in an ecological science context. I aim to equip students with transferrable skills for research management that will form the foundation of a successful career. In the future I hope to forge an academic career in a university as I enjoy researching alongside other academics, sharing knowledge for the greater good, and writing robust science.

Research and Outreach Grants

Feb 2019 | Davis Expedition Fund | £4000
Terrestrial LiDAR assessment of canopy structure and ecosystem processes in southern Tanzania.

Jan 2019 | National Geographic Beginning Investigators Grant | $10,000
Co-I with PI Francisco Maiato. How resilient are the carbon stocks and biodiversity of miombo woodlands to degradation and fuelwood harvesting?

Jun 2018 | NERC bursary | £980
Funding to attend Applied Plant Taxonomy and Field Survey Skills course at Kew Gardens.

May 2018 | Principals Go Abroad Fund | £350
Funding to attend SEOSAW Network Meeting in Mozambique.

Feb 2018 | School of GeoSciences Facilities Committee - Research Equipment Grant | £810
Funding to buy Camera equipment for hemispherical tree canopy photography for the School of GeoSciences.

Nov 2017 | James Rennie Bequest | £170
Funding to run Coding Club workshop at the British Ecological Society Annual Meeting.

Nov 2017 | Centenary Agroforestry 89 Fund | £984
Construction of permanent woodland monitoring plots in Bicuar National Park, Angola.

Nov 2017 | British Ecological Society - Small Grant | £1500
Funding to run Scottish Tropical Ecology and Biology Student Meeting.

Nov 2017 | Institute for Academic Development - Action Fund Small Grant | £470
Funding to run Scottish Tropical Ecology and Biology Student Meeting.

Mar 2016 | Royal Society of Biology - Travel Grant | £500
Research expedition for Canadian Arctic herbivory study.

Dec 2015 | Friends of Roslin Glen - Outreach Fund | £900
Funding to design an interpretation panel about Roslin Glen's industrial history.

Nov 2015 | Lothian Conservation Volunteers - Outreach Fund | £500
Funding to install an interpretation panel about Roslin Glen's industrial history.

May 2015 | Principal's Go Abroad Fund | £350
Research expedition for Peruvian Andes seedling competition study (undergraduate dissertation).

Apr 2015 | British Travel Association Fund | £1000
Research expedition for Peruvian Andes seedling competition study (undergraduate dissertation).

Academic & Research Experience

Apr - Sep 2020 | Research assistant under Dr. Casey Ryan | University of Edinburgh
Developed the SEOSAW database through production of an R package for cleaning and analysing SEOSAW data. I wrote documentation and a created a robust data management system for the SEOSAW database. I created educational research-focussed tools to facilitate collection and management of plot data such as advanced ODK XForms for digital data collection, data sheets, a field manual and a data analysis manual. I facilitated fieldwork by in-country partners in Angola (ISCED Huíla), Democratic Republic of Congo (University of Lubumbashi) and Zimbabwe (Zimbabwe Forestry Commission), with the aim of expanding SEOSAW's permanent plot coverage to under-represented bioclimatic regions. I provided support for other researchers using the SEOSAW dataset to create floristic maps and estimate carbon dynamics.

May - Jun 2017 | Fieldwork coordinator under Dr. Edward Mitchard | University of Edinburgh
Managed the fieldwork of a long term experiment in collaboration with the US Forest Service, the Wildlife Conservation Society and Paula Nieto-Quintano, a PhD student at the University of Edinburgh. Fieldwork conducted in remote and logistically challenging Beteke Plateau of the Republic of Congo. I supervised students from Marien Ngouabi University, Brazzaville, and maintenance workers responsible for creating firebreaks. Fieldwork involved a tree growth and mortality census, with herbaceous biomass measurements in four 25 ha plots, followed by controlled burning of the plots.

Sep - Dec 2016 | Research assistant under Dr. Lucy Rowland | University of Exeter
Six weeks fieldwork at the Caxiuanã Esecaflor drought experiment followed by work at the University of Exeter. Extensive experience with the Li-COR 6400XT Portable Photosynthesis System, collection and analysis of leaf traits. Lab work in Exeter included use of CAN-EYE Leaf Area Index analysis software and developing a method for the analysis of foliar fungal infections from scanned leaf images. I worked with a 10 year time series of leaf traits to analyse the effects of experimentally induced drought on tree growth and photosynthetic capacity.

Mar - Aug 2016 | Field assistant under Dr. Isla Myers-Smith | University of Edinburgh
Two months fieldwork at Kluane Lake Research Station and Herschel Island (Qikiqtaruk) in the Yukon Territory, Canada. I conducted an experiment investigating elevation-dependent patterns of seed herbivory, the data from which form part of a larger latitudinal study (Hargreaves et al. 2019). Other work included the collection of plant traits, monitoring of vegetation cover, and investigating soil decomposition rates with the International Tea Bag Index.

Jul - Sep 2015 | Field assistant under Dr. Pippa Stone | University of Edinburgh
Part of a five person field team for two months on an elevational plot transect in Manú National Park, Peru. Physiological and morphological measurements of seedling and adult trees, as well as competition measurements among tree seedlings for which I designed and executed the methodology. Experience using a MINIPAM-II portable chlorophyll fluorescence meter and analysing ecophysiological data.

May - Dec 2015 | Research assistant under Dr. Stephen Cavers | Centre for Ecology & Hydrology
Research assistant and data analyst for a common garden experiment investigating differentiation in Scots pine seed stock in terms of growth, phenology and environmental resistance. I conducted a study investigating the resistance of seedlings to pine weevils, an economically important pest of Scots pine.

Teaching and Outreach Experience

Sep 2018, 2019 | Field demonstrator - Ecological Sciences Field Course | University of Edinburgh
I taught 4th year undergraduate students on a week long field course in near Oban, Scotland. I designed a student research project brief and mentored 5 students in their experimental design, data collection and analysis. I ran clinics on the operation of hemispherical photography equipment for measuring tree canopy structure.

Sep-Dec 2017, 2018 | Demonstrator - Principles of Ecology | University of Edinburgh
I led two groups of 2nd year ecology undergraduates through the research design process, data collection and analysis of a plant fungal pathology project looking at tar-spots on sycamore. I also tutored students in basic statistics and translated older Minitab statistics practicals into modern R.

Oct 2017 - Present | Web developer for SEOSAW | University of Edinburgh
I designed and currently maintain the website for the SEOSAW network, using Jekyll, Bitbucket Pipelines, and Github-Pages. Notably, I implemented an interactive Javascript 'leaflet' map of study sites, using geoJSON compiled from the SEOSAW dataset.

Jan 2017 - May 2019 | Copy writer | Agricology, sustainable farming magazine
I wrote summaries of online resources on the Agricology website. Articles had a focus on soil enrichment and enhancing pollinator services on British farms. Experience writing for an informed non-academic audience.

Oct 2016 - Jan 2019 | Co-founder, tutorial designer, tutor | Coding Club - programming proficiency initiative - University of Edinburgh
Founding member of Coding Club, a peer-to-peer learning environment to overcome statistics anxiety and provide training in programming for the life sciences. I created online tutorials and delivered workshops to classes of up to 30 students/staff. Focusses include Shiny web-apps, hierarchical modelling, reproducible research using R Markdown. Co-organised and delivered two Coding Club workshops at international conferences: the SEECC conference in Aberdeen the British Ecology Society Annual Meeting.

Sep 2015 - Apr 2016 | Interpretation resources designer | Midlothian Ranger Service
I designed an interpretation panel that was installed at Roslin Glen, a Midlothian Country Park. The panel demonstrates historical land use of the Glen and the resulting landscape features. I designed factsheets for use in secondary schools and a QR code enabled walking route through the Glen.

Academic Service Positions

Mar 2018 | Organiser of the Scottish Tropical Ecology and Biology Student Meeting
I led organisation of this conference hosted by the Royal Botanic Gardens Edinburgh and the University of Edinburgh. Attended by ˜50 people, 17 speakers and a midday skills workshop on creating academic posters. Secured funding from the British Ecological Society, University of Edinburgh Institute for Academic Development and the Royal Botanic Gardens Edinburgh.

Sep 2013 - Jul 2016 | Ecological and Environmental Sciences Student Representative
Year wide degree programme representative. Liaison for student issues on course content, deadlines, and pastoral care.

Sep 2015 - Jul 2016 | School of GeoSciences Convenor
Elected student association position at Edinburgh University Student's Association, representing the School of GeoSciences at Student Council and various committees including the architectural board for the construction of a new GeoSciences faculty building. Skills developed in project planning, effective representation, creative problem solving, committee chairing.

Sep 2013 - Jul 2016 | Project Co-ordinator, Edinburgh University Conservation Volunteers
Liaison with park rangers to direct weekly group excursions for between 10 and 40 students, focussed on practical conservation. Developed skills in logistics and team supervision. More practical skills in forestry, wooden construction and tool maintenance.

Awards

Mar 2019 | Edinburgh Teaching award
Completed a programme to improve teaching skills in higher education. Worked with a mentor over the course of an academic year to produce a series of reflective essays, drawing on pedagogical practitioner literature and personal teaching experiences. As part of the award I was inducted as an Associate Fellow of the Higher Education Academy.

Jun 2017 | SEECC Conference - Best Long Presentation
Best 15 minute talk from a group of 24 at the Scottish Ecology, Environment and Conservation Conference, hosted by the University of Aberdeen. The talk presented research on forest structure and climate induced range shifts in the Peruvian Andes.

Apr 2017 | STEB Conference - Best Presentation
Best 15 minute talk from a group of 13 at the Scottish Tropical Ecology and Biology Student Meeting, hosted by the University of Stirling. The talk presented research on tree seedling competition interactions and climate induced range shifts in the Peruvian Andes.

2015 | Edinburgh Award
Professional development course at the University of Edinburgh aimed at improving graduate skills. Attended seminars and wrote reflective essays on: public speaking, academic writing and project leadership. Kept self-evaluative blog over the course of an academic year.

Quantitative, Programming and Technical Skills

R
Structural Equation Modelling with 'lavaan' and 'semPlot'. Generalised linear mixed effects models with 'lme4'/'nlme', model selection with 'MuMIn'. Manipulation of large datasets, including SEOSAW, Living Planet Index and GBIF databases. Spatial analyses of large datasets using 'sf' and 'raster'. Authoring of R packages. Advanced data presentation with 'ggplot2'. 'R Markdown' and 'Sweave' to produce reproducible reports. 'Shiny' HTML5 web-apps for science communication.

Julia
Ecological network analysis using the 'SpatialEcology.jl' package. Rapidly calculation of diversity statistics from large databases. Analysing huge point cloud (10^8 points) nearest neighbour distances and estimating point clusters with a custom algorithm adapted from C++.

Terrestrial LiDAR
Designed sampling protocol to assess canopy structure of savanna trees and herbaceous biomass using a Leica HDS6100 scanner. Registration of point clouds using Leica Cyclone and CloudCompare. Extensive use of PDAL for point cloud processing. Use of R and Julia to extract statistical parameters from point clouds. Basic knowledge of 'treeseg' for isolation of individual trees from point clouds.

ImageJ
Advanced knowledge of the ImageJ macro language for leaf area analysis and processing hemispherical tree canopy photographs. I designed a routine to identify fungal growths on leaves from droughted trees in the Brazilian Amazon. I wrote a manual on hemispherical tree canopy photography which covers use of ImageJ to analyse images.

Python
Processing spatial data with the Google Earth Engine Python API. Collection and processing of climate data using the ECMWF Python API. Knowledge of 'numpy' and 'matplotlib' for simple data visualisation and data wrangling.

QGIS
Experience creating maps for publication and using GDAL both within QGIS and on the command line to manipulate spatial data.

LaTeX
Construction of long documents with tabular and graphical elements for myself and others. Integration of citation management software, custom BibTeX stylesheets and templating with custom .sty. Creation of custom Beamer presentation templates.

Git
Experience managing collaborative research, websites and teaching resources. Branch management with multiple collaborators, pull requests, troubleshooting with 'git diff'. I currently maintain the SEOSAW Bitbucket repository which holds resources and data for the SEOSAW project and involves a number of collaborators. In 2018 I ran two workshops at the University of Edinburgh on using Git on the command line.

Web development
I created the Coding Club and SEOSAW websites using Jekyll, Markdown, HTML, CSS, and Javascript, hosted using Github Pages.

Off-road driving and field vehicle maintenance
Completed an off-road driving and 4x4 vehicle maintenance course with the Ronnie Dale Driving School. Training in basic 4x4 field mechanicking, oil changes, radiator repair, tyre replacement, axle alignment, identifying faults. Extensive experience driving and maintaining 4x4 vehicles in Angola, Tanzania, and the UK.

Fieldwork First Aid, Expedition Medical Skills & Advanced First Aid Qualifications
Four day intensive first aid training with Marlin Training Ltd, valid until June 2021. Trained in: AED/O2, airways, trauma care, spinal injury care, suturing wounds, injections, pain relief drugs, recognition of expedition illness and antibiotic therapy in remote locations.

Languages

Portuguese: Basic-intermediate reading and writing, basic speaking.

Spanish: Basic reading, writing and speaking.

Professional Associations

Higher Education Academy (Associate Fellow)
Botanical Society of Scotland (Student Member)
Royal Society of Biology (Affiliate Member)
British Ecological Society (Student Member)
Royal Scottish Geographical Society
EdinbR R User Group

References

(PhD supervisor)
Dr. Kyle G. Dexter
Senior Lecturer
School of GeoSciences
University of Edinburgh
Email: kyle.dexter@ed.ac.uk

(Most recent employer)
Dr. Casey M. Ryan
Senior Lecturer
School of GeoSciences
University of Edinburgh
Email: casey.ryan@ed.ac.uk