

## **SCOTT J. DAVIDSON**

Department of Geography and Environmental Management  
University of Waterloo  
+1 (226) 507-5991  
[s7davidson@uwaterloo.ca](mailto:s7davidson@uwaterloo.ca)  
[www.sj davidson ecology.com](http://www.sj davidson ecology.com)  
@scootjd

### **Research interests**

I am broadly interested in ecosystem processes and change, especially across northern latitudes. I have previously researched linkages between vegetation communities and methane (CH<sub>4</sub>) emissions at multiple scales in Arctic tundra landscapes. I am interested in i) identifying the key biotic and abiotic drivers of CH<sub>4</sub> fluxes across fine-scale micro-topographic features and ii) combining vegetation community analyses with field spectroscopy and remote sensing to improve vegetation mapping and thus enable better understanding of scaling from chamber to eddy covariance tower measurements.

Currently I am interested in the influence of disturbances on natural and developed peatlands across Canada, looking at the impacts on vegetation communities and greenhouse gas fluxes in particular.

### **Key research skills and experience**

Greenhouse gas flux measurements (spatial and automated chambers, eddy covariance) techniques using a range of different equipment such as LGR Ultraportable Gas Analyzer and LiCor gas flux analyzers. Field spectroscopy and remote sensing analysis with a working knowledge of PP Systems UniSpec DC spectral analysis system, processing spectral data and image analysis software such as ArcGIS/ENVI+IDL and QGIS. Laboratory experience including soil and vegetation analysis, mycorrhizal measurement techniques and gas flux measurements under controlled environments. Field identification of arctic and alpine vegetation across the Arctic/UK/European alpine regions. Highly proficient computer skills including: Microsoft office and internet skills and strong statistical knowledge (R). Skilled in a variety of photographic and drawing packages. Strong bird and mammal field identification across UK, Europe and North America

### **Higher Education**

#### **March 2018 – Present**

University of Waterloo, Canada

#### **Postdoctoral Fellow**

Department of Geography and Environmental Management  
University of Waterloo

#### **2013 – 2017**

University of Sheffield, UK

#### **PhD.**

Supervised by Dr. Donatella Zona, Dr. Gareth Phoenix (Department of Animal and Plant Sciences) and Dr. Maria J. Santos (Copernicus Institute of Sustainable Development, Utrecht University)

*Title:* Scaling CH<sub>4</sub> fluxes in spatially heterogeneous Arctic landscapes: the importance of vegetation

#### **2012 – 2013**

University of Sheffield, UK

#### **MSc Polar and Alpine Change – (Grade awarded: Merit),**

Supervised by Prof. Phillip Wookey & Dr. Gunnar Mallon, School of Geography, University of Sheffield

*Title:* Comparisons of environmental controls on stream and heathland vegetation community composition, Glenshee, Scotland

**2007 – 2012**  
University of Dundee, UK

**MA (Hons) Geography** – (Grade awarded: First), Supervised by Dr. Mark Cutler, School of the Environment, University of Dundee

*Title:* Vegetation colonisation on a debris-covered glacier, Miage Glacier, Mont Blanc Massif, Italy

## Employment

**July 2017 – Feb 2018**  
Atkins, UK

### **Assistant Ecologist**

*Role:* Working on a wide range of infrastructure and development projects:

- Ecology survey and assessment (with a particular specialism in botany)
- Advise on protected sites and species
- Ecological Impact Assessments
- Habitat creation, restoration and translocation
- Post development monitoring

**Sep 2011 – Sep 2012**  
FDM Ecology, UK

### **Assistant Ecologist/Ornithologist**

*Role:* Looking at impact of wind turbine and other renewable energies on bird and bats. Impact of 'rewilding' on native flora and fauna

## Grants and awards

- Ian Dunderdale Scholarship for academic merit, University of Sheffield 2012-2013 **£2000**
- British Ecological Society Training and Travel award for research visit to European Geosciences Union General Assembly 2015 **£430**
- APS PhD research travel and conference grant 2015 **£620**
- COST Action: ES1309: STSM title: Scaling CH<sub>4</sub> fluxes using hyperspectral and multispectral data in Arctic tundra ecosystems (May 2016) **£1700**
- **Prizes:** Nominated for the RGS-IBG Biogeography Research Group Dissertation award

## Peer-reviewed Publications

**Davidson, S.J.**, Santos, M.J., Sloan, V.L., Reuss-Schmidt, K., Phoenix, G.K., Oechel, W.C. and Zona, D., (2017) Upscaling CH<sub>4</sub> Fluxes Using High-Resolution Imagery in Arctic Tundra Ecosystems, *Remote Sensing*

**Davidson, S.J.**, Santos, M.J., Sloan, V.L., Watts, J.D., Phoenix, G.K., Oechel, W.C. and Zona, D., 2016, Mapping Arctic Tundra Vegetation Communities Using Field Spectroscopy and Multispectral Satellite Data in North Alaska, U.S.A., *Remote Sensing*

**Davidson, S.J.**, Sloan, V., Phoenix, G., Wagner, R., Fisher, J, P., Oechel, W. and Zona, D., 2016, Vegetation type as a main driver for arctic tundra CH<sub>4</sub> fluxes, *Ecosystems*

Walker et al. (co-author **Davidson, S.J.**), The Alaska Arctic Vegetation Archive (AK-AVA), 2016, *Phytocoenologia*

Field K.J, **Davidson S.J**, Alghamdi S.A, Cameron D.D., Magnitude, dynamics and control of the carbon flow to mycorrhizas. In: Mycorrhizal Mediation of Soil; Fertility, Structure, and Carbon Storage. Eds: Nancy C Johnson, Catherine Gehring & Jan Jansa

## Conference presentations

*Improving the understanding of the spatial variability in methane fluxes across Arctic tundra*, Oral Presentation: Soil Plant Interaction Conference, Lancaster Environment Centre, Lancaster University, UK (November 2014)

*Improving the understanding of the spatial variability in methane fluxes across Arctic tundra*, Poster Presentation Royal Geography Society Mid-Term Conference 2015, University of Sheffield, UK (February 2015)

*Improving the understanding of the spatial variability in methane fluxes across Arctic tundra*. **Invited speaker**: University College London (UCL), UK (March 2015)

*Improving the understanding of the spatial variability in methane fluxes across Arctic tundra*, Oral Presentation: EGU-BG 2.3 Understanding CO<sub>2</sub> and CH<sub>4</sub> fluxes from WETLANDS: Reducing the gaps between experimentalists and modellers, European Geosciences Union General Assembly 2015, Vienna, Austria (April 2015)

*Arctic methane emissions: the role of vegetation*, Poster Presentation: Biological Postgraduate Poster Conference, University of Sheffield, UK (May 2015)

*Vegetation type dominates the spatial variability in CH<sub>4</sub> emissions across multiple Arctic tundra landscapes*. Poster Presentation UK Arctic Science Conference 2015, University of Sheffield, UK (September, 2015)

*Vegetation type dominates the spatial variability in CH<sub>4</sub> emissions across multiple Arctic tundra landscapes*. Poster Presentation UK British Ecological Society Annual General Meeting 2015, Edinburgh, UK (December, 2015)

*Arctic methane emissions: the role of vegetation*, Oral Presentation, LGBT STEMinar, University of Sheffield, UK (January 2016)

*Arctic methane emissions: the role of vegetation*, **Invited Speaker**, Utrecht University, Utrecht, The Netherlands (March 2016)

*Remote sensing of Arctic tundra vegetation communities along a latitudinal gradient in Northern Alaska*, Poster Presentation, Space: The Final Frontier for biodiversity monitoring, Zoological Society of London, London, UK (April, 2016)

*Scaling arctic tundra vegetation from plot to the landscape across the North Slope of Alaska, U.S.A.*, Oral Presentation: GC42A Biota and Biogeochemical Cycling: Ecological Patterns and Processes across Scales in the Arctic I, American Geophysical Union Annual Meeting 2016, San Francisco, USA (December 2016)

*Scaling CH<sub>4</sub> fluxes in spatially heterogeneous Arctic landscapes: the importance of vegetation*, **Invited Speaker**, University of Edinburgh, Edinburgh, UK (May 2017)

## Summer schools/courses

- COST Action FP0903 (MAFor) COST Action ES0804 (ABBA) FP 7 Project: **Flux measurement techniques for non CO<sub>2</sub> GHG: methods, sensors, databases and modelling**, Poznan, Poland (May 2013)
- NERC course: **Applied Plant Taxonomy, Identification and Field Survey Skills Course**, Natural History Museum, London, UK (March 2014)
- NERC/Plant Environmental Physiology Group (PEPG) Techniques Workshop: **Scaling Molecular Physiology to Leaf and Crop Canopy**, Lisbon, Portugal (September 2016)

## Teaching and fieldwork experience

- Supervision of undergraduate and masters student projects (2013-present) ranging from greenhouse gas emissions from agricultural peat to using digital cameras to monitor snow melt rate and productivity across Arctic tundra ecosystems.
- Laboratory and field demonstrator for first and second year undergraduate students from 2013-Present (University of Sheffield) including field identification of plants, plant habitats and distribution and the biology of bryophytes and fungi, bird and mammal ID and bird beak morphology
- Field demonstrator on 10-day field course in Abisko, Arctic Sweden (2015 and 2016) including arctic vegetation identification and ecological measurement techniques, GHG flux measurements, environmental and climatic environmental measurements
- Experienced in a variety of arctic and alpine field work including 4 months in northern Alaska, 5 weeks on Svalbard, 3 weeks in the Italian Alps and numerous trips to the Scottish Highlands
- Breaking Boundaries facilitator 2015-2016 – responsible for facilitating ~60 students in with the aim of to foster deeper and broader learning and to prepare students for the future by engaging them in unique, interdisciplinary and cross-faculty learning experiences
- PhD Mentor, BES Undergraduate Summer school, July 2016

## Other responsibilities and memberships

- **LGBT representative**, Athena Swan committee, Animal and Plant science department, University of Sheffield (2016-present)
- **Committee member**: UK Polar Network (2015-2016)
- Elected student representative on **Royal Scottish Geographical Society committee, Dundee Branch** (2011-2012)
- President of the **Geography and Environmental Science Society**, University of Dundee (2011-2012)
- **Member** of European Geosciences Union (EGU), American Geophysical Union (AGU), British Ecological Society (BES), British Society of Geomorphology (2013 – present)
- **Committee member**: LGBTSTEMinar (2016-2017)
- **Advanced Outdoor First Aid Course** 3 year certificate

## Outreach and media

- “Discovering Drowned Doggerland”, Royal Society Summer Science Exhibition, London, UK (July 2012)
- “Sunshine for Breakfast”, Animals and Plant Sciences Christmas Lecture, University of Sheffield, Sheffield, UK (Dec. 2013)
- Responsible for **UK Polar Network** twitter account
- Curated **@Biotweeps** twitter account for one week (focused on Arctic tundra ecosystems and greenhouse gas emissions)