

SCOTT J. DAVIDSON, PhD - CURRICULUM VITAE

CONTACT INFORMATION

Dept. of Geography and Environmental Management.
University of Waterloo
200 University Ave W
Waterloo, ON, Canada N2L 3G1

Phone: +1 (226) 507-5991
Email: [sjdavidson989@gmail.com](mailto:sj davidson989@gmail.com)
Website: sjdavidsonecology.com

SUMMARY OF QUALIFICATIONS

Over 10 years' research experience focusing on characterizing the vulnerability and resilience of biogeochemical and biogeophysical functioning of terrestrial ecosystems to global change.

Experience in developing, organizing and teaching a range of physical geography and environmental science classes.

Seven lead author and two co-author publications in international, peer-reviewed journals. 1 co-author on an invited book chapter.

Extensive experience of using field techniques in remote locations, remote sensing/GIS techniques and laboratory techniques.

Adjunct Assistant Professor status to allow for graduate student supervision

RESEARCH INTERESTS

- Ecosystem resilience, vulnerability and management
- Climate change
- Biogeosciences
- Carbon cycling
- Disturbance/restoration ecology
- Remote sensing and GIS
- Ecohydrology

TEACHING INTERESTS

- Physical Geography
 - Ecosystem resilience, vulnerability and management
 - Global change
 - Remote sensing/GIS
 - Science communication
 - Ecohydrology
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EDUCATION

PhD Nov 2013 – Aug 2017

University of Sheffield, UK & San Diego State University, USA

PhD thesis: *Scaling methane in spatially heterogeneous Arctic tundra landscapes: the importance of Vegetation*

Supervisors: Dr. Donatella Zona
Prof. Gareth Phoenix
Dr. Maria J. Santos

Master of Science (Merit) Polar and Alpine Change

Oct 2012 – Oct 2013

University of Sheffield, UK

MSc thesis: *Comparisons of environmental controls on riparian and heathland vegetation community composition,*

Supervisors: Prof. Phillip Wookey

Master of Arts (First Class Hons) Geography

Sep 2007 – Jun 2012

University of Dundee, UK

Honours thesis: *Vegetation colonisation on a debris-covered glacier*

Supervisor: Dr. Mark Cutler

EMPLOYMENT HISTORY	Adjunct Assistant Professor	Oct 2019 – Present
	Postdoctoral Fellow University of Waterloo, Canada Supervisor: Prof. Maria Strack	March 2018 – Present

TEACHING EXPERIENCE	Sessional Instructor	January 2019
	University of Waterloo, Canada Role: Leading discussions on ‘ <i>Managed Wetlands: Biogeochemistry</i> ’ postgraduate course focusing on methane production, oxidation and emissions from wetlands	
	Sessional Instructor	Sep 2018 – Dec 2018
	University of Waterloo, Canada Role: Developing, organising and teaching and innovative 2 nd year undergraduate module ‘ <i>Approaches to Research in Physical Geography</i> ’ (12 lectures, 4 lab components, 1 exam) 60 students	
	Mentor	July 2016
	British Ecological Society Undergraduate summer school Role: Teaching undergraduate students about the importance of ecological and conservation research across the UK	
	Field Instructor	2015 – 2017
	University of Sheffield, UK Role: Co-leading 3 field trips to Arctic Sweden teaching undergraduate students about the importance of arctic ecosystems under a changing climate	

STUDENT SUPERVISION	Abigail Shingler (MSc student)	2020 – 2022
	Project: Impact of wildfire on methane production and emissions from rock barren peatlands	
	Tianshi Wang (MSc student)	2020 – 2022
	Project: Remote sensing of wetland plant stress	
	Megan Schmidt (MSc student)	2019 – 2021
	Project: Greenhouse gas exchange on restored peatland seismic lines	
	Leo Gabriel (BSc student)	Jan – May 2021
Project: Developing low-cost GHG sensors for flux measurements		
Claire Estey (BSc student)	2020 – 2021	
Project: Differences in mycorrhizal infection rates between three common boreal peatland plant species		
Olivia Trudeau (BSc student)	2018 – 2019	
Project: Soil properties following seismic line restoration		
Markus Kangur (High school student)	2019 – 2020	
Project: Carbon dynamics of northern peat swamps		

**PEER REVIEWED
PUBLICATIONS**
(Underlined names
indicate HQP)

Davidson, SJ, Goud, EM, Franklin, C, Nielsen, S and Strack, M (2020) Seismic line disturbance alters soil physical and chemical properties across boreal forest and peat soils, *Front. Earth. Sci.* 8:821, <https://doi.org/10.3389/feart.2020.00281> IF: 2.689

Arndt, KA, Santos, MJ, Ustin, S, **Davidson, SJ**, Stow, D, Oechel, WC, Tran, TTP, Graybill, B and Zona, D (2019) Arctic Greening Associated with Lengthening Growing Season in Northern Alaska, *Environmental Research Letters* <https://doi.org/10.1088/1748-9326/ab5e26> IF: 6.192

Davidson, SJ, Strack, M, Bourbonniere, RA and Waddington, JM (2019) Controls on soil carbon dioxide (CO₂) and methane (CH₄) fluxes from a peat swamp vary by hydrogeomorphic setting, *Ecohydrology* <https://doi.org/10.1002/eco.2162> IF: 2.767

Davidson, SJ, Elmes, MC, Rogers, H, van Beest, C, Petrone, R, Price, JS and Strack M (2019) Hydrogeologic setting overrides any influence of wildfire on pore water dissolved organic carbon (DOC) concentration and quality at a Boreal Fen, *Ecohydrology*, <https://doi.org/10.1002/eco.2141> IF: 2.767

Davidson, SJ, van Beest, C, Petrone, R and Strack, M (2019) Wildfire overrides hydrological controls on boreal peatland methane emissions, *Biogeosciences*, 16, 2651-2660, <https://doi.org/10.5194/bg-16-2651-2019> IF: 3.7

Davidson, SJ, Santos, MJ, Sloan, VL, Reuss-Schmidt, K, Phoenix, GK, Oechel, WC and Zona, D, (2017) Upscaling CH₄ Fluxes Using High-Resolution Imagery in Arctic Tundra Ecosystems, *Remote Sensing*, 9(12), 1227; <https://doi.org/10.3390/rs9121227> IF: 4.509

Davidson, SJ, Santos, MJ, Sloan, VL, Watts, JD, Phoenix, GK, Oechel, WC and Zona, D (2016) Mapping Arctic Tundra Vegetation Communities Using Field Spectroscopy and Multispectral Satellite Data in North Alaska, U.S.A., *Remote Sensing*, 8(12), 978; <https://doi.org/10.3390/rs8120978> IF: 4.509

Davidson, SJ, Sloan, VL, Phoenix, GK, Wagner, R, Fisher, JP, Oechel, WC and Zona, D (2016) Vegetation Type Dominates the Spatial Variability in CH₄ Emissions Across Multiple Arctic Tundra Landscapes, *Ecosystems*, 19: 1116. <https://doi.org/10.1007/s10021-016-9991-0> IF: 4.466

Walker, DA et al. (inc. **Davidson, SJ**) (2016) The Alaska Arctic Vegetation Archive (AVA-AK). *Phytocoenologia*, 46(2), 221-229, <https://doi.org/10.1127/phyto/2016/0128> IF: 1.404

**PUBLICALLY
AVAILABLE
DATASETS**

Davidson, SJ, Zona, D and Walker, DA. 2017, Pre-ABOVE: Arctic Vegetation Plots in Flux Tower Footprints, North Slope Alaska, 2014. ORNL DAAC, Oak Ridge, Tennessee, USA https://daac.ornl.gov/ABOVE/guides/Flux_Tower_Zona_Veg_Plots.html

**PUBLICATIONS
IN REVIEW**

Davidson, SJ, Smith, M, Prystupa, E, Murray, K, Nwaishi, F, Petrone, R and Strack, M. High sulfate concentrations maintain low methane emissions at a constructed fen over the first seven years of ecosystem development (In review *Science of the Total Environment* IF: 6.5)

Drever, CR et al. (inc. **Davidson, SJ**) Natural Climate Solutions for Canada (in review: *Science Advances* IF: 13.1. Revision requested)

Harris, L et al. (inc. **Davidson, SJ**) Closing the emissions gap: the essential carbon value of peatlands in Canada (in review: *Frontiers in Ecology and the Environment* IF: 9.295)

Irvine, S, **Davidson, SJ**, Price, JS and Strack M. Dissolved organic carbon production and transport within a constructed fen watershed in the Athabasca Oil Sands Region, Alberta, Canada (In review: *Journal of Hydrology* IF: 4.5)

Engering, A, **Davidson, SJ**, Xu, B, Bird, M, Rochefort, L and Strack M. Evaluating Mineral Fill Removal and Burial Under Peat Layer for Restoration of a Peatland Impacted by an In-Situ Oil Sands Well-Pad: 2. Greenhouse Gas Exchange (In review: *Restoration Ecology* IF: 2.826)

Prystupa, EJ, **Davidson, SJ**, Price, JS and Strack M. Response of Dissolved Organic Carbon Dynamics to Salinity in a Constructed Fen Peatland in the Athabasca Oil Sands Region (In review: *Science of the Total Environment* IF: 6.5)

**PUBLICATIONS
IN
PREPARATION**

Davidson, SJ, Goud, EM, Malhotra, A, Estey, CO, Korsah, P and Strack, M. Boreal peatland plant communities and phenology altered by linear disturbances (journal for submission: *Journal of Applied Ecology* IF: 5.78)

Davidson, SJ, Daze, E, Hilier, D, Byun, E, Kangur, M, Talbot, J, Finkelstein, S and Strack, M. Carbon stocks and fluxes from North American swamps (journal for submission: *TBC*)

Elmes, MC, **Davidson, SJ** and Price, JS. Ecohydrological interactions in a boreal fen-swamp complex, Alberta, Canada (journal for submission: *Ecohydrology* IF: 2.767)

Phoenix, GK et al. (including **Davidson, SJ**). Event drivers in Arctic Browning (journal for submission: *Global Change Biology* IF: 8.88)

Goud, EM, **Davidson, SJ**, Kleinke, K, Gauthier, T-L and Strack, M. Intraspecific variability of leaf traits in two geographically widespread peatland species (journal for submission: *TBC*)

BOOK CHAPTER

Davidson, SJ, Wilkinson, SL, Shuttleworth, E, Nwaishi, F, Noble, A, Muh, T. Anthropogenic disturbances and peatlands under a changing climate. in *Peatlands and Climate Change 2nd Edition*, Eds. Maria Strack (*in preparation*)

Field KJ, **Davidson SJ**, Alghamdi SA and Cameron DD, 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

INVITED TALKS	<p>“Drawing a line in the peat”: Royal Geographical Society, Public Lecture Feb 2021</p> <p>“The impact of linear disturbances on boreal peatlands”: Catchment and Wetland Sciences Research Group (CAWS) virtual seminar Dec 2020</p> <p>“Anthropogenic disturbances across Boreal Canada”: Arctic Boreal Carbon Flux Upscaling Workshop, ABoVE Virtual Workshop Oct 2020</p> <p>“Peatlands as Natural Climate Solutions”: Nature-Based Climate Solutions Summit, Nature Canada, Ottawa, Canada Feb 2020</p> <p>“Impact of anthropogenic and natural disturbances on Boreal Peatlands” McMaster University, Hamilton, Canada Nov 2019</p> <p>“Effects of seismic line creation on soil characteristics across contrasting boreal soils” Waterloo Ecology Network, Waterloo, Canada Sep 2019</p> <p>“Upscaling CH₄ emissions across contrasting arctic tundra landscapes” University of Edinburgh, Edinburgh, UK Sep 2016</p> <p>“Remote sensing of Arctic tundra landscapes” Utrecht University, Utrecht, The Netherlands May 2016</p> <p>“Vegetation type dominates CH₄ emissions across spatially heterogeneous arctic landscapes” University College London, London, UK April 2015</p>
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PRESENTATIONS
(lead author only)

* indicates
cancellation due to
COVID19)

Davidson, SJ, Goud, EM, Estey, CO and Strack M. *Using easily accessible digital photography to monitor phenology to monitor of boreal peatland vegetation impacted by linear disturbances*. Poster Presentation: B501 Understanding Phenological Responses and Feedbacks in Terrestrial Vegetation: Patterns, Mechanisms and Consequences, American Geophysical Union 2020 Fall Virtual Meeting (December 2020)

Davidson, SJ, Goud, EM, Franklin, C, Nielsen, SE and Strack M. *Seismic line disturbance alters soil physical and chemical properties across boreal forest and peatland soils*, Poster Presentation: RE³ conference, Quebec, Canada (June 2020*)

Davidson, SJ, Robichaud, CD, Rooney, R and Strack M. *Vulnerabilities of Canadian wetlands to a changing climate*, Oral Presentation: Canadian Geophysical Union, Banff, Canada (May 2020*)

Davidson, SJ, Drever, CR, Santos, MJ and Strack M. *Road extent across Canadian peatlands*, Poster Presentation: Canadian Geophysical Union, Banff, Canada (May 2020*)

Davidson, SJ, Elmes, M, van Beest, C, Petrone, R, Price, J and Strack M. *Hydrogeologic setting overrides any influence on wildfire on pore water dissolved organic carbon concentration and quality at a boreal fen*, Poster presentation: Canadian Geophysical Union c/o International Union of Geodesy and Geophysics, Montreal, Canada (July 2019)

Davidson, SJ. *Impact of disturbance on boreal peatland carbon exchange*, Poster presentation: Canadian Carbon Cycle Research Workshop, Toronto, Canada (June 2019)

Davidson, SJ, van Beest, C, Petrone, R and Strack M. *Impact of wildfire on methane emissions at a continental boreal peatland*, Oral Presentation: EGU-BG12.17 Peatlands under pressure, European Geosciences Union Annual Meeting 2019, Vienna, Austria (April 2019)

Davidson, SJ, Elmes, M, van Beest, C, Petrone, R, Price, J and Strack, M. *Impact of wildfire on methane emissions and dissolved organic carbon at a boreal fen, Alberta, Canada*, Poster Presentation: B31F: The Resilience and Vulnerability of Arctic and Boreal Ecosystems to Climate Change, American Geophysical Union Fall Meeting 2018, Washington DC, USA (December 2018)

Davidson, SJ, Elmes, M, van Beest, C, Petrone, R, Price, J and Strack, M. *Impact of wildfire on methane emissions and dissolved organic carbon at a boreal fen, Alberta, Canada*, Poster Presentation: Peatlands and Climate Change, International Peatland Society Summit, Rotterdam, The Netherlands (September 2018)

Davidson, SJ, Santos, MJ, Reuss-Schmidt, K, Watts, J, Sloan, VL, Phoenix, GK, Oechel, WC and Zona, D. *Upscaling CH₄ Fluxes Using High-Resolution Imagery in Arctic Tundra Ecosystems*, Poster Presentation: Canadian Society of Agricultural and Forest Meteorology (CSAFM) session, Canadian Geophysical Union, Niagara Falls, Canada (May 2018)

Davidson, SJ, Sloan, VL, Phoenix, GK, Fisher, JP, Oechel, WC and Zona, D. *Vegetation type dominates the spatial variability in CH₄ emissions across multiple Arctic tundra landscapes*. Poster Presentation: UK British Ecological Society Annual General Meeting 2015, Edinburgh, UK (December 2015)

Davidson, SJ, Sloan, VL, Phoenix, GK, Fisher, JP, Oechel, WC and Zona, D. *Improving the understanding of the spatial variability in methane fluxes across Arctic tundra*, Oral Presentation: EGU-BG 2.3 Understanding CO₂ and CH₄ fluxes from WETLANDS: Reducing the gaps between experimentalists and modellers European Geosciences Union General Assembly 2015, Vienna, Austria (April 2015)

GRANTS AND AWARDS

Lead Investigator: Ducks Unlimited Canada *Understanding wetland phenology using smartphones – citizen science project* **\$2000 (approx. £1000)** 2021 - 2023

Co-Principal Investigator: IC3 Seed Grant *Peatland conservation and restoration: Managing Canadian Peatlands as natural climate solutions* **\$9200 (approx. £5300)** 2021 - 2022

Co-Principal Investigator: Canadian Institute of Ecology and Evolution Working Group: *Vulnerabilities of Canadian Wetlands in a Changing Climate* **\$10,280 CAD (approx. £6000)** 2020 - 2021

Highly Qualified Personnel: Boreal Water Futures: *Modelling hydrological processes for Wildfire and Carbon Management* **\$200,000 (approx. £115,000)** 2020 – 2023

Allan Robertson Research Grant: International Peatland Society **\$710 CAD (approx. £500)** 2019

2016

	EU COST Action: ES1309: Short Term Scientific Mission: Scaling CH ₄ fluxes using hyperspectral and multispectral data in Arctic tundra ecosystems £2000	
	APS PhD Research and Travel Grant £830	2015
	British Ecological Society Training and Travel Grant £580	2014
	Ian Dunderdale Scholarship for Academic Achievement £2000	2012
ACADEMIC SERVICES AND OUTREACH	Co-founder Peatland ECR Action Team (PEAT) Network	2020 - Present
	Committee member American Geophysical Union – Biogeosciences Early Career Researchers	2020 - Present
	Session Convener Old Peat, New Voices: Frontiers in global peatland research from early career researchers American Geophysical Union (Virtual)	2020
	Organiser Workshop series: Canada’s Peatlands: Towards a National Inventory (Global Peatland Assessment/United Nations Environment Programme)	2020
	Symposium Convener *cancelled due to COVID19 Conference Symposium: The role of wildfire in wetland ecosystems: Drawing insights from the Arctic to the Tropics Quebec RE ³	2020
	Session Convener *cancelled due to COVID19 Conference session: Disturbance impacts across boreal and subarctic wetlands and peatlands Canadian Geophysical Union, Canada	2020
	Co-organiser *cancelled due to COVID19 Conference sessions: Advances in Methane Measurements, Attribution and Modeling/ Spatial and Temporal Extremes in Carbon Cycling North American Carbon Program (NACP) Open science Meeting, USA	2020
	Co-organiser World Wetlands Day, University of Waterloo, Canada	2019 - Present
	Co-organiser LGBTSTEMinar University of Sheffield, UK	2016
	Journal Reviewer Biogeosciences, Remote Sensing, Ecosystems, Journal of Glaciology, Journal of Remote Sensing and Photogrammetry, Forests, Catena, Geophysical Research Letters, Wetlands, Advances in Polar Research	2017 - Present
LGBTQ+ Representative	2015 - 2017	

Athena SWAN
University of Sheffield, UK

ADDITIONAL TRAINING	Indigenous Canada online course University of Alberta	2020
	Scaling Molecular Physiology to Leaf and Crop Canopy Field Techniques workshop NERC/Plant Environmental Physiology Group, Lisbon, Portugal	Sep 2015
	Applied Plant Taxonomy, Identification and Field Survey Skills Natural History Museum, London, UK	Mar 2014
	Flux measurement techniques for non-CO₂ GHG: methods, sensors, databases and modeling Poznan University of Life Sciences, Poznan, Poland	July 2013
INDUSTRY EXPERIENCE	Ecologist Atkins Global, UK	Jul 2017 – Feb 2018
	Assistant Ecologist FDM Ecology, UK	Sep 2011 – Sep 2012
PROFESSIONAL AND ACADEMIC MEMBERHIPS	Society of Wetland Scientists	Since 2020
	International Peatland Society	Since 2018
	Canadian Geophysical Union	Since 2018
	American Geophysical Union	Since 2016
	European Geosciences Union	Since 2015
