Jacqueline K.Y. Hung

Woodwell Climate Research Center
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EDUCATION

PhD (2017 to 2021)
Physical Geography, *Queen's University*
Thesis: Controls on terrestrial carbon and nutrient cycling in Arctic permafrost environments
Supervisors: Dr. Neal Scott and Dr. Paul Treitz

MASc (2015 to 2017)
Environmental Applied Science and Management, *Ryerson University*
Thesis: Spatial and temporal assessment of soil nitrogen availability and relationships to biophysical variables in a High Arctic wetland
Supervisor: Dr. David Atkinson

BA (Hons) (2011 to 2015)
Geographic Information Science and Spanish Language & Culture, *University of Western Ontario*

PROFESSIONAL EXPERIENCE

2023 to present — **Research Scientist**, Woodwell Climate Research Center

- Principal and co-investigator on government and foundation-funded projects looking at climate change effects carbon and nutrient cycling in Arctic tundra and coastal environments
- Coordinate and manage teams of researchers in remote field campaigns and laboratory settings
- Research advances understanding of climate warming and disturbance effects (permafrost thaw, wildfire, saltwater intrusion) on carbon and nutrient cycling on permafrost-affected and coastal environments
- Contributor to a broad variety of Woodwell Climate initiatives and outreach, including speaking engagements and hiring committees

2021 to 2023 — **Postdoctoral Researcher**, Woodwell Climate Research Center

- Postdoctoral position under Dr. Sue Natali, working on carbon cycling in Arctic and boreal environments and leading the field component of the Arctic Carbon Monitoring project
- Program of work includes measurement of CO_2, CH_4, and N_2O fluxes from wetlands and peat uplands in the Yukon-Kuskokwim Delta of Alaska, using both chamber based and eddy covariance techniques
- Research works to improve coverage of on-the-ground monitoring of changing Arctic landscapes while strengthening process-level understanding of drivers of change including permafrost thaw and wildfire

2016 to 2019 **Research Assistant**, Queen's University
Cape Bounty Arctic Watershed Observatory, Melville Island, Nunavut
- Employed and analyzed ion exchange resins in wetland and mesic tundra sites to assess the soil nutrient availability over the peak growing season
- Conducted trace gas and carbon flux data sampling using static chambers and autochambers across a variety of ecosystems
- Set up and maintained an eddy covariance tower for Dr. Elyn Humphreys (Carleton University) as part of the Canadian Tundra Carbon Exchange Study
- Aided other researchers and graduate students in the hydrological data collection, lake sampling, and snow surveys

2012 to 2015 **Laboratory Technician**, University of Western Ontario
Advanced Facility for Avian Research, Department of Biology
- Maintained aviaries and flight cages to house migratory birds, which were sampled to test the effects of varied amino acids in their diet
- Conducted regular health checks and feeding checks of birds to be used in wind tunnel experimental flights the effects of pollution and environmental contaminants on bird migration

2012 to 2013 **Research Assistant**, University of Western Ontario
Neff Lab, Department of Biology
- Conducted video analysis of fish sperm samples to determine the effects of increased temperature on sperm traits
- Extracted the DNA of Trinidad guppies used for microsatellites and ran PCR on samples to study the evolutionary response of increased temperature on the specie

RESEARCH GRANTS

2024 Woodwell Climate Research Center Fund for Climate Solutions (co-PI): "Assessing the impacts of ecosystem disturbance on carbon emissions from Arctic and Amazon ponds" ($110,175)

2023 National Science Foundation Office of Polar Programs (lead PI): "Collaborative Research: Drivers and Biogeochemical Implications of Saltwater Intrusion Along Arctic Coastlines" ($343,925 awarded to Woodwell)

2023 Woodwell Climate Research Center Fund for Climate Solutions (lead PI): "Global Hotspots and Hot Moments of Nitrous Oxide Emissions" ($120,157)

HONOURS AND AWARDS

2024	AGU Biogeosciences Caregiver Grant ($500)
2024	US Permafrost Association Caregiver Award ($500)
2021-2023	NSERC Postdoctoral Fellowship ($90,000 over two years)
2021	Queen's Graduate Research Fellowship ($4000)
2020	AGU Fall Meeting Registration Award ($100)
2020	Mitacs Globalink Research Award ($6000 – declined due to COVID-19 travel restrictions)
2019	NASA AGU Chapman Conference Travel Grant ($2500)
2018-2021	NSERC Postgraduate Scholarship ($63,000 over three years)
2017-2020	Graduate Student Conference Travel Award ($1355 over three years)
2018-2019	Graduate Dean's Doctoral Field Travel Grant ($3000)
2018-2019	Queen's Geography and Planning Award for Excellence in Teaching Assistance
2018-2021	Queen's Graduate Award ($4491 over three years)
2017-2019	Northern Scientific Training Program Grant ($10,348 over three years)
2018	ArcticNet Annual Scientific Meeting Travel Award ($605)
2017-2018	Ontario Graduate Scholarship ($15,000)
2017-2018	Graduate Entrance Tuition Award ($6415)
2017	Ryerson University Governor General Gold Medal nominee
2015-2017	Ryerson Graduate Fellowship ($14,000 over two years)
2016	Ryerson Graduate Student Travel Award ($500)
2016	Faculty of Arts Graduate Student Travel Grant ($250)

PUBLICATIONS AND PRESENTATIONS

Journal Publications

15. Mullen, A., **Hung J.K.Y.**, Gurbanov, K., *et al.* (2025). Modeling Thermal and Biogeochemical Dynamics in two ponds within Alaska's Yukon-Kuskokwim Delta: Impacts of Climatic Variability on Greenhouse Gas Fluxes. *Journal of Advances in Modeling Earth Systems, 17*(4): e2024MS004441. doi:10.1029/2024MS004441.
14. **Hung, J.K.Y.,** Arndt, K.A., Murphy, P., *et al.* (2024). Slow post-fire carbon balance recovery despite increased net uptake rates in Alaskan tundra. *Environmental Research Letters, 19*(12): 124013. doi:10.1088/1748-9326/ad8764.
13. Treitz, P., Atkinson, D., Blaser, A., … **Hung, J.K.Y.**, *et al.* (2024). Contributing to watershed science in an era of environmental change with remote sensing at the Cape Bounty Arctic Watershed Observatory, Canada. *Arctic Science, 10*(2): 281-304. doi:10.1139/as-2023-0043.
12. Berner, L., Orndahl, K., Rose, M., … **Hung, J.K.Y.**, *et al.* (2024). The Arctic Plant Aboveground Biomass Synthesis Dataset. *Scientific Data, 11*(305). doi.org/10.1038/s41597-024-03139-w.
11. Ludwig, S.M., Schiferl, L., **Hung, J.K.Y.**, *et al.* (2024). Resolving heterogeneous fluxes from tundra halves the growing season carbon budget. *Biogeosciences, 21*(5): 1301-1321. doi:10.5194/bg-2023-119.
10. Richardson, J.L., Desai, A.R., Thom, J., … **Hung, J.K.Y.**, *et al.* (2024). On the relationship between aquatic CO_2 concentration and ecosystem fluxes in some of the world's key wetland types. *Wetlands, 44*(1). doi:10.1007/s13157-023-01751-x.
9. **Hung, J.K.Y.**, Scott, N.A., and Treitz, P.M. (2024). Drivers of soil nitrogen availability and carbon exchange processes in a High Arctic wetland. *Arctic Science, 10*: 22-33. doi:10.1139/AS-2022-0048.
8. Mullen, A., Watts, J., Rogers, B.M., … **Hung, J.K.Y.**, *et al.* (2023) Using high-resolution satellite imagery and deep learning to track dynamic seasonality in small water bodies. *Geophysical Research Letters, 50*(7): e2022GL10327. doi:10.1029/2022GL102327.
7. **Hung, J.K.Y.**, Scott, N.A., and Treitz, P.M. (2023). Investigating ten years of warming and enhanced snowfall on nutrient availability and greenhouse gas fluxes in a High Arctic ecosystem. *Arctic, Antarctic, and Alpine Research, 55*(1). doi:10.1080/15230430.2023.2178428.

6. Zolkos, S., MacDonald, E., **Hung, J.K.Y.**, *et al*. (2022). Physiographic controls and wildfire effects on aquatic biogeochemistry in tundra of the Yukon-Kuskokwim Delta, Alaska. *Journal of Geophysical Research: Biogeosciences, 127*(8). doi:10.1029/2022JG006891.
5. Beel, C.R., Heslop, J.K., Orwin, J.F., … **Hung, J.K.Y.**, *et al*. (2021). Emerging dominance of summer rainfall in driving High Arctic terrestrial-aquatic connectivity. *Nature Communications, 12*(1448). doi:10.1038/s41467-021-21759-3.
4. Heslop, J.K., **Hung, J.K.Y.**, Tong, H., *et al.* (2021). Diverging pond dissolved organic matter characteristics yield similar CO_2 flux potentials in a disturbed High Arctic landscape. *Environmental Research Letters, 16*044016. doi:10.1088/1748-9326/abc913.
3. **Hung, J.K.Y.** and Treitz, P. (2020). Environmental land cover classification for integrated watershed studies: Cape Bounty, Melville Island, Nunavut. *Arctic Science,* 6(4): 404-422. doi:10.1139/AS-2019-0029.
2. Atkinson, D.M., Gregory, F.M., **Hung, J.K.Y.**, *et al*. (2020). High spatial resolution remote sensing models for landscape-scale CO_2 exchange in the Canadian Arctic. *Arctic, Antarctic, and Alpine Research*, 52(1): 1-16. doi:10.1080/15230430.2020.1750805.
1. Wagner, I., **Hung, J.K.Y.**, Neil, A., and Scott, N.A. (2019). Net greenhouse gas fluxes from three High Arctic plant communities along a moisture gradient. *Arctic Science*, 5(4): 185-201. doi:10.1139/as-2018-0018.

Reports

1. Natali, S.M, Rogers, B., Schuur, E.A.G.., … **Hung, J.K.Y.**, *et al.* (2024). Arctic Terrestrial Carbon Cycling. *NOAA Arctic Report Card* 2024. doi:10.25923/0gpp-mn10.

Conference Oral Presentations

17. *Dietrich, Z., Savage, K.E., Mullen, A., … **Hung, J.K.Y.**, *et al.* (2024). Assessing the Impacts of Ecosystem Disturbance on Carbon Emissions from Arctic and Amazon Ponds with Floating Autochambers. *American Geophysical Union Fall Meeting 2024,* Washington DC, USA.
16. *Mullen, A., Gurbanov, **Hung, J.K.Y.**, *et al*. (2024). Modeling Climate Sensitivity of Biogeochemistry at Two Ponds in the Yukon-Kuskokwim Delta, AK. 104th *American Meteorological Society Meeting,* Baltimore, USA.
15. Sistla, S., *Gaspord, C.J., and **Hung, J.K.Y.** (2023) Exploring the biogeochemical legacy of tundra fire in a seasonally-explicit manner. *American Geophysical Union Fall Meeting 2023,* San Francisco, USA.
14. *Ludwig, S., Schiferl, L.D., **Hung, J.K.Y.**, *et al*. (2023). Accounting for complex landscapes in eddy covariance fluxes and effects on carbon budgets when scaling in heterogeneous tundra and wetlands. *103rd American Meteorological Society Meeting,* Denver, USA.
13. *Ludwig, S., Schiferl, L.D., **Hung, J.K.Y.**, *et al*. (2022). Accounting for landscape heterogeneity in eddy covariance fluxes and effects on carbon budgets when scaling in the Yukon-Kuskokwim Delta. *American Geophysical Union Fall Meeting 2022,* Chicago, USA.
12. ***Hung, J.K.Y.**, Scott, N.A., and Treitz, P.M. (2021). The impact of soil nitrogen availability on trace gas fluxes and net greenhouse gas balance in a High Arctic wetland. *2021 Canadian Geophysical Union Seminar Series,* Virtual.
11. ***Hung, J.K.Y.,** Scott, N.A., and Treitz, P.M. (2021). Soil nitrogen dynamics can alter carbon exchange processes in a High Arctic wetland. *2021 Queen's Northern Research Symposium,* Virtual.
10. *Heslop, J.K., Beel, C.R., Orwin, J.F., … **Hung, J.K.Y.**, *et al*. (2020). Emerging role of summer rainfall events in driving High Arctic terrestrial-aquatic connectivity. *Arctic Change 2020,* Virtual.
9. Beel, C.R., *Heslop, J.K., Orwin, J.F., … **Hung, J.K.Y.**, *et al*. (2020). Emerging role of summer rainfall events in driving High Arctic terrestrial-aquatic connectivity. *American Geophysical Union Fall Meeting 2020,* Virtual.
8. ***Hung, J.K.Y.**, Holloway, J.E., Macmillan, G.A., *et al*. (2019). Building capacity by training early career researchers to conduct projects that are culturally sensitive and community-collaborative. *ArcticNet Annual Scientific Meeting 2019,* Halifax, Canada.
7. *Heslop, J.K., **Hung, J.K.Y.**, Chapman, F., *et al*. (2019). Vegetation and disturbance drive variability in pond DOM at Cape Bounty Arctic Watershed Observatory. *2019 Queen's Northern Research Symposium,* Kingston, Canada.
6. ***Hung, J.K.Y.**, Wagner, I., Neil, A., and Scott, N.A. (2019). High Arctic vegetation cover along a moisture gradient drives net greenhouse gas flux variability. *2019 Canadian Geophysical Union Eastern Student Conference,* Toronto, Canada.

5. *Holloway, J., Burgers, T., Falardeau-Côté, … and **Hung, J.K.Y.** (2018). Using online platforms to communicate science and stimulate international public engagement. *ArcticNet Annual Scientific Meeting 2018,* Ottawa, Canada.
4. *Treitz, P., Atkinson, D.M., Collingwood, … **Hung, J.K.Y.**, *et al.* (2018). Remote sensing of environmental change at local scales in the Canadian Arctic. *EUMETSAT Meteorological Satellite Conference 2018,* Tallinn, Estonia.
3. ***Hung, J.K.Y.**, Atkinson, D.M., and Scott, N.A. (2017). Spatial and temporal patterns of soil nitrogen availability and carbon exchange in a High Arctic wetland. *Arctic Change 2018,* Quebec City, Canada.
2. ***Hung, J.K.Y.**, Atkinson, D.M., and Scott, N.A. (2017). Examining the spatial and temporal effects of soil nitrogen availability on carbon exchange in a High Arctic wetland. *Canadian Association of Geographers – Ontario Division 2017*, Kingston, Canada.
1. ***Hung, J.K.Y.** and Atkinson, D.M. (2017). Spatial and temporal assessment of soil nitrogen availability and relationships to biophysical variables in a High Arctic Wetland. *Queen's Northern Research Symposium 2017*, Kingston, Canada.

Conference Poster Presentations

15. ***Hung, J.K.Y.,** Arndt, K.A., Murphy, P., *et al*. (2024). Wildfire Amplifies Carbon Cycling in the Yukon-Kuskokwim Delta, Alaska. (2024). *American Geophysical Union Fall Meeting 2024,* Washington DC, USA.
14. *Minions, C., **Hung, J.K.Y.,** Korolev, M.K., *et al.* (2024). The Role of Landcover on CO_2 and CH_4 Emissions on the Yukon-Kuskokwim Delta, Alaska. *American Geophysical Union Fall Meeting 2024,* Washington DC, USA.
13. *Mullen, A., Watts, J., Jafarov, E., … **Hung, J.K.Y.**, *et al*. (2024). Coupling Cubesat Remote Sensing and a Process-based Model for Regional Estimates of Aquatic Greenhouse Gas Emissions. *American Geophysical Union Fall Meeting 2024,* Washington DC, USA.
12. *Korolev, M.V., **Hung, J.K.Y.**, Natali, S.M. (2023). Wildfire and moisture availability drive shrub phenology differences in the Yukon-Kuskokwim Delta. *American Geophysical Union Fall Meeting 2023,* San Francisco, USA.
11. ***Hung, J.K.Y.**, Korolev, M.V., Ludwig, S., and Natali, S.M. (2022). Heterogeneity in carbon dioxide fluxes within flux footprints driven by wildfire and permafrost thaw. *American Geophysical Union Fall Meeting 2022,* Chicago, USA.
10. *Windholz, T., **Hung, J.K.Y.**, Bradley, E., *et al*. (2022). Implications of thermokarst landscapes on carbon cycling in the Yukon-Kuskokwim Delta, Alaska. *American Geophysical Union Fall Meeting 2022,* Chicago, USA.
9. *Korolev, M.V., **Hung, J.K.Y.**, Natali, S.M. (2022). Assessing burn status and moisture regimes as drivers for variability in shrub phenology in the Yukon-Kuskokwim Delta. *American Geophysical Union Fall Meeting 2022,* Chicago, USA.
8. ***Hung, J.K.Y.**, Scott, N.A., and Treitz, P.M. Soil moisture inputs from enhanced snowfall impact nitrogen availability and the greenhouse gas balance of High Arctic mesic tundra. (2021). *American Geophysical Union Fall Meeting 2021,* New Orleans, USA/Virtual.
7. ***Hung, J.K.Y.** and Scott, N.A. (2020). *In situ* winter soil respiration measurements in High Arctic environments. *American Geophysical Union Fall Meeting 2020,* Virtual.
6. ***Hung, J.K.Y.**, Minions, C., McDonald, R., and Scott, N.A. (2019). Non-growing season soil respiration measurements in a High Arctic environment. *ArcticNet Annual Scientific Meeting 2019,* Halifax, Canada.
5. ***Hung, J.K.Y.**, Minions, C., McDonald, R., and Scott, N.A. (2019). Continuous *in situ* soil respiration measurements in High Arctic environments. *American Geophysical Union Chapman Conference on Understanding Carbon-Climate Feedbacks*, San Diego, USA.
4. Scott, N.A. and ***Hung, J.K.Y.** (2018). Impact of moss cover on the carbon balance of a mesic High Arctic ecosystem. *ArcticNet Annual Scientific Meeting 2018,* Ottawa, Canada.
3. *Heslop, J.K., Chapman, F., **Hung, J.K.Y.**, *et al*. (2018). Variables affecting potential CO_2 fluxes from ponds in the Canadian High Arctic. *ArcticNet Annual Scientific Meeting 2018,* Ottawa, Canada.
2. ***Hung, J.K.Y.** and Atkinson, D.M. (2016). Spatial statistical analysis of biophysical variables in a High Arctic Wetland. *ArcticNet Annual Scientific Meeting 2016*, Winnipeg, Canada.
1. ***Hung, J.K.Y.** (2016). Perennial snowpack change detection analysis and impacts on nearby vegetation in the Cape Bounty Watershed. *Canadian Association of Geographers Annual Meeting 2016*, Halifax, Canada.

TEACHING

Teaching Assistant and Guest Lecturer, *Queen's University*
Department of Geography and Planning
- GPHY 243 –Geographic Information Science (Fall 2017 and Fall 2020), GPHY 102 – Earth System Science (Winter 2018 and Winter 2021), GPHY 242 – Remote Sensing I: Remote Sensing of the Environment (Fall 2018), GPHY 207 – Principles of Biogeography (Winter 2019 and Winter 2020)

Teaching Assistant, *Ryerson University*
Department of Geography and Environmental Studies
- GEO 605 – The Geography of the Canadian North (Winter 2017), GEO 793 – Geography of Toronto (Fall 2015, Winter 2016, and Fall 2016)

THESIS COMMITTEE ADVISING AND MENTORSHIP

- Cameron Gaspord, MSc, Cal Poly San Luis Obispo (2024)

INVITED TALKS

- "Earth Emergency". Panel at an *Earth Emergency* documentary showing organized by the Cape Cod Climate Change Collaborative and Woodwell Climate Research Center in Chatham, MA, 2022.
- "Arctic climate change – a terrestrial perspective". Talk given at the *Curiosity on Stage* event series at the Canadian Science and Technology Museum in Ottawa, Canada, 2019.
- "Arctic climate change". Presentation given to Grade 10 Science students for Conference2Classroom Inc. at Brookfield High School in Ottawa, Canada, 2018.
- "Sentinel North Arctic Field School". Presentation given to the department at the monthly Seminar Series, Kingston, Canada, 2018.

MEDIA

- "The Arctic is changing. And not for the better, scientists say", *The Independent,* 2024.
- "Climate change in the Arctic", *Futurum Careers*, 2024.
- "Coffee At KYUK", *KYUK AM,* 2023.
- "Boston Is Losing Its Snow Wicked Fast", *The Atlantic*, 2022.
- Interview guest on *Aboriginal Voices* radio show on CFRC 101.9FM, Queen's School of Graduate Studies *Grad Chat* radio show on CFRC 101.9FM, and *TundraCast* podcast, 2021-2022.

SERVICE AND OUTREACH

2021-present **Committee Member**, Woodwell Climate Research Center
- Field Safety Committee
- Various hiring committees for science and administration roles

2019-present **Reviewer**
- Biogeosciences, Arctic Science, Scientific Reports, Earth System Science Data, Global Change Biology
- IPCC AR6 First and Second Order Drafts – Chapter 5: Global carbon and other biogeochemical cycles and feedbacks

2019-present **Science Communicator**
- Polar Impact
- Skype a Scientist
- Protect Our Winters Canada – Science Alliance

2017-present **Science Fair and Conference Student Presentation Judge**
- American Geophysical Union Fall Meeting OSPA
- Frontenac, Lennox, and Addington School Board, Kingston ON
- Qarmartalik School, Resolute Bay, NU

2017-2022 **Board Member and Vice Chair – Communications**, Association of Polar Early Career Scientists Canada

2017-2021 **Geography Graduate Student Council Representative**, Queen's University

2017-2019 **Conference Organizing Committee Member**
ArcticNet Student Day, Queen's Northern Research Symposium, Canadian Association of Geographers' Ontario

ACADEMIC ASSOCIATIONS

- American Geophysical Union
- Association of Early Career Polar Scientists

CERTIFICATIONS

- Wilderness First Responder
- Canadian Firearms Safety Training
- Transport Canada Pleasure Craft Operator
- Workplace Hazardous Material Information System 2015
- PADI Rescue Diver and DAN Oxygen Provider
- Red Cross Standard First Aid and CPR-C
- Valid Massachusetts Class 'D' Driver's License