

ALEK PETTY - CURRICULUM VITAE

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RESEARCH SUMMARY

RESEARCH INTERESTS: Arctic/Antarctic sea ice; atmosphere-ice-ocean interaction; polar oceanography; sea ice predictability.

RESEARCH APPROACH: Remote sensing (satellite and airborne) and direct (*in-situ*) observations. Geospatial/statistical analysis. Developing and adapting climate models of varying complexity. Numerical simulations.

PROFESSIONAL APPOINTMENTS

2015-Now	RESEARCH ASSOCIATE NASA Goddard Space Flight Center, Greenbelt, MD, USA Earth System Science Interdisciplinary Center, University of Maryland, College Park, MD, USA Supervisor: Nathan Kurtz
2014-2015	RESEARCH ASSOCIATE NOAA Laboratory for Satellite Altimetry, College Park, MD, USA Earth System Science Interdisciplinary Center, University of Maryland, College Park, MD, USA Supervisor: Sinead Farrell

EDUCATION & QUALIFICATIONS

2010-2014	PHD, CLIMATE SCIENCE Centre for Polar Observation & Modelling, University College London, London, UK Thesis Title: Sea ice and the ocean mixed layer over the Antarctic continental shelf Supervisors: Daniel L. Feltham & Paul R. Holland
2006-2010	MSCI, PHYSICS (1ST CLASS HONOURS) University of Bristol, Bristol, UK

PEER REVIEWED PUBLICATIONS

- Boisvert, L. N., **A. A. Petty**, J. C. Stroeve (2016), The extreme winter 2015/2016 Arctic cyclone and its impact on the Barents-Kara seas, *Mon. Wea. Rev.*, 144, 4279–4287, doi:10.1175/MWR-D-16-0234.1.
- Petty, A. A.**, M. C. Tsamados, N. T. Kurtz, S. L. Farrell, T. Newman, J. Harbeck, D. L. Feltham, J. A. Richter-Menge (2016), Characterizing Arctic sea ice topography using high-resolution IceBridge data, *The Cryosphere*, 10(3), 1161–1179, doi:10.5194/tc-10-1161-2016.
- Petty, A. A.**, J. K. Hutchings, J. A. Richter-Menge, M. A. Tschudi (2016), Sea ice circulation around the Beaufort Gyre: The changing role of wind forcing and the sea ice state, *J. Geophys. Res. Oceans*, 121(5), 3278–3296, doi:10.1002/2015JC010903.
- Tsamados, M. C., D. L. Feltham, **A. A. Petty**, D. Schroder, D. Flocco (2015), Processes controlling surface, bottom and lateral melt of Arctic sea ice in a state of the art sea ice model, *Phil. Trans. Roy. Soc., Lond A*, 373, doi:10.1098/rsta.2014.0167
- Petty, A. A.**, D. L. Feltham, and P. R. Holland (2014), Sea ice and the ocean mixed layer over the Antarctic shelf seas, *The Cryosphere*, 8(2), 761–783, doi:10.5194/tc-8-761-2014.
- Petty, A. A.**, D. L. Feltham, and P. R. Holland (2013), Impact of atmospheric forcing on Antarctic continental shelf water masses, *J. Phys. Oceanogr.*, 43(5), 920–940, doi:10.1175/JPO-D-12-0172.1.

Petty, A. A., D. Schroder, J. C. Stroeve, T. Markus, J. Miller, N. T. Kurtz, D. L. Feltham, D. Flocco, Skillful spring forecasts of September Arctic sea-ice extent using passive microwave sea ice observations, *J. Geophys. Res. Earth's Future* (in review).

Petty, A. A., M. C. Tsamados, N. T. Kurtz, Atmospheric form drag over Arctic sea ice from 2009–2015 (in prep).

Cole, S. T., J. M. Toole, R. Lele, M-L Timmermans, S. G. Gallaher, T. P. Stanton, W. J. Shaw, B. Hwang, T. Maksym, J. P. Wilkinson, M. Ortiz, H. Graber, L. Rainville, **A. A. Petty**, S. Farrell, J. A. Richter-Menge, C. Haas, Ice and ocean velocity in the Arctic marginal ice zone: Ice roughness and momentum transfer (in prep).

GRANTS AND FELLOWSHIPS

NASA Cryospheric Science NNH16ZDA001N-ICEBST (3/1/17–2/28/20), Using IceBridge data to improve the characterization, simulation and prediction of Arctic and Southern Ocean sea ice - completing the bridge to ICESat-2, Total budget: \$483,324, **PI: Alek Petty**, Co-I: Ludovic Brucker, Collaborators: Melinda Webster, Guillaume Vernieres, Daniel Feltham, Michel Tsamados, Role: PI (under review)

NERC Standard Grant, Improving Models of Turbulent Exchange Over Sea Ice, PI: Ian Brooks, Co-I: Michel Tsamados, **Project Partner: Alek Petty**, (under review)

NASA Cryospheric Science NNH15ZDA001N-CRYO (1/1/16–12/31/18), Causes and Impacts of Arctic Sea Ice Melt Pond Variability, Total budget: \$336,942, **PI: Alek Petty**, Co-Is: Linette Boisvert, Nathan Kurtz, Collaborators: Daniel Feltham, Michel Tsamados, Role: PI (unsuccessful)

NASA IceBridge Research NNH14ZDA001N-ICEBR (11/1/14–10/31/17), Characterizing Ridges in the Sea Ice System (CRISIS), Total budget: \$358,926, **PI: Alek Petty**, Co-PI: Sinead Farrell, Co-Is: Nathan Kurtz, Thomas Newman, Jacqueline Richter-Menge, Collaborators: Daniel Feltham, Michel Tsamados, Role: PI (unsuccessful)

International Arctic Science Committee (IASC) Fellow for the Cryosphere Working Group, 2016–2019 (travel award to support attendance at international planning meetings).

UK National Environment Research Council postgraduate award. Awarded to University College London, 2010–2014.

SELECTED PRESENTATIONS (AS PRESENTING AUTHOR)

Petty, A.A., M.C. Tsamados, N. Kurtz, Atmospheric form drag over Arctic sea ice, 2009–2015, *American Geophysical Union Fall meeting*, 13th–18th December 2016, San Francisco, CA, USA (oral, upcoming).

Petty, A.A., M.C. Tsamados, N. Kurtz, S.L. Farrell, T. Newman, J. Harbeck, J.A. Richter-Menge, D.L. Feltham, Characterizing Arctic sea ice topography using high-resolution IceBridge data, *American Geophysical Union Fall meeting*, 14th–18th December 2015, San Francisco, CA, USA (poster).

Petty, A.A., M.C. Tsamados, N. Kurtz, S.L. Farrell, T. Newman, J. Harbeck, J.A. Richter-Menge, D.L. Feltham, Characterizing Arctic sea ice topography using high-resolution IceBridge data, *Arctic Observing Open Science Meeting*, 17th–19th November 2015, Seattle, WA, USA (oral, travel award recipient)

Petty, A.A., M.C. Tsamados, T. Newman, S.L. Farrell, N. Kurtz, J.A. Richter-Menge, D.L. Feltham, Characterizing sea ice surface morphology using high-resolution IceBridge data, *NASA Operation IceBridge sea ice meeting*, 27th–28th January 2015, NASA Goddard Space Flight Center, MD, USA (oral).

Petty, A.A., J.K. Hutchings, S.L. Farrell, J.A. Richter-Menge, Seasonal trends in sea ice circulation and wind forcing over the Beaufort Sea, *American Geophysical Union Fall meeting*, 15th–19th December 2014, San Francisco, CA, USA (poster).

Petty, A.A., S.L. Farrell, T. Newman, N. Kurtz, J.A. Richter-Menge, M.C. Tsamados, D.L. Feltham, Characterizing Sea Ice Surface Morphology Using High-resolution IceBridge Data, *American Geophysical Union Fall meeting*, 15th–19th December 2014, San Francisco, CA, USA (poster).

Petty, A.A., J.K. Hutchings, S.L. Farrell, J.A. Richter-Menge, Seasonal trends in sea ice circulation and wind forcing over the Beaufort Sea, *CICS-MD Science Meeting*, 12th–13th November 2014, College Park, MD, USA (poster).

- Petty, A.A.**, S.L. Farrell, J.K. Hutchings, J.A. Richter-Menge, Seasonal trends in sea ice circulation and wind forcing over the Beaufort Sea, *Forum for Arctic Ocean Modeling and Observational Synthesis*, 21st–24th October 2014, Woods Hole Oceanographic Institute, Falmouth, MA, USA (poster, travel award recipient).
- Petty, A.A.**, D.L. Feltham and P.R. Holland, Sea ice-ocean modelling of the Antarctic shelf seas, *Polar Oceans Seminar Series*, 15th January 2014, British Antarctic Survey, Cambridge, UK (oral - invited).
- Petty, A.A.**, P.R. Holland, and D.L. Feltham, Sea ice ocean modelling of the Antarctic shelf seas, *European Geophysical Union meeting*, 7th–12th April 2013, Vienna, Austria (oral).
- Petty, A.A.**, D.L. Feltham and P.R. Holland, Impact of atmospheric forcing on Antarctic shelf water masses, *Forum for Research into Ice Shelf Processes*, 12th–14th June 2012, Uto, Sweden (oral).
- Petty, A.A.**, P.R. Holland, and D.L. Feltham, Sea ice and the ocean mixed layer over the Antarctic shelf seas, *American Geophysical Union Fall meeting*, 5th–9th December 2011, San Francisco, CA, USA (poster - **winner of the Outstanding Student Paper Award (OSPA)** in the cryosphere section).

FIELDWORK

- NASA's Operation IceBridge Antarctic campaign, Nov. 2016, Role: Observer, outreach.
- Joint Ocean Ice Study (JOIS)/Beaufort Gyre Exploration Project (BGEP) Arctic research expedition, 20th Sep.–19th Oct. 2016, Role: On-ice lead scientist (ice cores, thickness transects), ship-based sea ice observations.
- NASA's Operation IceBridge spring Arctic campaign, Apr. 2016, Role: Observer, outreach.
- Joint Ocean Ice Study (JOIS)/Beaufort Gyre Exploration Project (BGEP) Arctic research expedition, 20th Sep.–16th Oct. 2014, Role: On-ice lead scientist (ice cores, thickness transects), ship-based sea ice observations.

SELECTED WORKSHOPS

- XSEDE 2016 NSF Polar Hackathon, Sea Ice Team member, Miami, FL, USA, 16th–21st July 2016 (travel award).
- Forum for Arctic Modeling & Observational Synthesis (FAMOS) workshop, Cape Cod, MA, USA, 3rd–6th November 2015 (travel award).
- New Generation of Polar Researchers Leadership Symposium, Wrigley/Boone Center for Environmental Science and Leadership, CA, USA, 2nd–9th May, 2015 (invited, travel award recipient).
- NERC 'Engaging the public with your research' workshop, NERC, Swindon, UK, 12th–13th December 2013.
- ResClim 'Role of sea ice in climate system' summer school, UNIS, Longyearbyen, Svalbard, 27th June–8th July 2011.
- NERC/NCAS Earth System Science Spring School (ES4), Cambridge, UK, 4th–15th April 2011.

MENTORING

PHD STUDENTS

- Rebecca Frew, University of Reading. Primary supervisor: Daniel L. Feltham. Sea ice and climate feedbacks in the Southern Ocean (co-supervisor).

MASTERS STUDENTS

- Colton Byers, United States Naval Academy. Primary supervisor: Joseph P. Smith. Arctic sea ice mapping using low-cost aerial drones (co-supervisor).

SYNERGISTIC ACTIVITIES

OUTREACH

- Guest blog for NASA's Notes from the Field: The 2016 Beaufort Gyre Exploration Project: Searching for Sea Ice (Sep.–Oct., 2016).
- NASA Cryospheric Sciences Python meetup group organizer (Apr., 2016 onwards).
- Recommendation and quote for the NASA Earth Observatory Image of the Day: 'A Polynya Seldom Seen' (Sep., 2016).
- Guest blog post on the Arctic Sea Ice blog: 'Sea ice circulation around the Beaufort Gyre', (May., 2016).
- Contributor to the NSIDC Arctic sea ice blog, (Mar., 2016).

- Featured blog post on The Climate Lab Book blog series: ‘The sea ice orchestra’, (Sep., 2015).
- Featured blog series on the University of Maryland ‘Scientists’ Soapbox’ based on my participation in the 2014 JOIS research expedition, (Sep. –Oct., 2014).
- Public lecture on Antarctic climate change on behalf of the Cambridge zero-carbon society, (Nov., 2013).

PROJECT TEAMS

- Sea Ice Prediction Network, Sea Ice Outlook Action Team member (2015 onwards).
- International Arctic Science Committee, Cryosphere Working Group, Early Career Fellow, 2016–2019.
- NASA’s Operation IceBridge sea ice project office team member (2015 onwards).

REVIEWER

- Geophysical Research Letters, Journal Geophysical Research, The Cryosphere, Journal of Physical Oceanography, Remote Sensing.
- Snow, Water, Ice and Permafrost in the Arctic (SWIPA) follow-up assessment.
- National Science Foundation.

EXTERNAL PANELS

- National Science Foundation, Division of Polar Programs.

TEACHING

MADE CLEAR climate change scientific expert - providing advice to K-12 teachers in Maryland/Delaware, since Feb. 2015.

Python for Cryospheric Sciences meetup organizer - NASA Goddard Space Flight Center, monthly since Apr. 2016.

UCL Earth Sciences GEOL 3039 course ‘Physics of Oceans, Ice sheets & Climate’, teaching assistant.

UCL Earth Sciences GEOL 1006 course ‘Foundations of Physical Geoscience’, teaching assistant.

UCL Earth Sciences undergraduate mathematics tutor.

ASPIRE after-school course, The Melting Planet, City & Islington College, London, UK on climate change and the polar regions (6 weekly lessons), Feb.–Mar. 2013.

PROFESSIONAL AFFILIATIONS

MEMBERSHIPS

- American Geophysical Union (AGU), since 2011.
- Association for Polar Early Career Scientists (APECS), since 2011.
- UK Polar Network, 2011-2014.