

Andreas Münchow

Jan.-6, 2020

Present Position: Professor
Present Address: School of Marine Science & Policy, University of Delaware
Newark, Delaware 19716
muenchow@udel.edu, 302-831-0742

Academic Degrees:

1992 Ph.D., Oceanography
Advisor: Dr. Richard W. Garvine, University of Delaware.
Dissertation: The formation of a buoyancy driven coastal current

1989 M.S., Marine Studies
Advisor: Dr. Richard W. Garvine, University of Delaware
Thesis: Nonlinear tides and bores in shallow water

Professional Appointments:

2018 - present	Professor, Physical Ocean Science and Engineering, University of Delaware	(with tenure)
2001 - 2018	Associate Professor, Physical Ocean Science and Engineering, University of Delaware	(with tenure)
2000 - 2001	Associate Professor, Physical Ocean Science and Engineering, University of Delaware	(without tenure)
1994 - 1999	Assistant Professor in Physical Oceanography	(without tenure)

Postdoctoral Research Experience:

1992 - 1994 Postdoctoral Research Associate under Dr. Nancy Bray, Scripps Institution of Oceanography, University of California, San Diego focusing on physical oceanography of submarine channels and canyons

Career Highlights:

2017	Front Page News Feature on Climate Change and Petermann Gletscher, Greenland Washington Post, Jan.-1
2010	Congressional Testimony on Climate Change and Petermann Gletscher, Greenland Select Committee on Energy Independence and Global Warming
2003	NSF Award “Collaborative Research: Variability and Forcing of Fluxes Through Nares Strait and Jones Sound” at \$2,054,843 for 5-years at University of Delaware

Peer Reviewed Publications:

(*) Student Author

43. 2020 **Münchow**, A., J. Schaffer, and T. Kanzow: Ocean circulation connecting Fram Strait to glaciers off North-East Greenland – Mean flows, topographic Rossby waves, and their forcing, *J. PHYS. OCEANOGR.*, in press, 64 pp.
42. 2019 Scott, R.M., R.S. Pickart, P. Lin, **A. Münchow**, M. Li, D.A. Stockwell, and J.A. Brearley: Three-dimensional structure of a cold-core Arctic eddy interacting with the Chukchi Slope Current. *J. GEOPHYS. RES.*, 124, 8375-8391, <https://doi.org/10.1029/2019JC015523>.
- 41.* 2019 Washam, P., K. Nicholls, **A. Münchow**, L. Padman: Summer surface melt thins Petermann Gletscher ice shelf by enhancing channelized basal melt, *J. Glac.*, 65 (252), 662-674.
- 40.* 2018 Washam, P., **A. Münchow**, and K. Nicholls: A decade of ocean changes impacting the iceshelf of Petermann Gletscher, *J. PHYS. OCEANOGR.*, 48. 2477-2493.
- 39.* 2017 Ryan, P. and **A. Münchow**: Sea ice draft observations in Nares Strait from 2003 to 2012, *J. GEOPHYS. RES. OCEANS*, 122, doi:10.1002/2016JC011966.
38. 2017 Heuze, C., A. Wahlin, H. Johnson, and **A. Münchow**: Pathways of meltwater export from Petermann Glacier, Greenland. *J. PHYS. OCEANOGR.*, 47, 405-418.
37. 2017 Shroyer, E.L., L. Padman, R.M. Samelson, **A. Münchow**, and L.A. Stearns: Seasonal control of Petermann Gletscher ice-shelf melt by the ocean's response to sea-ice cover in Nares Strait, *J. GLAC.*, pp. 1-7, doi:10.1017/jog.2016.140.
36. 2016 **Münchow**, A., L. Padman, P. Washam, and K. Nicholls: The ice shelf of Petermann Gletscher, North Greenland and its connection to the Arctic and Atlantic oceans, *OCEANOGRAPHY*, 29 (4), 84-95.
35. 2016 Fenty, I, J.K. Willis, A. Khazendar, S. Dinardo, R. Forsberg, I. Fukumori, D. Holland, M. Jakobsson, D. Moller, J. Morison, **A. Münchow**, E. Rignot, M. Schodlok, A.F. Thompson, K. Tinto, M. Rutherford, and N. Trenholm: Oceans Melting Greenland: Early results from NASA's ocean-ice mission in Greenland, *OCEANOGRAPHY*, 29 (4), 72-83.
34. 2016 **Münchow**, A.: Volume and freshwater flux Observations from Nares Strait to the west of Greenland from 2003 to 2009, *J. PHYS. OCEANOGR.*, 46, 141-157.
33. 2015 Shroyer, E.L., R.M. Samelson, L. Padman, and **A. Münchow**: Modeled ocean circulation in Nares Strait and its dependence on land-fast ice cover, *J. GEOPHYS. RES OCEANS.*, doi:10.1002/2015JC011091.

32. 2015 Tinto, K., R.E. Bell, J.R. Cochran, and **A. Münchow**: Bathymetry in Petermann Fjord from Operation IceBridge aerogravity, *EARTH PLANET. SCI. LET.*, 422, 58-68.
31. 2015 **Münchow, A.**, K.K. Falkner, and H. Melling: Baffin Island and West Greenland Current Systems in northern Baffin Bay. *PROGR. OCEANOGR.*, 132, 305-317.
30. 2014 **Münchow, A.**, L. Padman, H.A. Fricker: Interannual changes of the floating ice shelf of Petermann Gletscher, North Greenland, from 2000 to 2012. *J. GLAC.*, 60, 221, doi: 10.3189/2014JoG13J135.
29. * 2012 Rabe, B., H. Johnson, **A. Münchow**, and H. Melling: Geostrophic Currents and freshwater fluxes across the Canadian polar shelf via Nares Strait. *J. MAR. RES.*, 70, 603-640.
28. 2011 **Münchow, A.**, K.K. Falkner, H. Melling, B. Rabe, and H.L. Johnson: Ocean Warming of Nares Strait Bottom Waters off NW Greenland 2003-2009. *OCEANOGRAPHY*, 24, 114-123.
27. 2011 Falkner, K.K., H. Melling, **A. Münchow**, and 9 other: Context for the recent massive Petermann Glacier calving event. *EOS, Trans., AGU*, 92(14), 117-118.
26. 2011 Johnson, H.L, **A. Münchow**, K.K. Falkner, and H. Melling: Ocean circulation and properties in Petermann Fjord, Greenland. *J. GEOPHYS. RES.*, 116, C01003, doi:10.1029/2010JC006519.
25. * 2010 Rabe, B, **A. Münchow**, H. Johnson, and H. Melling: Nares Strait hydrography and salinity from a three-year moored array. *J. GEOPHYS. RES.*, 115, C07010, doi:10.1029/2009JC005966.
24. 2008 **Münchow, A.** and H. Melling: Ocean current observations from Nares Strait to the west of Greenland: Interannual to tidal variability and forcing. *J. MAR. RES*, 66, 801, 833.
23. * 2008 Pimenta, F., R.W. Garvine, and **A. Münchow**: Observations of coastal upwelling off Uruguay downshelf of the Plata Estuary, South America. *J. MAR. RES.*, 66, 835-872.
22. 2008 Melling, H., T.A. Agnew, K.K. Falkner, D.A. Greenberg, C.M. Lee, **A. Münchow**, B. Petri, S.J. Prinsenberg, R.M. Samelson, and R.A. Woodgate: Fresh-water fluxes via Pacific and Arctic outflows across the Canadian polar shelf. In: R. R. Dickson et al. (eds.), *ARCTIC-SUBARCTIC OCEAN FLUXES*, 193-247, Springer, Dordrecht, The Netherlands.
21. 2007 **Münchow, A.**, K.K. Falkner, and H. Melling: Spatial continuity of measured seawater and tracer fluxes through Nares Strait, a dynamically wide channel bordering the Canadian Archipelago. *J. MAR. RES.*, 65(6), 759-788.

20. 2006 **Münchow**, A., K.K. Falkner, H. Melling: An Observational Estimates of Volume and Freshwater Flux Leaving the Arctic Ocean Through Nares Strait. J. PHYS. OCEANOGR., 36, 2025-2041.
19. * 2006 Zweng, M.M. and A. **Münchow**: Warming and Freshening of Baffin Bay, 1916-2003. J. GEOPHYS. RES., 111, C07016, doi:10.1029/2005JC003093.
18. 2006 Samelson, R.M., T. Agnew, H. Melling, A. **Münchow**: Evidence for atmospheric control of sea-ice motion through Nares Strait. Geophys. Res. Let., 33, L02506, doi:10.1029/2005GL025016.
17. 2001 Yankovsky, A.E., B.M. Hickey, and A. **Münchow**: The impact of variable inflow on the dynamics of a coastal buoyant plume. J. GEOPHYS. RES., 106, 19809-19824.
16. 2000 Yankovsky, A.E., R.W. Garvine, and A. **Münchow**: Meso-scale currents on the inner New Jersey shelf driven by the interaction of buoyancy and wind forcing. J. PHYS. OCEANOGR., 30, 2214-2230.
15. 2000 **Münchow**, A, E.C. Carmack, and D.A. Huntley: Synoptic density and velocity observations of North Siberian slope waters. J. GEOPHYS. RES., 105, 14,103-14,119.
14. 2000 **Münchow**, A.: Detiding three-dimensional velocity survey data in coastal waters. J. ATMOS. OCEAN. TECH., 17, 736-748.
13. 2000 **Münchow**, A.: Wind-stress curl forcing of the coastal ocean near Point Conception, California. J. PHYS. OCEANOGR., 30, 1265-1280.
12. 2000 **Münchow**, A., R.J. Chant: Kinematics of inner shelf motions during the summer stratified season off New Jersey. J. PHYS. OCEANOGR., 30, 247-268.
11. 1999 **Münchow**, A., T. Weingartner, and L. Cooper: The summer hydrography and surface circulation of the East Siberian Sea. J. PHYS. OCEANOGR., 29, 2167-2182.
10. 1998 **Münchow**, A.: Tidal currents in a topographically complex channel. CONT. SHELF RES., 18, 561-584.
9. 1997 **Münchow**, A. and E.C. Carmack: Synoptic flow and density observations near an Arctic shelf break. J. PHYS. OCEANOGR., 27, 1402-1419.
8. 1997 Signorini, S.R., A. **Münchow**, and D. Haidvogel: Flow dynamics in a wide Arctic canyon. J. GEOPHYS. RES., 102, 18661-18680.
7. 1995 **Münchow**, A., C.S. Coughran, M.C. Hendershott, and C.W. Winant: Performance and calibration of an acoustic Doppler current profiler towed below the surface. J. ATMOS. OCEAN. TECH., 12, 435-444.

6. 1995 Wong, K.-C. and A. **Münchow** (1995): Buoyancy forced interactions between estuary and shelf. *CONT. SHELF RES.*, 15, 59-88.
5. 1993 **Münchow**, A. and R.W. Garvine: Dynamical properties of a buoyancy driven coastal current. *J. GEOPHYS. RES.*, 98, 20063-20077.
4. 1993 **Münchow**, A. and R.W. Garvine: Buoyancy and wind forcing of a coastal current. *J. MAR. RES.*, 51, 293-322.
3. 1992 **Münchow**, A., R.W. Garvine, and T.F. Pfeiffer: Subtidal currents from a shipboard acoustic Doppler current profiler in tidally dominated waters. *CONT. SHELF RES.*, 12, 499-515.
2. 1992 **Münchow**, A., A.K. Masse, and R.W. Garvine: Astronomical and nonlinear tidal currents in a coupled estuary/shelf system. *CONT. SHELF RES.*, 12, 471-498.
1. 1991 **Münchow**, A. and R.W. Garvine: Nonlinear barotropic tides and bores in estuaries. *TELLUS*, 43A, 246-256.

Data published in US National Archives:

17. **Muenchow**, A. 2019. Physical ocean property profile from Petermann Fjord, Greenland, surveyed in 2015 by IB/Oden. Arctic Data Center. doi:10.18739/A2XS5JH16.
16. **Muenchow**, A. and P. Washam. 2019. Ocean profile of temperature and salinity below the ice shelf of Petermann Gletscher, Greenland, 2015. Arctic Data Center. doi:10.18739/A2PC2T86B.
15. **Muenchow**, A. and P. Washam. 2019. Glacier-ocean interactions at a Greenland ice shelf at tidal to interannual time scales, North Greenland, 2015-17. Arctic Data Center. doi:10.18739/A22J6846K.
14. **Muenchow**, A. 2019. Atmosphere and ocean measurements from an automated weather station on landfast sea ice in Wolstenholme Fjord, Greenland, March – April 2017. Arctic Data Center. doi:10.18739/A2XW47W12.
13. **Muenchow**, A. 2019. Ocean sensor data from multi-path acoustic network under land-fast sea ice in Wolstenholme Fjord, Greenland, April 2017. Arctic Data Center. doi:10.18739/A22N4ZH5K.
12. **Muenchow**, A. 2019. Temperature under land-fast sea ice from a thermistor mooring in Wolstenholme Fjord, Greenland, March - April 2017. Arctic Data Center. doi:10.18739/A24M9196C.
11. **Muenchow**, A. 2019. Currents under land fast sea ice from tilt sensor moorings in Wolstenholme Fjord, Greenland, 2017. Arctic Data Center. doi:10.18739/A2T14TP7R.

10. **Muenchow**, A. 2017. Conductivity-Temperature-Depth (CTD) Survey in Wolstenholme Fjord, Greenland, April 2017. Arctic Data Center. doi:10.18739/A2M80H.
9. **Muenchow**, A. H. Melling, K. K. Falkner, B. Rabe, and H. L. Johnson. 2016. Canadian Archipelago Throughflow Study (CATS). Arctic Data Center. doi:10.5065/D698854C.
8. **Muenchow**, A. and H. Huntley. 2014. Canadian Archipelago Throughflow Study: Ice profiling Sonar moorings 2003-09. Arctic Data Center. doi:10.18739/A2MH2P.
7. **Muenchow**, A. 2013. Canadian Archipelago Throughflow Study: ADCP Surveys 2003. Arctic Data Center. doi:10.18739/A2ZS3X.
6. **Muenchow**, A. 2013. Canadian Archipelago Throughflow Study: ADCP moorings 2003-06. Arctic Data Center. doi:10.18739/A23K67.
5. **Muenchow**, A., K.K. Falkner, and H. Melling. 2013. Canadian Archipelago Throughflow Study: CTD Surveys 2003. Arctic Data Center. doi:10.18739/A27884.
4. **Muenchow**, A. and B. Rabe. 2013. Canadian Archipelago Throughflow Study: CT/D Moorings 2003-06. Arctic Data Center. doi:10.18739/A2C310.
3. **Muenchow**, A. 2013. Dynamics and Forcing of Nares Strait from 2003 to 2009: Tidal to Interannual Variability to the West of Greenland. Arctic Data Center. urn:uuid:6624e413-3681-4547-8c60-9418eebb069f.
2. **Muenchow**, A. 2013. Collaborative Research: Variability and Forcing of Fluxes Through Nares Strait and Jones Sound, a Freshwater Emphasis. Arctic Data Center. urn:uuid:47314a4d-b71e-4bb3-9449-917d7dfdac1f.
1. **Muenchow**, A. 2007. HLY-03-01 ADCP Data (2-min Averages). Version 1.0. UCAR/NCAR - Earth Observing Laboratory. <https://doi.org/10.5065/D6CN71ZH>. Accessed 28 Jul 2017.

Research Grants:

23.	2016-19	NSF	Glacier-Ocean interactions at a Greenland ice shelf at tidal to interannual time scales	\$360,488	PI
22.	2015-18	ONR	Shelf-Basin acoustics, noise, and oceanography	\$1,000,000	Co-PI
21.	2014-17	NSF	Acoustic Sensor Networks for Ice-Covered Seas	\$999,943	PI
20.	2015-16	ONR	Instrumentation for long-term Arctic shelf and slope acoustical oceanography	\$297,000	Co-PI
19.	2015-16	JPL	Analysis of hydrographic data from Petermann Fjord and Nares Strait	\$59,478	PI
18.	2015-16	NASA	Ocean observations below Petermann Glacier	\$64,957	PI
17.	2013-14	NSF	Shelf-Basin Exchange near 79N Glacier and Zachariae Isstrom, North-East Greenland	\$179,343	PI
16.	2012-13	NSF	Supplement: Dynamics and Forcing of Nares Strait 2003 to 2009	\$112,950	PI
15.	2010-13	NSF	Dynamics and Forcing of Nares Strait from 2003 to 2009	\$684,039	PI
14.	2003-07	NSF	Collaborative Research: Variability and Forcing of Fluxes through Nares Strait and Jones Sound	\$2,052,911	PI
13.	2002-06	NSF	Collaborative research: CTD/Hydrographic and underway service measurements for the Shelf-Basin Interaction phase II field project	\$215,365	PI
12.	2000-02	NSF	Coastal upwelling circulation on a wide shelf	\$285,659	Co-PI
11.	2000-01	ONR	Cross-shelf exchange on the outer Chukchi shelf and Barrow Canyon	\$32,001	PI
10.	1998-00	ONR	Modelling Exchange processes near wide Arctic canyons	\$83,579	PI
9.	1997-00	ONR	Exchange processes near wide Arctic canyons	\$89,759	PI
8.	1997-99	NSF	The outflow of fresh water from the Canadian Archipelago: Synoptic currents, hydrography, and long term forcing	\$182,417	PI

7.	1996-99	NSF	Coastal upwelling circulation on a wide shelf: An observational study	\$518,956	PI
6.	1995-97	ONR	Dynamics of wind and buoyancy forced motions on the Beaufort Shelf	\$120,070	PI
5.	1995-97	ONR	Lagrangian flow field observations of the East Siberian Coastal Current	\$179,250	PI
4.	1995-97	ONR	Slope currents near the shelf break of the East Siberian and Chukchi Seas	\$62,112	PI
3.	1995	ONR	Model-data intercomparison in the western Arctic	\$100,000	Co-PI
2.	1995	ONR	Purchase of a towed acoustic Doppler current profiler	\$144,745	Co-PI
1.	1993-95	ONR	Dynamics over Arctic Canyons	\$125,765	PI

Conference Presentations 2010-present (published abstract)

28. Freitag, L., S. Singh, K. Bell, T. Johnson, D. Giaya, **A. Münchow**, and P. Washam, Experimental Results in Acoustic Communications Under Shore-Fast Greenland Ice, Oceans2019, Marseille, France, Jun. 2019.
27. **Münchow**, A. and T. Kanzow, Subsurface Pathways of Warm Waters Towards Greenland Glaciers, European Geophysical Union, Vienna, Austria, Apr.-2019.
26. Washam, P., **A. Münchow**, K.W. Nicholls, and L. Padman, Observations of Subglacial Runoff-Enhanced Basal Melt Beneath Petermann Gletscher's Ice Shelf, Greenland, European Geophysical Union, Vienna, Austria, Apr.-2019.
25. **Münchow**, A. and P. Washam, Ice-Ocean-Glacier interactions in Wolstenholme Fjord, North-West Greenland in April 2017, HE14B-2836, Ocean Science Meeting, Portland, OR, Feb.-2018.
24. Washam, P., **A. Münchow**, and K. W. Nicholls, Dynamics of ice-ocean interactions beneath Petermann Gletscher's ice shelf, Greenland, HE14B-2839, Ocean Science Meeting, Portland, OR, Feb.-2018.
23. Kanzow, T., **A. Münchow**, and J. Schaffer, Observed subsurface heat advection towards tidewater glaciers in North-East Greenland from tidal to interannual time scales, HE14B-2836, Ocean Science Meeting, Portland, OR, Feb.-2018.
22. **Münchow**, A., C. Elmer, M. Badiey, J. Eickmeier, and P. Ryan, Shelf-Basin exchange over the continental slope of the Chukchi Sea 2003/04 vs. 2016/17, C33B-1198, Fall AGU Meeting, New Orleans, LA, Dec.-2017.
21. P. Ryan, M. Badiey, C. Elmer, **A. Muenchow**, and J. Eickmeier, Heat content and ice draft variability over the slope of the Chukchi Sea from 2016/17 ocean moorings, C33B-1195, Fall AGU Meeting, New Orleans, LA, Dec.-2017.
20. **Münchow**, A. Ocean impacts on glacier motions at Petermann Gletscher, North Greenland, Program for Arctic Regional Climate Assessment, Silver Spring, MD, Jan.-2017.
19. **Münchow**, A., K. Nicholls, L. Padman, and P. Washam, Ocean observations below Petermann Gletscher ice shelf, Greenland from a cabled observatory, PP13A-2042, Fall AGU Meeting, San Francisco, CA, Dec.-2016.
18. Willis, J.K. et al. NASA's Oecean Melts Greenland (OMG) mission: Year 2 mission update, C51A-0652, Fall AGU Meeting, San Francisco, CA, Dec.-2016.
17. Mix, A.C., et al. The Petermann Glacier Experiment, NW Greenland, PP12C-01, Fall AGU Meeting, San Francisco, CA, Dec.-2016.

16. Mayer, L.A. et al. Towards the complete characterization of marine-terminating glacier outlet systems, PP12C-02, Fall AGU Meeting, San Francisco, CA, Dec.-2016.
15. **Münchow**, A., P. Washam, L. Padman, and K. Nicholls, Ocean warming in Petermann Fjord, North Greenland, H14B-1417, Ocean Science Meeting, New Orleans, LA, Feb.-2016.
14. Ryan, P., Topography of ice in Nares Strait 2003 to 2012, Ocean Science Meeting, New Orleans, LA, Feb.-2016.
13. **Münchow**, A., K. Nicholls, C. Heuze, A. Wahlin, and A. Mix, Ocean observations from below Petermann Gletscher, C21A-0693, Fall AGU Meeting, San Francisco, CA, Dec.-2015.
12. **Münchow**, A., U. Schauer, L. Padman, H. Melling, and H.A. Fricker, North Greenland's ice shelves and ocean warming, C34B-01, Fall AGU Meeting, San Francisco, CA, Dec.-2014.
11. **Münchow**, A. and H. Melling, Volume and freshwater flux to the west of Greenland: Nares Strait from 2003 to 2009, OS51-C-1000, Fall AGU Meeting, San Francisco, CA, Dec.-2014.
10. Ryan, P.A. and A. **Münchow**. Regime change of ice draft in Nares Strait to the west of Greenland 2003 to 2009, OS51C-1001, Fall AGU Meeting, San Francisco, CA, Dec.-2014.
9. **Münchow**, A., Coastal circulation and dynamics of straits and fjords of North Greenland, Gordon Research Conference on Coastal Ocean Circulation, Biddeford, ME, May 2013.
8. **Münchow**, A., L. Padman, H. Johnson, A. Mix, and R. Samelson, Decadal variability of Petermann Gletscher, NW Greenland from observations of ice, ocean, and atmosphere, Davos Atmosphere and Cryosphere Assembly, Davos, Switzerland, Jul.-2013.
7. **Münchow**, A., Oceanic climate change of western Greenland: Fact or fiction? O32-B1790, Ocean Science Meeting Salt Lake City, UT, Feb.-2012.
6. **Münchow**, A., K.K. Falkner, H. Melling, H.L. Johnson, H.S. Huntley, and P. Ryan, Ice-Ocean interactions to the north-west of Greenland: Glaciers, Straits, Ice Bridges, and the Rossby radius (invited), C53B-03, Fall AGU Meeting, San Francisco, CA, Dec.-2010.
5. **Münchow**, A., Vertical and lateral structure of Arctic Subarctic Ocean Exchange via Nares Strait to the west of Greenland 2003 to 2009, C43D-0576, Fall AGU Meeting, San Francisco, CA, Dec.-2010.
4. Falkner, K.K. et al. Interactions of the Greenland Petermann Glacier with the ocean: An initial perspective (Invited), C12B-01, Fall AGU Meeting, San Francisco, CA, Dec.-2010.
3. **Münchow**, A., H. Melling, and B. Rabe, Interannual and mesoscale variability of buoyant discharges from the Arctic to the west of Greenland, PO35G-10, Ocean Science Meeting, Portland, OR, Feb.-2010.
2. Falkner, K.K. et al. Oceanographic observations pertinent to the Petermann Glacier,

Greenland, IT15H-13, Ocean Science Meeting, Portland, OR, Feb.-2010.

1. Rabe, B. and A. **Münchow**. Ocean current variability in Nares Strait, West of Greenland, from 2003-06, PO45C-08, Ocean Science Meeting, Portland, OR, Feb.-2010.

Public Presentations 2011-present (invited)

14. “*Canyon Circulation Connecting Fram Strait to Glaciers off North-East Greenland*,” University of Bremen, Germany, Jan.-2019.
13. “*Ice-glacier interactions at the ice shelf of Petermann Gletscher, Greenland 2002-17*,” Alfred-Wegener-Institute, Bremerhaven, Germany, Nov.-2018.
12. “*Ice, ocean, and glacier change in a warming Arctic*,” University of Bremen, Germany, Oct.-2018.
11. “*On thin ice: Research via snowmobile and helicopter*,” Chester County Citizen for Climate Protection, West Chester, PA, May-2017.
10. “*Oceanography on thin ice by snowmobile and helicopter*,” Knud Rasmussen Community Center, Thule Air Base, Greenland, Apr.-2017.
9. “*North-East Greenland ice shelves and ocean warming: Canyon dynamics and real time ocean data via acoustic communication networks*,” Svalbard Science Forum Ocean Flagship Workshop, Sopot, Poland, Jun.-2015.
8. “*The American passage to the North Pole: Ice, ocean, glaciers, and climates of Nares Strait*,” Bowdoin College, Brunswick, ME, Feb.-2015.
7. “*North Greenland’s ice shelves and ocean warming*,” Physical Ocean Science and Engineering Seminar, Newark, DE, 2014
6. “*West Greenland above 78 N: Icy seas, mountains, and floating glaciers*,” R/V Polarstern, Fram Strait, Jun.-2014.
5. “*Travails of a sailor in a changing climate*,” Ocean Currents Lecture, Lewes, DE, Apr.-2014.
4. “*Arctic coastal processes and climate change*,” Institute of Marine Research, Tromso, Norway, Dec.-2013.
3. “*Observed volume and freshwater flux to the west of Greenland 2003-12*,” Alfred-Wegener-Institute, Bremerhaven, Germany, Jul.-2013.
2. “*Remarks on some Physical Oceanography relating to Ocean/Ice-shelf/Ice-Sheet Interactions*,” NSF workshop San Francisco, CA, Dec.-2011
1. “*Warming of Nares Strait waters 2003-09: Observations and Implications for oceanography, glaciology, and remote sensing*,” Danish Meteorological Institute, Copenhagen, Denmark, 2011.

Time at Sea (since 2000):

27.	2018	R/V Maria S. Merian	31 days	Greenland Sea, Denmark Strait
26.	2017	USCGC Healy	28 days	Arctic Alaska
25.	2017	R/V Polarstern	28 days	Spitsbergen and North Greenland
24.	2017	Snowmobile	42 days	North Greenland
23.	2016	R/V Sikuliaq	31 days	Arctic Alaska
22.	2016	Helicopter	7 days	North Greenland
21.	2015	I/B Oden	35 days	North Greenland
20.	2014	R/V Polarstern	28 days	Spitsbergen and North Greenland
19.	2012	CCGS Henry Larsen	17 days	Arctic Canada and North Greenland
18.	2009	CCGS Henry Larsen	30 days	Arctic Canada and North Greenland
17.	2007	CCGS Henry Larsen	30 days	Arctic Canada and North Greenland
16.	2006	CCGS Henry Larsen	21 days	Arctic Canada and North Greenland
15.	2005	ice-camp	evacuated	Arctic
14.	2004	USCGC Healy	28 days	Arctic Alaska and Siberia
13.	2003	USCGC Healy	42 days	Arctic Alaska and Siberia
12.	2003	USCGC Healy	42 days	Arctic Canada and Greenland
11.	2000	ARA Comodoro Rivadavia	21 days	coastal Argentina and Uruguay

Formal Classroom Teaching

11. Geophysical Data Analysis	2019, 2018, 2016, 2015, 2013, 2011, 2010, 2009 1999, 1995	Online*
10. Waves in the Marine Environment	2020, 2018	Online*
9. Introduction to Arctic Oceanography	2014	Online*
8. Geophysical Fluid Dynamics	2012, 2005	Online*
7. MODIS Optical Remote Sensing	2010	Online*
6. Physical Ocean Science and Engineering Seminar	2018, 2008, 2006	Online*
5. Introduction to Physical Oceanography	2004, 1999, 1998, 1997	Online*
4. Oceanography and Abrupt Climate Change	2003	
3. Coastal Oceanography: From Physics to Fish	2001	
2. Impacts on Fisheries in the Pacific NW	2000	
1. Coastal Ocean Dynamics	2000	

(*) <http://muenchow.cms.udel.edu/html/courses.html>

Students Advised:

10. Sohyun Bae, MS-current, Research Assistant (2019-present), University of Delaware
9. Cassandra Elmer, MS 2020, University of Delaware
8. Peter Washam, PhD 2019, Research Associate, Georgia Tech
7. Patricia Ryan, PhD 2018, University of Delaware
6. Akeem Booker, MS, Research Assistant (2016), University of Delaware

5. Claire Macdonald, MS, Research Scientist (2011-12), University of Hamburg
4. Lauren Brown, MS 2011: Program Officer Polar Research Board, National Academy of Science
3. Berit Rabe, PhD 2010: Inshore Physical Oceanographer, Government Scotland
2. Melissa Zweng, MS 2006: Oceanographer, NOAA/NODC Ocean Climate Laboratory
1. Hank Statscewich, MS, Staff Oceanographer, University of Alaska Fairbanks

Post-doctoral Scientists Mentored:

1. Robert Chant, Professor, Rutgers University

Professional Service – Proposal Review

6. NASA Cryosphere Proposal Panelist 2012
5. NSF Office of Polar Program Proposal Panelist 2014, 2006, 2005, 1998
4. NSF Physical Oceanography Proposal Panelist 2018, 2009, 1999, 1997
3. NSF Proposal Review (3-8 per year) for multiple programs and disciplines 1994-present
2. United Kingdom - National Environmental Research Council Proposal Review 2014
1. Sweden - Polar Research Secretariat Proposal Review 2015

Professional Service – Manuscript Review

Nature, Journal of Physical Oceanography, Journal of Geophysical Research, Journal Marine Research, Geophysical Research Letters, Progress in Oceanography, Ocean Science, Continental Shelf Research, Cryosphere, Ocean Science