GALEN A. MCKINLEY

Professor of Earth and Environmental Sciences and Senior Scientist
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EDUCATION

	Massachusetts Institute of Technology	Cambridge, MA
2002	***Ph.D. Climate Physics and Chemistry***	
	Thesis: *Interannual Variability of Air-Sea Fluxes of Carbon Dioxide and Oxygen*	
	Rice University	Houston, TX
1995	***B.S. Civil Engineering – Environmental option***	

RESEARCH AND PROFESSIONAL EXPERIENCE

	Columbia University / Lamont-Doherty Earth Observatory	New York, NY / Palisades, NY
2017 to present	*Professor, Earth and Environmental Sciences*	
2017 to present	*Senior Scientist, Lamont-Doherty Earth Observatory*	
2021 to present	*Affiliate Professor, Earth and Environmental Engineering*	
	I study the ocean carbon cycle and its role in the global carbon cycle. Understanding physical and biogeochemical drivers of carbon cycle variability and distinguishing this from anthropogenic trends is a key interest. My primary tools are numerical models and machine learning.	
2021 to 2023	*Deputy Director, Learning the Earth with Artificial Intelligence and Physics (LEAP), NSF STC*	
	ETH-Zürich	Zürich, Switzerland
spring 2024	*Guest Professor, Environmental Physics*	
	University of Wisconsin - Madison	Madison, WI
2017 to 2020	*Adjunct Professor, Atmospheric and Oceanic Sciences*	
2016 to 2017	*Professor, Atmospheric and Oceanic Sciences and Bryson Professor, Center for Climatic Research*	
2011 to 2016	*Associate Professor, Atmospheric and Oceanic Sciences*	
2004 to 2011	*Assistant Professor, Atmospheric and Oceanic Sciences*	
summer 2011	**Woods Hole Oceanographic Institution**	Woods Hole, MA
	Institution Visiting Scholar in Physical Oceanography and Marine Chemistry and Geochemistry	
	Princeton University / University of Wisconsin - Madison	Princeton, NJ
2003 to 2004	*Visiting Research Staff / Anna Julia Cooper Postdoctoral Fellow*	
	Ar and N_2 in ocean and atmospheric models, ocean ^{14}C and inverse techniques; and CO_2 and O_2 fluxes.	
	Instituto Nacional de Ecología (National Institute of Ecology)	Mexico City, Mexico
2002 to 2003	*Consultant*	
	Public health co-benefits from air pollution/greenhouse gas emission control in Mexico City	
	Massachusetts Institute of Technology	Cambridge ,MA
1996 to 2002	*Graduate Research assistant and Postdoctoral associate*	
	Brown and Root Environmental	Houston, TX
1995 to 1996	*Environmental specialist*	
	Environmental compliance; water and soils, hazardous waste, air pollution modeling.	
	Clivius Multrum, USA	Newton, MA
summer 1993	*Project consultant*	

GALEN A. MCKINLEY

PEER-REVIEWED PUBLICATIONS (McKinley group: grad*, undergrad**; postdoc+)

Jiang, L.-Q., A. Fay, J. D. Müller, L. Gregor, A. Roobaert, L. Keppler, D. Carroll, S. K. Lauvset, T. DeVries, J. Hauck, C. Rödenbeck, N. Metzl, A. J. Fassbender, J.-P. Gattuso, P. Landschützer, R. Wanninkhof, C. Sabine, S. R. Alin, M. Hoppema, A. Olsen, M. P. Humphreys, K. Chakraborty, A. C. Franco, K. Azetsu-Scott, D. C. E. Bakker, L. Barbero, N. R. Bates, N. Besemer, H. C. Bittig, A. E. Boyd, D. Broullón, W.-J. Cai, B. R. Carter, T.-T.-T. Chau, C.-T. A. Chen, F. Cyr, J. E. Dore, I. Enochs, R. A. Feely, H. E. Garcia, M. Gehlen, P. K. Ghoshal, L. Gloege, M. González-Dávila, N. Gruber, D. Ianson, Y. Iida, M. Ishii, A. P. Joshi, E. Kennedy, A. Kozyr, N. Lange, C. Lo Monaco, D. P. Manzello, G. A. McKinley, N. M. Monacci, X. A. Padin, A. M. Palacio-Castro, F. F. Pérez, J. M. Santana-Casiano, J. Sharp, A. Sutton, J. Swift, T. Tanhua, M. Telszewski, J. Terhaar, R. van Hooidonk, A. Velo, A. J. Watson, A. E. White, Z. Wu, L. Xue, H. Yoo, J. Zeng and G. Zhong (2026). Synthesis of data products for ocean carbonate chemistry. Earth System Science Data, 18(2), 1405–1462. doi:10.5194/essd-18-1405-2026. (89)

McKinley, G.A. (2026) Global carbon budget rebalanced. Nature doi:10.1038/d41586-025-03981-x. (88)

Parazoo, N. D. Carroll, J. B. Abshire, Y. M Bar-On, R. A. Birdsey, A. A. Bloom, K.W. Bowman, R. K. Braghiere, L. M. Bruhwiler, B. Byrne, A. Chatterjee, D. Crisp, L. Duncanson, A. F. Feldman, A. M. Fox, C. Frankenberg, B. A. Gay, F. Hopkins, F. M. Hoffman, J. R. Holmquist, L. R. Hutyra, M. Keller, C. D. Koven, J. L. Laughner, J. Liu, N.S. Lovenduski, N. Macbean, G.A. McKinley, G. McNicol, D. Menemenlis, A. M. Michalak, C. E. Miller, H. Nesser, T. Oda, E. M. Ordway, L. E. Ott, K. Paustian, Z. A. Pierrat, B. Poulter, S. C. Reed, D. S. Schimel, S. P. Serbin, S. S. Saatchi, H. Suto, L. Windham-Myers, D. Wunch (2025) A Scientific Community Vision for an Operational, Unified Greenhouse Gas Observing System to Support Earth System Science and Climate Intervention. AGU Advances 6(6) e2025AV001914, doi:10.1029/2025AV001914. (87) Editor's Highlight.

Fay, A.R., T.H. Heimdal, V. Acquaviva, A.P. Shaum and G.A. McKinley (2025) Sensitivity of ocean carbon sink estimates to rare observations, *Geophys. Res. Lett.* 52(19), doi:10.1029/2025GL117961. (86)

Heimdal, T.H.+, A.P. Shaum, V. Acquaviva, A.R. Fay*, D. Samant*, J. Busecke and G.A. McKinley (2025) Targeting bias in algorithm optimization improves reconstructions of surface ocean pCO_2, *Machine Learning: Earth* 1 015003, doi:10.1088/3049-4753/adddc3. (85)

Muller, J.D., N. Gruber, A. Schneuwly, D.C.E. Bakker, M. Gehlen, L. Gregor, J. Hauck, P. Landschützer and G.A. McKinley (2025) Unexpected decline of the ocean carbon sink under record-high sea surface temperatures in 2023, *Nature Climate Change* 15, 978–985 doi:10.1038/s41558-025-02380-41. (84)

Olivarez, H., N.S. Lovenduski, E. Maroon, A.R. Fay*, K.M. Krumhardt, M.N. Levy, K. Lindsay, G.A. McKinley, J.D. Muller, and J.K. Rader (2025) Internal climate variability modulates decadal changes in ocean anthropogenic carbon storage, *Environ. Res. Lett*. 20 014070, doi:10.1088/1748-9326/ada2ad. (83)

Fay, A.R.* D. Carroll, G.A. McKinley, D. Menemenlis, H. Zhang (2024) Scale-dependent drivers of air-sea CO_2 flux variability, *Geophys. Res. Lett.* 51, e2024GL11191, doi:10.1029/2024GL111911. (82)

Heimdal, T.H.+ and G.A. McKinley (2024) Using observing system simulation experiments to assess impacts of observational uncertainties in surface ocean pCO_2 machine learning reconstructions, *Scientific Report*s, doi:10.1038/s41598-024-70617-x. (81)

Fay, A.R.*, D.R. Munro, G.A. McKinley, D. Pierrot, S.C. Sutherland, C. Sweeney, and R. Wanninkhof (2024) Updated climatological mean delta fCO_2 and net sea–air CO_2 flux over the global open ocean regions, *Earth Sys. Sci. Data* 16*,* 2123–2139, doi:10.5194/essd-16-2123-2024. (80)

Heimdal, T.H.+, G.A. McKinley, A.J. Sutton, A.R. Fay*, and L. Gloege* (2024) Assessing improvements in global ocean pCO_2 machine learning reconstructions with Southern Ocean autonomous sampling, *Biogeosciences* 21, 2159–2176, doi:10.5194/bg-21-2159-2024. (79)

Guan Y., G.A. McKinley, A.R. Fay*, S.C. Doney, G. Keppel-Aleks (2024) Ocean-driven interannual variability in atmospheric CO_2 quantified using OCO-2 observations and atmospheric transport simulations, *Frontiers in Marine Science* 11, doi:/10.3389/fmars.2024.1272415. (78)

Olivarez, H., N.S. Lovenduski, Y. Eddebbar, A.R. Fay*, G.A. McKinley, M. Levy, and M. Long. How does the Pinatubo eruption influence our understanding of long-term changes in ocean biogeochemistry? (2024) *Geophys. Res. Lett.* 51, e2023GL10543, doi:10.1029/2023gl105431. (77)

Friedlingstein, P., M. O'Sullivan, M.W. Jones, R.M. Andrew, D. C. E. Bakker, Hauck, J., Landschützer, P., Le Quéré, C., Luijkx, I. T., Peters, G. P., Peters, W., Pongratz, J., Schwingshackl, C., Sitch, S., Canadell, J. G., Ciais, P., Jackson, R. B., Alin, S. R., Anthoni, P., Barbero, L., Bates, N. R., Becker, M., Bellouin, N., Decharme, B., Bopp, L., Brasika, I. B. M., Cadule, P., Chamberlain, M. A., Chandra, N., Chau, T.-T.-T., Chevallier, F., Chini, L. P., Cronin, M., Dou, X., Enyo, K., Evans, W., Falk, S., Feely, R. A., Feng, L., Ford, D. J., Gasser, T., Ghattas, J., Gkritzalis, T., Grassi, G., Gregor, L., Gruber, N., Gürses, Ö., Harris, I., Hefner, M., Heinke, J., Houghton, R. A., Hurtt, G. C., Iida, Y., Ilyina, T., Jacobson, A. R., Jain, A., Jarníková, T., Jersild, A., Jiang, F., Jin, Z., Joos, F., Kato, E., Keeling, R. F., Kennedy, D., Klein Goldewijk, K., Knauer, J., Korsbakken, J. I., Körtzinger, A., Lan, X., Lefèvre, N., Li, H., Liu, J., Liu, Z., Ma, L., Marland, G., Mayot, N., McGuire, P. C., G.A. McKinley, Meyer, G., Morgan, E. J., Munro, D. R., Nakaoka, S.-I., Niwa, Y., O'Brien, K. M., Olsen, A., Omar, A. M., Ono, T., Paulsen, M., Pierrot, D., Pocock, K., Poulter, B., Powis, C. M., Rehder, G., Resplandy, L., Robertson, E., Rödenbeck, C., Rosan, T. M., Schwinger, J., Séférian, R., Smallman, T. L., Smith, S. M., Sospedra-Alfonso, R., Sun, Q., Sutton, A. J., Sweeney, C., Takao, S., Tans, P. P., Tian, H., Tilbrook, B., Tsujino, H., Tubiello, F., van der Werf, G. R., van Ooijen, E., Wanninkhof, R., Watanabe, M., Wimart-Rousseau, C., Yang, D., Yang, X., Yuan, W., Yue, X., Zaehle, S., Zeng, J., and Zheng, B. (2023) Global Carbon Budget 2023, *Earth Sys. Sci. Data* 15*,* doi:10.5194/essd-15-5301-2023. (76)

McKinley, G.A., V.S. Bennington*[+], M. Meinshausen, and Z. Nicholls (2023) Modern air-sea flux distributions reduce uncertainty in the future ocean carbon sink, *Envi. Res. Lett,* doi:10.1088/1748-9326/acc195. (75)

Fay, A.R.*, G.A. McKinley, N. Lovenduski, Y. Eddebbar, M. Levy, M. Long, H. Olivarez and R. Rustagi* (2023) Immediate and long-lasting impacts of the Mt. Pinatubo eruption on ocean oxygen and carbon inventories, *Global Biogeochem. Cycles* 37(2), doi:10.1029/2022GB007513. (74)

Gruber, N., D.C.E. Bakker, T. DeVries, L. Gregor, J. Hauck, P. Landschützer, G.A. McKinley and J.D. Muller (2023) Recent trends and variability in the ocean carbon sink, *Nature Reviews Earth and Environment* 4, 119–134*,* doi:10.1038/s43017-022-00381-x. (73)

Wong, S.C.W.*, G.A. McKinley, and R. Seager (2022) Equatorial Pacific pCO_2 interannual variability in CMIP6 models, *JGR-Biogeoscience*, doi:10.1029/2022JG007243. (72)

Bennington, V.S.*[+], T. Galjanic*, and G.A. McKinley (2022) Explicit physical knowledge in machine learning for ocean carbon flux reconstruction: The pCO_2-Residual method, *J. Adv. Model. Earth Sys.,* e2021MS002960, doi:10.1029/2021MS002960. (71)

Bennington, V.S.*[+], L. Gloege*, and G.A. McKinley (2022) Variability in the global ocean carbon sink from 1959-2020 by correcting models with observations, *Geophys. Res. Lett.* e2022GL098632, doi:10.1029/2022GL098632. (70)

Olivarez, H., N.S. Lovenduski, R. Brady, A.R. Fay*, M. Gehlen, L. Gregor, P. Landschützer, G.A. McKinley, K. McKinnon, and D. Munro (2022) Replaying the tape of history: Synthetic large ensembles of sea-air CO_2 flux, *Global Biogeochem. Cycles,* 36, e2021GB007174, doi:10.1029/2021GB007174. (69)

Crisp, D., H. Dolman, T. Tanhua, G.A. McKinley, J. Hauck, A. Bastos, S. Sitch, S. Eggleston and V. Aich (2022) How well do we understand the land-ocean-atmosphere carbon cycle? *Rev. Geophysics*, 60, e2021RG000736. doi:10.1029/2021RG000736. (68)

Gloege, L.*, M. Yan*, T. Zheng and G.A. McKinley (2022) Improved quantification of ocean carbon uptake by using machine learning to merge global models and pCO_2 data, *J. Adv. Model. Earth Sys.*, 14, e2021MS002620. doi: 10.1029/2021MS002620. (67)

Laughner, J.L, J.L. Neu, D. Schimel, P.O. Wennberg, K. Barsanti, K. Bowman, A. Chatterjeee, B. Croes, H. Fitzmaurice, D. Henze, J. Kim, E.A. Kort, Z. Liu, K. Miyazaki, A.J. Turner, S. Anenberg, J. Avise, H. Cao, D. Crisp, J. de Gouw, A. Eldering, J.C. Fyfe, D.L. Goldberg, K.R. Gurney, S. Hasheminassa, F. Hopkins, C. E. Ivey, D.B.A. Jones, J. Liu, N.S. Lovenduski, R.V. Martin, G.A. McKinley, L. Ott, B. Poulter, M. Rua, S.P. Sander, N. Swart, Y.L. Yung, Z-C Zeng, and the rest of the Keck Institute for Space Studies "COVID-19: Identifying Unique Opportunities for Earth System Science" study team (2021) Societal shifts due to COVID-19 reveal large-scale complexities and feedbacks between atmospheric chemistry and climate change*, PNAS,* doi:10.1073/pnas.2109481118. (66)

Fay, A.R.*, L. Gregor, P. Landschützer, G.A. McKinley, N. Gruber, M. Gehlen, Y. Iida, G.G. Laurelle, C. Rödenbeck, A. Roobaert and J. Zeng (2021) SeaFlux: Harmonization of global surface ocean pCO_2 mapped products and flux calculations for an improved estimate of the ocean carbon sink, *Earth Sys. Sci. Data,* doi:10.5194/essd-13-4693-2021. (65)

Fay, A.R.*, and G.A. McKinley (2021) Observed regional fluxes to constrain modeled estimates of the ocean carbon sink, *Geophys. Res. Lett.,* doi:10.1029/2021GL095325. (64)

Ridge, S.M.*, and G.A. McKinley (2021) Ocean carbon uptake under aggressive emission mitigation, *Biogeosciences.* doi:10.5194/bg-18-2711-2021. (63)

Gloege, L.*, G.A. McKinley, P. Landschützer, N.S. Lovenduski, K.B. Rodgers, A. Fay*, T. Frölicher, J.C. Fyfe, T. Illyina, S.D. Jones, C. Rödenbeck, S. Schlunegger and Y. Takano (2021) Quantifying errors in observationally-based estimates of ocean carbon sink variability*, Global Biogeochem. Cycles,* 10.1029/2020GB006788. (62)

Lovenduski, N.S., N.C. Swart, A.J. Sutton, J.C. Fyfe, G.A. McKinley, C. Sabine and N.L. Williams (2021) The ocean carbon response to COVID-related emissions reductions, *Geophys. Res. Lett.,* 10.1029/2020GL092263. (61)

Stamell, J.*, R.R. Rustagi**, L. Gloege*, and G.A. McKinley (2020) Strengths and weaknesses of three Machine Learning methods for pCO_2 interpolation, *Geoscientific Model Development Discuss.* doi: 10.5194/gmd-2020-311. (60)

Diffenbaugh, N.S., C.B. Field, E. Appel, I. Azevedo, D. Baldocchi, M. Burke, J. Burney, P. Ciais, S.J. Davis, A.M. Fiore, S. Fletcher, T. Hertel, D.E. Horton, S. Hsiang, R.B. Jackson, X. Jin, M. Levi, D. Lobell, G.A. McKinley, F.C. Moore, A. Montgomery, K.C. Nadeau, D. Pataki, J.T. Randerson, M. Reichstein, J.L. Schnell, S.I. Seneviratne, D. Singh, A. Steiner and G. Wong-Parodi (2020) The COVID-19 Lockdowns: A Window into the Earth System, *Nature Reviews Earth & Environment,* doi:10.1038/s43017-020-0079-1. (59)

Ridge, S.M.* and G.A. McKinley (2020) Advective controls on the North Atlantic anthropogenic carbon sink, *Global Biogeochem. Cycles,* doi:10.1029/2019GB006457. (58)

McKinley, G.A., A.R. Fay*, Y. Eddebbar, L. Gloege* and N.S. Lovenduski (2020) Forced mechanisms explain recent variability of the ocean carbon sink, *AGU Advances,* doi: 10.1029/2019AV000149. (57)

Gloege, L.*, G.A. McKinley, R. Mooney, J.D. Allan, M. Diebel and P. McIntyre (2020) Lake hydrodynamics intensify the potential impact of watershed pollutants on coastal ecosystem service, *ERL,* doi:10.1088/1748-9326/ab7f62. (56)

Uchida, T., D. Balwada, R. Abernathey, G.A. McKinley, S. Smith & M. Levy (2020) Eddy iron fluxes control primary production in the open Southern Ocean*, Nature Communications,* doi:10.1038/s41467-020-14955-0. (55)

Uchida, T., D. Balwada, R. Abernathey, G.A. McKinley, S. Smith and M. Levy (2019) The contribution of submesoscale over mesoscale eddy iron transport in the open Southern Ocean, *J. Adv. Model. Earth Sys.,* doi:10.1029/2019MS001805. (54)

Chen, H.*, and G.A. McKinley (2019) Isopycnal processes allow for summertime net heterotrophy despite net oxygen accumulation in the lower euphotic zone of the North Atlantic subtropical gyre, *Global Biogeochem. Cycles,* doi: 10.1029/2018GB006094. (53)

McKinley, G.A., A.L. Ritzer*, and N.S. Lovenduski (2018) Mechanisms of northern North Atlantic biomass variability, *Biogeosciences* 15, 6049-6066, doi:10.5194/bg-15-6049-2018. (52)

Fay, A.R.*, N.S. Lovenduski, G.A. McKinley, D.R. Munro, C. Sweeney, A.R. Gray, P. Landschützer, B. Stephens, T. Takahashi, N. Williams (2018) Utilizing the Drake Passage Time-series to understand variability and change in subpolar Southern Ocean pCO_2, *Biogeosciences,* 15, 3841-3855, doi:10.5194/bg-15-3841-2018. (51)

Muller-Karger, Frank, E. Hestir, C. Ade, K. Turpie, D. Roberts, D. Siegel, R. Miller, D. Humm, N. Izenberg, M. Keller, F. Morgan, R. Frouin, A. Dekker, R. Gardner, J. Goodman, B. Schaeffer, B. Franz, N. Pahlevan, A. Mannino, J. Concha, S. Ackleson, K. Cavanaugh, A. Romanou, M. Tzortziou, E. Boss, R. Pavlick, A. Freeman, C. Rousseaux, J. Dunne, M. Long, E. Klein, G.A. McKinley, R. Letelier, M. Kavanaugh, M. Roffer, J. Goes, A. Bracher, K. Arrigo, H. Dierssen,X. Zhang, F. Davis, B. Best, R. Guralnick, J. Moisan, H. Sosik, R. Kudela, C. Mouw, A. Barnard, S. Palacios, C. Roesler, E. Drakou, W. Appeltans (2018) Satellite Sensor Requirements for Monitoring Essential Biodiversity Variables of Coastal Ecosystems. *Ecological Applications, 18, doi:* 10.1002/eap.1682. (50)

Peters, G.P., C. LeQuere, R.M. Andrew, J.G. Canadell, P. Friedlingstein, T. Ilyina, R.B. Jackson, F. Joos, J.I. Korsbakken, G.A. McKinley, S. Sitch, and P. Tans (2017) Towards real-time verification of CO_2 emissions, *Nature Climate Change, doi:* 10.1038/s41558-017-0013-9. (49)

Golub, M., A.R. Desai, G.A. McKinley, C.K. Remucal, and E.H. Stanley (2017) Large uncertainty in estimating pCO_2 from carbonate equilibria in lakes, *J. Geophys. Res.- Biogeosci., 122* doi:10.1002/2017JG003794. (48)

Pilcher, D.J.*, G.A. McKinley, J. Kralj**, H.A. Bootsma and E.D. Reavie (2017) Modeled sensitivity of Lake Michigan productivity and zooplankton to changing nutrient concentrations and quagga mussels, *J. Geophys. Res. Biogeosci., 122, 2017–2032,* doi:10.1002/2017JG003818. (47)

Gloege, L.*, G.A. McKinley, Mouw, C.B.+ and A. Ciochetto (2017) Global evaluation of particulate organic carbon flux parameterizations*, Global Biogeochem. Cycles,* 31, 1192–1215*,* doi:10.1002/2016GB005535. (46)

Orr, J. C., Najjar, R. G., Aumont, O., Bopp, L., Bullister, J. L., Danabasoglu, G., Doney, S. C., Dunne, J. P., Dutay, J.-C., Graven, H., Griffies, S. M., John, J. G., Joos, F., Levin, I., Lindsay, K., Matear, R. J., McKinley, G. A., Mouchet, A., Oschlies, A., Romanou, A., Schlitzer, R., Tagliabue, A., Tanhua, T., and Yool, A. (2017) Biogeochemical protocols and diagnostics for the CMIP6 Ocean Model Intercomparison Project (OMIP), *Geosci. Model Dev*., 10, 2169-2199, doi:10.5194/gmd-10-2169-2017. (45)

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Mouw, C.B.+, A. Barnett, G.A. McKinley, L. Gloege* and D.J. Pilcher* (2016) Phytoplankton size impact on export flux in the global ocean, *Global Biogeochem. Cycles,* 30, doi:10.1002/2015GB005355. (42)

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McKinley, G.A., D.J. Pilcher*, A.R. Fay*, K. Lindsay, M.C. Long, and N. Lovenduski (2016) Timescales for detection of trends in the ocean carbon sink, *Nature,* 530, 469–472, doi:10.1038/nature16958. (39)

Breeden, M.** and G.A. McKinley (2016) Climate impacts on multidecadal pCO_2 variability in the North Atlantic: 1948-2009, *Biogeosciences,* 13, 3387-3396, doi:10.5194/bg-13-3387-2016. (38)

McKinley, G.A., C.A. Carlson, A. Andrews, D. Brown, P. Romero-Lankao, and G. Shrestha (2015) Managing the carbon cycle requires strong science, *Eos,* 96, doi:10.1029/2015EO040161. (37)

Dave, A., A.D. Barton, M.S. Lozier, G.A. McKinley (2015) What drives seasonal change in oligotrophic area in the subtropical North Atlantic? *J. Geophys. Res,* doi: 10.1002/2015JC010787. (36)

Phillips, J.*, G.A. McKinley, V. Bennington*+, H. Bootsma, D. Pilcher*, R.W. Sterner, N.R. Urban (2015) Evaluating the potential for CO_2-induced acidification of the Laurentian Great Lakes, *Oceanography 28(2),* 136–145. doi:10.5670/oceanog.2015.37. (35)

Lovenduski, N., A.R. Fay*, G.A. McKinley (2015) Observing multi-decadal trends in Southern Ocean CO_2 uptake: What can we learn from an ocean model? *Global Biogeochem. Cycles,* doi: 10.1002/2014GB004933. (34)

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Kitchell, J.F., T. Cline, V. Bennington*+ and G.A. McKinley (2015) Challenges of managing invasive sea lamprey in Lake Superior. In Bioeconomics of Invasive Species: Integrating Ecology, Economics, Policy and Management. ed: R. P. Keller, D. M. Lodge, M. A. Lewis, J. F. Shogren, University of Chicago Press. (32)

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PUBLICATIONS IN REVIEW

Moseley, L.A.*, G.A. McKinley, A. Nguyen, D. Carroll, D. Menemenlis. The ASTE-BGC Data-Assimilative Regional Ocean Biogeochemical Model, *JAMES, in review.*

Heimdal, T.H.$^{+}$, G.A. McKinley, A.P. Shaum, V. Acquaviva, A.R. Fay* and A.J. Sutton. Quantifying errors in ocean carbon reconstructions in the context of marine carbon dioxide removal (mCDR), *Earth's Future, in review.*

Friedlingstein, P., M. O'Sullivan, M.W. Jones, R.M. Andrew, D. C. E. Bakker, ... G.A. McKinley... et al. Global Carbon Budget 2025, *Earth Sys. Sci. Data*, *in review*

Heimdal, T.H., A.R. Fay A.P. Shaum, V. Acquaviva, V. Bennington, A.E. Sharples, N.M. Joenson and G.A. McKinley. An update of the LDEO fCO2-Residual method: algorithmic choices improve ocean carbon sink, *Machine Learning: Earth, in review.* Preprint

Lamarque, J.F., P. Friedlingstein, B. Osias, S. Strongin, V. Balaji, K.W. Bowman, J.G. Canadell, P. Ciais, H. Cullen, K.J. Davis, S.C. Doney, K.R. Gurney, A.R. Karspeck, C.D. Koven, G.A. McKinley, G.P. Peters, J. Pongratz, B. Stephen and C. Sweeney. Improved comparability and system-Wide verification to support a scalable carbon credit market. *Earth System Dynamics, in review.* Preprint

GALEN A. MCKINLEY

PUBLICATIONS IN PREPARATION

McKinley, G.A., A.R. Fay*, A.P. Shaum*, L.A. Moseley, Heimdal, T.H.$^{+}$, and V. Aquaviva. Uncertainty in surface ocean pCO_2 at the scale of mCDR, *ERL in prep.*

Bian, Ce, G.A. McKinley, P. Brown, and E. McDonaugh, Future strengthening of northward anthropogenic carbon transport despite AMOC weakening, *JGR-Oceans in prep*.

Wong, S.C.W.*, G.A. McKinley, R. Seager, and T. Jacobson, 60 years of global air-sea CO_2 flux variability, *Biogeosciences, in prep.*

Fay, A.R.*, D. Carroll and G.A. McKinley. The resilience of the ocean CO_2 sink to SSP scenarios *in prep for Biogeosciences.*

Shaum, A.P.* and G.A. McKinley. Explainable machine learning to enhance model assessments with sparse data, *in prep.*

Fay, A.R.*, Y. Eddebbar and G.A. McKinley. Quantifying the impact of Mt Pinatubo on upper ocean oxygen trends, *in prep.*

Moseley, L.A.*, G.A. McKinley, D. Atamanchuk, J. Koelling, D.W.R. Wallace, Examining an oxygen budget of the central Labrador Sea. *in prep.*

SCIENTIFIC PLANNING AND REVIEW DOCUMENTS

Sabine, C., Robinson, C., Isensee, K., Bastian, L., Batten, S., Bellerby, R., Blasiak., R., Laarissa, S., Lira Loarca, A., McGeachy, C., G.A. McKinley Melbourne Thomas, J., Ortega Cisneros, K., Qiao, F., Samanta, D., Sanders, R. & Sarma, V. V. S. S. (2024*). Ocean Decade Vision 2030 White Papers – Challenge 5: Unlock Ocean-Based Solutions to Climate Change*. Paris, UNESCO-IOC. (The Ocean Decade Series, 51.5.). https://doi.org/10.25607/kbtq-nm78.

Aricò, S., Arrieta, J. M., Bakker, D. C. E., Boyd, P. W., Cotrim da Cunha, L., Chai, F., Dai, M., Gruber, N., Isensee, K., Ishii, M., Jiao, N., Lauvset, S. K., G.A. McKinley, Monteiro, P., Robinson, C., Sabine, C., Sanders, R., Schoo, K. L., Schuster, U., Shutler, J. D., Thomas, H., Wanninkhof, R., Watson, A. J., Bopp, L., Boss, E., Bracco, A., Cai, W., Fay, A., Feely, R. A., Gregor, L., Hauck, J., Heinze, C., Henson, S., Hwang, J., Post, J., Suntharalingam, P., Telszewski, M., Tilbrook, B., Valsala, V. and Rojas Aldana, A. (2021) Integrated Ocean Carbon Research: A Summary of Ocean Carbon Research, and Vision of Coordinated Ocean Carbon Research and Observations for the Next Decade. R. Wanninkhof, C. Sabine and S. Aricò (eds.). Paris, UNESCO. 46 pp. (IOC Technical Series, 158.) doi:10.25607/h0gj-pq41.

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Michalak, A.M., R.B. Jackson, G. Marland, C. Sabine and The Carbon Cycle Working Group: R.F. Anderson, D. Bronk, K.J. Davis, R.S. Defries, A. S. Denning, L. Dilling, A. Jacobson, S. Lohrenz, A.D. McGuire, G.A. McKinley, C. Miller, B. Moore III, D.S. Ojima, B. O'Neill, J.T. Randerson, S.W. Running, B. Sohngen, P.P. Tans, P.E. Thorton, S.C. Wofsy, N. Zeng (2011) A U.S. Carbon Cycle Science Plan, a UCAR report.

Alin S.R., J. Day, G.A. McKinley, C. Stow, M. Baker, E. Brody, R. Bohne, T. Nalepa, T. Heatlie, A.J. Sutton, and R.A. Feely (2010) Great Lakes Region Acidification Research Plan—NOAA Ocean Acidification Steering Committee: NOAA Ocean and Great Lakes Acidification Research Plan, NOAA Special Report, 143 pp.

OTHER PUBLICATIONS AND PRODUCTS

Acquaviva, V., E.A. Barnes, D.J. Gagne II, G.A. McKinley, and S. Thais (2024) Ethics in climate AI: From theory to practice. PLOS Clim 3(8): e0000465. doi:10.1371/journal.pclm.0000465.

Carroll, D., D. Menemenlis, Z. Hong, M. Mazloff, G.A. McKinley, A.R. Fay*, S. Dutkiewicz, J. Lauderdale and I. Fenty (2024). Evaluation of the ECCO-Darwin Ocean Biogeochemistry State Estimate vs. In-situ Observations (ver 1.0). *Zenodo.* doi:10.5281/zenodo.10627664.

Levy, M., Y. A. Eddebbar, A. R. Fay*, M. C. Long, N. S. Lovenduski, G.A. McKinley, H. C. Olivarez, and R. R. Rustagi* (2023) CESM Large Ensemble with Different Pinatubo Forcings. Research Data Archive at the National Center for Atmospheric Research, Computational and Information Systems Laboratory. https://doi.org/10.5065/VRD4-7X93.

Crisp, D., H. Dolman, T. Tanhua, G.A. McKinley, J. Hauck, A. Bastos, S. Sitch, S. Eggleston and V. Aich (2022) Mysteries of the global carbon cycle, *Eos, 103,* doi:10.1029/2022EO225018.

Mouw, C.B.[+] A. Barnett, G.A. McKinley, L. Gloege* and D.J. Pilcher* (2016) Global Ocean Particulate Organic Carbon flux merged with satellite parameters. *PANGEA*. doi:10.1594/PANGAEA.855600.

Ocean Carbon and Biogeochemistry Program (2015) Temporal and Spatial Perspectives on the Fate of Anthropogenic Carbon: A Carbon Cycle Slide Deck for Broad Audiences with explanatory notes. Contributors: S. Khatiwala, T. DeVries, J. Cook, G.A. McKinley, C. Carlson and H. Benway. doi:10.1575/1912/7670.

Bracco, A., M.C. Long, N.M. Levine, R.Q. Thomas, C. Deutsch and G.A. McKinley (2015) NCAR's Summer Colloquium: Capacity Building in Cross-Disciplinary Research of Earth System Carbon–Climate Connections. *Bull. Amer. Meteor. Soc.*, **96**, 1381–1384. doi:10.1175/BAMS-D-13-00246.1.

Fay, A.R.* and G.A. McKinley (2014) Global Ocean Biomes: Mean and time-varying maps. *PANGEA.* doi:10.1594/PANGAEA.828650.

Thomas, R.Q., G.A. McKinley, and M.C. Long (2013) Examining uncertainties in representations of the carbon cycle in Earth System Models. *EOS* 94:460.

Mooney, M.E., S. Ackerman, S., G.A. McKinley, T. Whittaker and T. Jasmin (2012) Lesson plans and classroom activities from the Climate Literacy Ambassadors community. *The Earth Scientist* 28, 30-32.

McKinley, G.A., N. Urban, V. Bennington*[+], D. Pilcher* and C. McDonald (2011) Preliminary carbon budgets for the Laurentian Great Lakes, *OCB News,* Spring/Summer 2011.

McKinley, G. A. (2008), Fixing Climate: What Past Climate Changes Reveal About the Current Threat—And How to Counter It (*Book review*), *Eos Trans. AGU*, 89(43), 422–422, doi:10.1029/2008EO430009.

PROFESSIONAL SERVICE

2025 to present	**International Ocean Carbon Coordination Project, IOCCP** Scientific Steering Group (SSG) member
2025 to present	**Marine Carbon Dioxide Removal (mCDR) Standing Committee, NASEM** Member
2024 to present	**Science Advisory Committee on Great Lakes Ocean Acidification, Michigan Tech** Member
2022 to present	**Ocean Studies Board, National Academies of Sciences, Engineering, and Medicine** Member
2022 to present	**Climate and Global Dynamics Advisory Panel, National Center for Atmospheric Research** Member
2022 to present	**US National Committee for the UN Decade of Ocean Sciences for Sustainable Development** Member
2019 to present	**Annual Reviews of Earth and Planetary Science, Editorial Board** Member
2022 to 2025	**Climate Security Roundtable, National Academies of Sciences, Engineering, and Medicine** Member
December 2024	**AGU 2024,** Washington DC Co-convener and chair: "The Global Carbon Cycle and Its Feedbacks with Anthropogenic Change"
November 2024	**Senate of Canada Standing Committee on Fisheries and Oceans** Individual testimony on ocean carbon
July 2024	**International Conference on Machine Learning,** Vienna Austria ML4ESM @ ICML Program Committee
2021 to 2024	**PICES/ICES, Working Group 46, Ocean Negative Carbon Emissions** Member
October 2023	**World Climate Research Program Open Science Conference,** Kigali Rwanda Session convener, S13 Global Carbon Cycle
2020 to 2022	**The Oceanography Society** Chemical Oceanography Councilor
2020 to 2022	**Ocean Carbon and Biogeochemistry program, Working Group on Ocean Carbon Gaps** Chair
2019 to 2022	**Defense Science Study Group Alumni Outreach Committee** Committee of 10 recent DSSG alumni; tasked by IDA to advise on alumni engagement
March 2022	**AGU/ASLO/TOS Ocean Sciences 2022,** virtual Co-convener and chair: "Quantifying the Ocean Carbon Sink"
December 2021	**North Atlantic Biogeochemical Carbon Pump**, virtual Invited participant and plenary speaker
April 2020	**ECCO Review Panel, NASA,** Washington DC Member
February 2020	**AGU/ASLO/TOS Ocean Sciences 2020,** San Diego CA Co-convener and chair: "The Evolving Ocean Carbon Sink: Processes and Impacts "
October 2019	**Expert Workshop on Integrated Ocean Carbon Research (IOCR),** Paris, France Invited participant and speaker
October 2019	**CMIP6 Hackathon**, Boulder CO / Palisades NY / Seattle WA / ETH Zürich Co-organizer of OCB and CLIVAR sponsored hackathon
September 2019	**Vetlesen Prize Selection Committee** Awarded bi-annually for distinction in earth science research
2018 to 2019	**GO SHIP Program Review Committee** Committee of 6; tasked by OCB and US CLIVAR to review the repeat hydrography program
2017 to 2019	**AGU Chapman Conference**, La Jolla CA Program committee for conference: "Understanding carbon climate feedbacks", August 2019
December 2018	**American Geophysical Union Fall Meeting**, Washington DC Co-convener and chair: "Understanding changing ocean biogeochemistry"
December 2018	**Ocean carbon uptake in CMIP6 models**, Washington DC Co-organizer of OCB-sponsored workshop

2014 to 2018	**Global Carbon Project Scientific Steering Committee** (GCP-SSC) The GCP coordinates international carbon cycle activities under Future Earth.
June 2018	**The effects of climate change on the world's oceans,** Washington DC Co-convener and chair: "Carbon uptake, ocean acidification, and ecosystem and human impacts"
February 2018	**AGU/ASLO/TOS Ocean Sciences 2018,** Portland OR Co-convener and chair: "The ocean carbon cycle across timescales"
2016 to 2018	**MPOWIR mentor** Co-lead of monthly mentoring teleconferences with 10 junior women in physical oceanography
2014 to 2017	**Ocean Model Intercomparison Project Scientific Steering Committee** (OMIP6-SSC) This is the 6th round of ocean model intercomparison under the CMIP6 umbrella.
2015 to 2017	**NASA Ocean Biology and Biogeochemistry Pre-Decadal Survey / Advanced Plan Review Team** Reviewed community-proposed input to the NASA Decadal Survey for the OBB program
2016 to 2017	**Great Lakes Advisory Board Science and Information Subcommittee** Appointed by the EPA administrator to advise the Great Lakes Interagency Task Force
2015 to 2017	**CONCORDE Scientific Advisory Panel** CONCORDE was a GoMRI-funded group pursuing science needs identified with Deepwater Horizon.
January 2017	**Panelist, NOAA Climate Program Office, Ocean Observing & Monitoring,** Washington DC Review panelist for OOM program
2011 to 2016	**Carbon Cycle Science Scientific Steering Group** (CCSSG) CCSSG discusses science with the US Carbon Cycle Interagency Working Group (CCIWG)
2008 to 2016	**North American Carbon Program / Ocean Carbon and Biogeochemistry Coastal CARbon Synthesis,** Leader**:** Great Lakes Working Group; Co-author of final CCARS Science Plan
February 2016	**AGU/ASLO/TOS Ocean Sciences 2016,** New Orleans, LA Co-convener: "How do the carbon pumps pump? Mechanisms of the solubility and biological pumps"
2012 to 2015	**US CLIVAR - OCB Working Group** Oceanic carbon uptake in the CMIP5 models, Core Member
2011 to 2014	**Global Biogeochemical Cycles** Associate Editor
November 2014	**External evaluator, Helmholtz Center Geesthacht,** Germany Evaluation of candidates for director
April 2014	**Planning Workshop: Int'l Research on the Coupled N. Atlantic-Arctic System,** Washington DC Invited participant
February 2014	**AGU/ASLO/TOS Ocean Sciences 2014,** Honolulu, HI Co-convener and session chair: "Mechanisms of biogeochemical variability in the global oceans"
2012 to 2013	**Defense Science Study Group** (DSSG), Institute for Defense Analysis (IDA) Selected from 150+ nominees to join a group of 15 for study of STEM needs in national security.
2012 to 2013	**NCAR ASP Colloquium, Summer 2013** Co-organizer and lecturer for workshop on "Carbon Climate Connections in the Earth System"
2012 to 2013	**External Review Committee for US CLIVAR AMOC program** Attendance and interviews at annual meeting, survey of AMOC PI community, report preparation
2010 to 2013	**REgional Carbon Cycle Assessment and Processes** (RECCAP) Co-lead: Arctic and Atlantic; co-author: Global Carbon Storage and Global Air-Sea Flux
2008 to 2011	**Carbon Cycle Science Working Group** (CCS-WG) The CCS-WG wrote the New US Carbon Cycle Science Plan (2012)
October 2011	**Patullo Conference**, MPOWIR, Warrenton, VA Senior participant; Meeting goal is to promote retention of women in physical oceanography
December 2010	**NACP/OCB Coastal Carbon Synthesis Workshop**, San Francisco, CA Co-organizer and speaker
March 2010	**Caltech Keck Institute for Space Studies (KISS)**, Pasadena, CA Invited participant in study program "Quantifying the Sources and Sinks of Atmospheric CO_2"
February 2010	**AGU/ASLO/TOS Ocean Sciences 2010,** Portland, OR Co-convener and session chair: "Carbon Cycling in the Coastal Oceans"
May 2009	**International Association of Great Lakes Research Annual Meeting**, Toldeo, OH Co-convener and session chair: "Carbon Cycling in the Laurentian Great Lakes"
2005 to 2008	**Ocean Carbon and Biogeochemistry Scientific Steering Committee** (OCB-SSC) Committee member, tasked to advise NSF, NASA and NOAA on research directions

2005 to 2008	**Earth Science Women's Network** (ESWN) Leadership Board member
December 2008	**American Geophysical Union Fall Meeting**, San Francisco, CA Co-convener and session chair: "Ocean Carbon Cycle: Decadal Trends"
July 2007	**Ocean Carbon and Biogeochemistry Summer Workshop**, Woods Hole, MA Co-organizer and session chair for "Changing ocean biogeochemistry: The prediction challenge"
April 2005	**External Review Committee for JISAO at NOAA-University of Washington,** Seattle, WA
September 2005	**North American Coastal Margins: The Coastal CO_2 Workshop**, Boulder, CO
June 2004	**NOAA GCC Workshop: Understanding North Pacific Carbon-cycle Changes**, Seattle WA
June 2004	**UCAR/NCAR Junior Faculty Forum on Future Scientific Directions,** Boulder, CO
December 2003	**American Geophysical Union Fall Meeting**, San Francisco, CA Co-convener and session chair for Union session: "Health, Air Pollution and Climate"

2002 to present **Reviewer**

Assessment Reports: National Academy review of SOCCR2 (2018), IPCC SROCC (2018), BAMS State of the Climate (2020-2024)

Conferences: International Conference on Machine Learning (ICML)

Papers and books: AGU Books, Annual Reviews (Marine Science, Earth and Planetary), BAMS, BG/BGD, Cambridge U. Press, DSR, Ecology Lett, ESD/ESDD, EST, EI, EOS, Frontiers, GBC, GMD/GMDD, GRL, Inland Waters, JAMES, JES, JGR, L&O, Nature, Nature Climate Change, Nature Geoscience, Ocean Dynamics, Oceanography, OS/OSD, PNAS, Prog. Oceanog., Princeton U. Press, Science, Springer, Tellus B, U. Chicago Press

Proposals: NASA (Carbon Cycle, MAP, OBB), NOAA, NSF (CO, DEB, OTIC, PO), ArcticNet, Leaders Opportunity Fund (Quebec), Ocean Frontier Institute (CA), NERC (UK), NSERC (Canada), SeaGrant (WI, HI, OH), SCOR (International), Marsten Fund (NZ), U. Michigan Water Center

Proposal Panels: NASA (2004, 2011, 2013, 2021); NSF (2008; 2017; 2025; 2025); NOAA (2021, 2025)

PROFESSIONAL DEVELOPMENT

November 2004	**UW System Women & Science, Workshop for STEM Faculty**, Wisconsin Dells, WI
March 2003	**Dissertations Initiative for the Advancement of Climate Change Research,** Guanica, PR
May 2002	**Carbon Cycle Data Assimilation Institute**, Boulder, CO
June 2001	**American Meteorological Society Summer Policy Colloquium**, Washington, DC
January 1999	**JGOFS Training Course on Biogeochemical Modeling of the Ocean**, Bangalore, India

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AWARDS AND HONORS

2025	Frontiers in Ocean Sciences Symposium, National Science Foundation (NSF), Invited speaker
2024	Dissertations Symposium in Chemical Oceanography (DISCO), Keynote Speaker
2024	Senior Fellow, Collegium Helveticum (ETH-Zürich and University of Zürich)
2023	Leadership Award, LEAP Science and Technology Center
2020	Ocean Sciences Voyager Award, American Geophysical Union
2019	ATOC Distinguished Lecturer, University of Colorado Boulder
2016	Kavli Fellow / National Academy of Sciences
2012 to 2013	Defense Science Study Group
2011	Class of 1955 Distinguished Teaching Award, University of Wisconsin - Madison
2008 to 2011	NASA New Investigator
2010	Faculty teaching award from UW-Madison AOS Graduate Student Association
2003 to 2004	Anna Julia Cooper Postdoctoral Fellow, University of Wisconsin – Madison
1999 to 2002	NASA Earth System Science Fellowship
1999	Teaching Assistant Prize, MIT Department of Earth, Atmospheric and Planetary Sciences

PROFESSIONAL MEMBERSHIPS

American Association for the Advancement of Science (2020-present)
American Geophysical Union (1998-present)
Earth Science Women's Network (2003-present)
European Geophysical Union (2021-present)
The Oceanography Society (2008-present)

SERVICE at COLUMBIA UNIVERSITY

2025 to present	**Graduate Admissions Committee, Chair,** Earth and Environmental Sciences
2025 to present	**Graduate Program Review Committee, Chair,** Earth and Environmental Sciences
2024 to present	**Faculty Search Committees,** Earth and Environmental Sciences
2024 to 2025	**Curriculum Committee,** Earth and Environmental Sciences
2018 to 2023	**Diversity Committee,** Earth and Environmental Sciences, Chair 2019-2022
2022 to 2023	**Casa Muraro Vision Committee**, Arts and Sciences
2022	**Carbon Cycle & Decarbonization Implementation Team**, LDEO
2020 to 2022	**STEM DEI Committee**, Arts and Sciences
2020	**Diversity, Equity and Inclusion Task Force,** Lamont-Doherty Earth Observatory
2020	**Vision Committee,** Lamont-Doherty Earth Observatory
2018 to 2020	**Graduate Admissions Committee,** Earth and Environmental Sciences
2017	**RISE Competition,** reviewer

SERVICE at UNIVERSITY OF WISCONSIN - MADISON

2015 to 2017	**Physical Sciences Divisional Committee,** Campus-level faculty tenure review committee
2013 to 2017	**Curriculum Committee chair,** AOS
2011 to 2017	**Women Faculty Mentoring Program Advisory Committee**
2015 to 2016	**Ad-hoc Committee on Post-Tenure Review**, Campus-level faculty committee
2013 to 2016	**Curriculum Committee,** College of Letters & Science
2010 to 2015	**Co-chair for Undergraduate Education**, AOS
2013 to 2015	**Major in Environmental Science, L&S Faculty Advisor, and Executive Committee**
2013 to 2014	**Center for Climatic Research Science Council**
2013 to 2014	**Ad-hoc Committee on Fossil Fuel Use and Climate Change**, Campus-level committee
2011 to 2012	**Nelson Institute Director Search and Screen Committee**
2004 to 2017	**Curriculum, Strategic Planning, Budget, Faculty Recruitment, Computing, Qualifying Exam, Award, Graduate Recruitment Committees**, AOS

SELECTED PRESENTATIONS

February 2026 **AGU/ASLO/TOS Ocean Sciences 2026,** Glasgow, Scotland
Poster, "Quantifying the ocean carbon sink by combining models, observations, machine learning"
Oral, "Future strengthening of N. Atlantic anthropogenic carbon transport despite AMOC weakening"

November 2025 **Fowler Climate Seminar, Woods Hole Oceanographic Institution**, Woods Hole MA
Invited speaker "Estimating ocean carbon uptake: Global integrals to mCDR additionality"

June 2025 **NSF Frontiers in Ocean Science Symposium,** virtual
Invited speaker for Oceans and Climate theme

May 2025 **ECCO Summer School,** Pacific Grove CA
Invited plenary, "Ocean carbon and biogeochemistry"

May 2025 **Yale Center for Natural Carbon Capture, AI for NCC Symposium,** New Haven CT
Invited plenary, "Supporting ocean carbon MRV with sparse data and machine learning"

April 2025 **GALCIT, Caltech,** Los Angeles CA
Invited Colloquium, "The ocean carbon sink: From global budgets to mCDR additionality"

April 2025 **NASA Jet Propulsion Laboratory,** Los Angeles CA
Carbon Club, "The ocean carbon sink: From global budgets to mCDR additionality"

December 2024 **American Geophysical Union 2024,** Washington DC
Oral, "Uncertainty in the ocean carbon sink at the scales of mCDR"

November 2024 **Lamont-Doherty Earth Observatory Symposium: Life & Earth**, Palisades, NY
Invited plenary, "The ocean carbon sink: Magnitudes, mechanisms, and future change"

October 2024 **Dissertations Symposium in Chemical Oceanography (DISCO) XXIX**, Lihue HI
Keynote, "A career in chemical oceanography and climate"

September 2024 **CLIVAR Phenomena, Observations, and Synthesis panel**, virtual
Invited presentation to the panel, "Quantification of the ocean carbon sink"

September 2024 **JPL/CalTech Carbon Stocks Workshop**, Pasadena, CA
Invited plenary, "The Ocean Carbon Sink"

June 2024 **NASEM Decadal Survey of Ocean Sciences panel**, virtual
Invited presentation to the panel, "Quantifying the ocean carbon cycle"

April 2024 **European Geophysical Union 2024 General Assembly**, Vienna, Austria
Oral, "Drivers of ocean carbon sink variability across spatial scales"

April 2024 **University of Bern,** Bern, Switzerland
Invited colloquium, "Improved ocean carbon sink estimates by combining models and data"

March 2024 **Collegium Helveticum,** Zürich, Switzerland
Talk and panel discussion, "Can we be smarter than the phytoplankton? Thoughts on the global climate and sustainability"

February 2024 **ETH-Zürich, Institute for Atmospheric and Climate Science,** Zürich, Switzerland
Invited colloquium, "Improved ocean carbon sink estimates by combining models and data"

February 2024 **Max Planck Institute for Meteorology,** Hamburg, Germany
Invited colloquium, "Improved ocean carbon sink estimates by combining models and data"

January 2024 **GEOMAR**, Kiel, Germany
Seminar, "All Hands on Deck! Improved ocean carbon sink estimates by combining models and data"

November 2023 **Surface ocean pCO_2 observations, synthesis and data products,** Oostende, Belgium
Invited plenary, "pCO_2 mapping and modeling"

October 2023 **World Climate Research Program Open Science Conference,** Kigali, Rwanda
Oral, "Constraining historical ocean carbon uptake with models, machine learning and data"

May 2023 **NASA Joint Carbon Cycle and Ecosystems Meeting,** College Park MD
Oral, "Ocean carbon and oxygen response to Mt. Pinatubo"

April 2023 **Atmospheric and Oceanic Sciences, University of Wisconsin,** Madison, WI
Invited colloquium, "Tighter constraints on ocean carbon uptake from ML, models and data"

March 2023 **Ecology, Evolution, and Environmental Biology, Columbia University,** NY, NY
Invited colloquium, "Change in the ocean carbon sink from sparse data and imperfect models"

January 2023 **International GHG Monitoring Symposium at WMO,** Geneva, Switzerland
Plenary, "Sparse data and imperfect models to quantify and project the ocean carbon sink"

September 2022 **Marine Carbon Dioxide Removal: Essential Science for MRV Workshop,** Kingston, RI
Invited plenary, "Understanding the ocean carbon sink models, data and machine learning"

September 2022	**ICOS Science Conference 2022,** Utrect, Netherlands Oral, "Physical knowledge to improve and extend machine learning pCO_2 reconstructions"
June 2022	**Ocean Carbon and Biogeochemistry Workshop**, Woods Hole MA Invited plenary, "The variable air-sea CO_2 flux: Insights models, observations, machine learning"
May 2022	**Gordon Research Conference: Ocean Biogeochemistry 2022,** Barcelona, Spain Invited plenary, "Constraining models of the future ocean carbon sink with machine learning"
March 2022	**AGU/ASLO/TOS Ocean Sciences 2022,** virtual Oral, "Constraining the future ocean carbon sink"
February 2022	**BGC-Argo Group Meeting**, virtual Invited speaker, "LEAP STC and connections to float based biogeochemistry"
December 2021	**North Atlantic Biogeochemical Carbon Pump**, virtual Invited plenary, "Models to understand the North Atlantic carbon sink"
October 2021	**University of California-Irvine,** Irvine CA Invited seminar, "Models, data and theory to understand the ocean carbon sink"
April 2021	**NOAA Global Monitoring Laboratory**, Boulder CO Invited seminar, "Decadal variability in the ocean carbon sink"
April 2021	**European Geophysical Union, Fall Meeting** Oral, "Quantifying the ocean carbon sink for 1994-2007: Combined evidence from multiple methods"
February 2021	**Earth and Environmental Engineering**, Columbia University Invited seminar, "Decadal variability in the ocean carbon sink"
December 2020	**Machine Learning in Science & Engineering**, Columbia Data Science Institute Invited, "Quantifying the ocean carbon sink with sparse data, physical models and machine learning"
December 2020	**American Geophysical Union, Fall Meeting** Oral, "Quantifying the ocean carbon sink for 1994-2007: Combined evidence from multiple methods"
April 2020	**Woods Hole Oceanographic Institution**, Woods Hole MA Invited seminar, "Understanding change in ocean carbon sink"
April 2020	**Geochemistry Seminar**, Lamont-Doherty Earth Observatory, Palisades NY Seminar, "Mechanisms of decadal variability in the ocean carbon sink"
February 2020	**AGU/ASLO/TOS Ocean Sciences 2020**, San Diego CA Oral, "Forced mechanisms of decadal variability in the ocean carbon sink"
October 2019	**Atmospheric and Oceanic Sciences, University of Colorado,** Boulder CO Distinguished lecture, "Understanding recent decadal variability of the global ocean carbon sink"
August 2019	**Observing Carbon Climate Feedbacks, Chapman Conference,** La Jolla CA Invited plenary, "Forced change in the ocean carbon sink"
July 2019	**Chemical Oceanography, Gordon Conference,** Holderness NH Invited plenary, "Forced change in the ocean carbon sink"
May 2019	**Princeton University,** Princeton NJ Invited seminar, "Forced change in the ocean carbon sink"
April 2019	**University of Connecticut,** Avery Point CT Invited seminar, "Forced change in the ocean carbon sink"
December 2018	**Ocean carbon uptake in CMIP6 models workshop,** Washington DC Oral, "Forced changes and internal variability in the ocean carbon sink"
June 2018	**The Effects of Climate Change on the World's Oceans, 4th Int'l Symposium,** Washington DC Oral, "Variability and trends in ocean carbon uptake: 1981-2016"
April 2018	**Massachusetts Institute of Technology,** Earth Atmospheric and Planetary Sciences, Cambridge MA Invited seminar, "Diagnosing change in the ocean carbon sink"
April 2018	**University of Pennsylvania,** Philadelphia, PA Invited seminar, "Diagnosing change in the ocean carbon sink"
February 2018	**AGU/ASLO/TOS Ocean Sciences 2018**, Portland OR Poster, "Correlations of surface ocean pCO_2 to satellite chlorophyll, monthly to interannual"
January 2018	**NASA GISS,** New York, NY Invited seminar, "Variability in the ocean carbon sink"
November 2017	**Geophysical Fluid Dynamics Laboratory,** Princeton NJ Invited seminar, "Variability in the ocean carbon sink: Drivers and challenges to detection"
October 2017	**Distinguished Scientist Seminar, Marine Biological Laboratory**, Woods Hole MA Invited seminar, "Understanding the ocean's role in the global carbon cycle"

September 2017	**Ocean Carbon Hotspots Workshop of CLIVAR and OCB**, Monterey CA Plenary, "Timescales and mechanisms of change in ocean carbon sink"
August 2017	**International Carbon Dioxide Conference 10**, Interlaken, Switzerland Plenary, "Detecting and understanding the changing ocean carbon sink with data and models"
April 2017	**Nelson Institute Earth Day Conference,** University of Wisconsin, Madison WI Moderator and Speaker**,** "What now? Preparing for Environmental Change"
January 2017	**Cooperative Inst. Limnology & Ecosystems Research**, U. Michigan, Ann Arbor MI Invited seminar, "Spatial variability and potential long-term trends in Great Lakes carbon"
December 2016	**American Geophysical Union, Fall Meeting**, San Francisco CA Oral, "Seasonal cycles and long-term growth in Southern Ocean carbon uptake"
November 2016	**Climate People and the Environment Program,** University of Wisconsin, Madison WI Seminar**,** "Mechanistic connections between carbon and chlorophyll in the global ocean"
October 2016	**Kavli Frontiers of Science Symposium**, Irvine CA Invited poster "Natural Variability and Anthropogenic Trends in the Ocean Carbon Sink"
July 2016	**Ocean Carbon and Biogeochemistry Workshop**, Woods Hole MA Invited plenary, "Detecting trends in the ocean carbon sink"
June 2016	**Scripps Institution of Oceanography,** La Jolla CA Seminar, "Detection of trends in the ocean carbon sink"
June 2016	**Lamont-Doherty Earth Observatory of Columbia University,** Palisades NY Invited colloquium, "Detection of trends in the ocean carbon sink"
April 2016	**University of Wisconsin – Climate Change Symposium,** Madison WI Invited plenary, "Ocean mitigation of climate change: past, present and future"
March 2016	**Sarmiento Symposium**, Princeton NJ Invited speaker and panelist, "The breath of life — a changing carbon cycle"
February 2016	**AGU/ASLO/TOS Ocean Sciences 2016**, New Orleans LA Oral, "Detectability of change in the ocean carbon sink"
February 2016	**Climate People and the Environment Program,** University of Wisconsin, Madison WI Invited seminar, "Variability and trends in ocean carbon uptake from models and data"
January 2016	**NOAA –Pacific Marine Environmental Laboratory,** Seattle WA Invited seminar, "Variability and trends in ocean biogeochemistry from models and data"
September 2015	**University of Southern Mississippi,** Hattiesburg, MS Invited seminar, "The ocean carbon sink: Separating trends from variability"
June 2015	**Global Carbon Project Scientific Steering Committee Meeting,** Oslo, Norway Invited plenary, "Ocean carbon research and integration in the global carbon cycle"
June 2015	**JASON summer study,** La Jolla, CA Invited brief, "Changing ocean carbon: Observations and models"
May 2015	**University of Wisconsin Water Symposium,** Madison WI Invited plenary, "Circulation and carbon: Oceans and Great Lakes"
March 2015	**Pre-decadal survey workshop on Carbon and Climate,** Norman OK Invited plenary, "Uncertainties and unknowns in the ocean carbon sink (+coastal and inland)"
December 2014	**American Geophysical Union, Fall Meeting**, San Francisco CA Oral, "Carbon cycle variability associated with AMO, NAO and AMOC"
December 2014	**US CLIVAR / OCB Joint Workshop on ocean heat and carbon uptake,** San Francisco CA Invited plenary, "Quantifying carbon uptake and its trends"
November 2014	**JASON 2014 fall meeting,** Washington DC Invited plenary, "The changing ocean: Carbon, climate and coupled feedbacks"
November 2014	**Carbon Cycle Interagency Working Group,** Washington DC Invited plenary, "The ocean carbon sink: Present knowledge and critical gaps"
August 2014	**Coastal Carbon Synthesis Community Workshop,** Woods Hole MA Invited plenary, "Great Lakes carbon budgets"
June 2014	**Oak Ridge National Lab**, Oak Ridge TN Talk, "Carbon and biogeochemistry in the oceans and Great Lakes"
April 2014	**Center for Climatic Research and Climate People and Environment Program,** Madison WI Seminar, "Climate change and national security: Implications and preparedness"
March 2014	**Institute for Defense Analysis,** Alexandria VA Invited seminar, "What I learned and some recommendations"

March 2014 **Lamont-Doherty Earth Observatory of Columbia University,** Palisades NY
Invited seminar, "Natural variability and anthropogenic trends in the ocean carbon sink"
http://tinyurl.com/mrj3bo8

February 2014 **AGU/ASLO/TOS Ocean Sciences 2014**, Honolulu HI
Oral, "CO_2-acidification of the Laurentian Great Lakes"

August 2013 **NCAR ASP Key Uncertainties in the Global Carbon Cycle**, Boulder CO
Invited plenary, "Using data to elucidate feedback mechanisms in the ocean carbon cycle"

August 2013 **NCAR ASP Graduate Student Colloquium**, Boulder CO
Invited lecture, "Mechanisms of ocean carbon climate feedback: What do the data support?"

July 2013 **NCAR ASP Graduate Student Colloquium**, Boulder,CO
Invited lecture, "Ocean carbon biogeochemistry: Productivity, export, remineralization"

June 2013 **9th International Carbon Dioxide Conference**, Beijing, China
Oral, "Regional distribution and seasonal mechanisms of carbon uptake in the global oceans"

March 2013 **Biogeochemistry of the Great Lakes System**, Wayne State University, Detroit MI
Invited plenary, **"**Spatio-temporal variability and long-term trends in Great Lakes carbon cycling"

January 2013 **University of Wisconsin - Madison**, Atmospheric and Oceanic Sciences, Madison WI
Seminar, "The ocean carbon sink: How strong? How vulnerable?"

January 2013 **Ohio State University**, Climate Change Webinar
Invited, "Climate, carbon impacts on productivity, chemistry & invasive species in the Great Lakes."

July 2012 **Ocean Carbon and Biogeochemistry Workshop**, Woods Hole MA
Invited Plenary, "RECCAP: Results from a global synthesis on ocean carbon uptake"

April 2012 **NASA Ocean Color Research Team Meeting,** Seattle WA
Plenary, "Trends in ocean carbon uptake"

February 2012 **AGU/ASLO/TOS Ocean Sciences 2012**, Salt Lake City UT
Oral, "Physical drivers of biogeochemical and carbon cycling in Lake Superior"

January 2012 **Lake Superior Research Symposium, University of Minnesota,** St. Paul MN
Invited talk, "Modeling circulation, carbon and climate for Superior"

November 2011 **Department of Chemistry and Biochemistry, University of Montana,** Boseman MT
Invited seminar, "Trends in ocean carbon uptake"

November 2011 **School for Freshwater Science, University of Wisconsin - Milwaukee**, Milwaukee WI
Invited seminar, "Circulation, carbon cycling and invasive species in Lake Superior"

September 2011 **The Ocean Carbon Cycle at A Time Of Change: Synthesis And Vulnerabilities**, Paris, France
Invited plenary, "Attribution: What drives CO_2 sink trends?" (given by A. Fay due to injury)

August 2011 **Gordon Research Conference**, Andover NH
Poster, "Convergence of atmospheric and North Atlantic CO_2 trends on multidecadal timescales"

July 2011 **Woods Hole Oceanographic Institution**, Woods Hole MA
Seminar, "Biogeochemistry, carbon cycling and invasive species in Lake Superior"

July 2011 **Ocean Carbon and Biogeochemistry Workshop**, Woods Hole MA
Poster, "Convergence of atmospheric and North Atlantic CO_2 trends on multidecadal timescales"

July 2011 **Woods Hole Oceanographic Institution**, Woods Hole MA
Seminar, "Convergence of atmospheric and North Atlantic CO_2 trends on multidecadal timescales"

February 2011 **North American Carbon Program Meeting**, New Orleans LA
Poster, "Lake Superior's influence on regional carbon budgets"

December 2010 **American Geophysical Union, Fall Meeting**, San Francisco CA
Poster, "The carbon cycle of Lake Superior: Balancing the budget with spatial heterogeneity"

December 2010 **NACP/OCB Coastal Carbon Synthesis Workshop**, San Francisco CA
Oral, "Modeling carbon in the coastal zone"

November 2010 **Environmental Chemistry and Technology Program,** University of Wisconsin, Madison WI
Invited seminar, "Spatio-temporal variability in the carbon cycle of Lake Superior"

October 2010 **Michigan Technological University**, Houghton MI
Invited seminar, "Spatio-temporal variability in the carbon cycle of Lake Superior"

October 2010 **Duke University**, Durham NC
Invited seminar, "Decadal variability and multidecadal trends in the North Atlantic carbon sink"

July 2010 **Ocean Carbon and Biogeochemistry Workshop**, La Jolla CA
Poster, "Decadal variability and multidecadal trends in the North Atlantic carbon sink"

June 2010 **JASON Study on Carbon Treaty Verification,** La Jolla CA
Invited talk, "Carbon in water: Open ocean, coastal zone and inland waters"

June 2010 **Scripps Institution of Oceanography**, La Jolla CA
Seminar, "Understanding recent variability in the North Atlantic carbon sink"

May 2010 **Aquatic Ecosystem Health and Management: Ecology of Lake Superior**, Duluth MN
Oral, "Carbon cycle variability in Lake Superior and impacts on the regional carbon budget"

May 2010 **Subpolar North Atlantic Workshop,** Durham NC
Invited talk, "North Atlantic carbon uptake from biogeochemical models and data"

March 2010 **Caltech Keck Institute for Space Studies (KISS),** Pasadena CA
Invited plenary, "Air-sea CO_2 fluxes: Climatology, variability and land-ocean links"

February 2010 **AGU/ASLO/TOS Ocean Sciences 2010,** Portland OR
Invited oral, "Reconciling observed and modeled trends in the North Atlantic carbon sink"

November 2009 **North American Carbon Program 2nd Joint Workshop**, Oak Ridge TN
Invited oral, "Carbon cycling in North American coastal waters"

August 2009 **Biogeochemistry and Carbon Cycle of Lake Superior**, Woodruff WI
Oral, "Biogeochemical variability in Lake Superior – A modeling perspective"

July 2009 **Ocean Carbon and Biogeochemistry Workshop**, Woods Hole MA
Poster, "Understanding the carbon budget of Lake Superior"

May 2009 **International Association of Great Lakes Research Annual Meeting,** Toledo OH
Oral, "The magnitudes and mechanisms determining the carbon budget of Lake Superior"

May 2009 **NASA Ocean Color Research Team Meeting**, New York NY
Poster, "Do hurricanes drive variability of the air-sea CO_2 flux in the subtropical North Atlantic?"

December 2008 **American Geophysical Union, Fall Meeting**, San Francisco CA
Oral, "The changing North Atlantic carbon sink: 1992-2006"

December 2008 **University of Wisconsin - Madison**, Atmospheric and Oceanic Sciences, Madison WI
Seminar, "Variability in the ocean carbon cycle: A North Atlantic perspective"

October 2008 **Colorado State University**, Fort Collins CO
Invited seminar, "Variability in the ocean carbon cycle: A North Atlantic perspective"

July 2008 **Ocean Carbon and Biogeochemistry Workshop**, Woods Hole MA
Invited plenary, "Carbon sink trends in the Northern Oceans"

June 2008 **Workshop on Teaching Weather and Climate Using Laboratory Experiments**, Chicago IL
Poster, "Rotating tank experiments in an atmospheric and oceanic science undergraduate curriculum"

May 2008 **Effects of Climate Change on the World's Oceans**, Gijon, Spain
Oral, "Trends in the North Atlantic carbon sink"

April 2008 **NASA Ocean Color Research Team Meeting,** Adelphi MD
Plenary, "The changing North Atlantic carbon cycle"

March 2008 **Princeton University,** Princeton NJ
Seminar "Trends and variability in the carbon cycle of the North Atlantic"

March 2008 **AGU/ASLO/TOS Ocean Sciences 2008**, Orlando FL
Oral, "Carbon cycle variability and trends at Bermuda and across the North Atlantic"

January 2008 **American Meteorological Society Annual Meeting,** New Orleans LA
Co-author on one talk and 2 posters on undergraduate teaching with the 'Weather in a tank' project

October 2007 **Stony Brook University**, Stony Brook NY
Invited public lecture, "The oceans and the climate system"

July 2007 **Ocean Carbon and Biogeochemistry Workshop**, Woods Hole MA
Poster, "Carbon cycle variability in the North Atlantic: Timescales of change"

April 2007 **Johns Hopkins University**, Baltimore MD
Invited seminar, "Air-sea CO_2 flux variability: Physical and ecological drivers"

April 2007 **Surface Ocean CO_2 Variability and Vulnerability Workshop**, UNESCO, Paris, France
Plenary, "North Atlantic CO_2 flux variability: Physical and ecological drivers"

April 2007 **NASA Ocean Color Research Team Meeting**, Seattle WA
Poster, "Physical and biological drivers of carbon cycle variability in the North Atlantic"

April 2007 **Michigan Technological University**, Houghton MI
Invited seminar, "Air-sea CO_2 flux variability: Physical and ecological drivers"

July 2006 **Ocean Carbon and Biogeochemistry Workshop**, Woods Hole MA
Poster, "Modeling the seasonal cycle of pCO_2 in the North Atlantic"

June 2006	**The Art of Climate Modeling, NCAR/ASP Summer School**, Boulder CO Invited lecture, "Modeling ocean biogeochemistry"
February 2006	**AGU/ASLO/TOS Ocean Sciences 2006,** Honolulu HI Talk, "North Pacific carbon cycle response to climate variability on seasonal to decadal timescales"
February 2006	**Old Dominion University**, Norfolk VA Invited seminar, "Air-sea CO_2 flux variability on seasonal, interannual and decadal timescales"
November 2005	**University of Maryland,** College Park MD Invited seminar, "Air-sea CO_2 flux variability on seasonal, interannual and decadal timescales"
November 2005	**Great Lakes Environmental Research Laboratory,** Ann Arbor MI Invited seminar, "Air-sea CO_2 flux variability on seasonal, interannual and decadal timescales"
September 2005	**Seventh International Carbon Dioxide Conference**, Broomfield CO Invited plenary, "Pacific dominance to global air-sea CO_2 flux variability"
August 2005	**Ocean Carbon Cycle and Climate Change Workshop**, Woods Hole MA Poster "North Pacific carbon cycle response to climate variability on seasonal to decadal timescales"
March 2005	**The Pennsylvania State University**, State College PA Invited seminar, "CO_2 air-sea flux variability: Ocean models and atmospheric inversions"
March 2005	**Princeton University**, Princeton NJ Seminar, "Argon as a tracer of physical processes in the atmosphere and ocean"
December 2004	**American Geophysical Union, Fall Meeting**, San Francisco CA Poster, "Testing ocean models with argon and nitrogen"
November 2004	**University of Wisconsin, Sustainability and the Global Environment (SAGE)**, Madison WI Seminar, "Local and global benefits of air pollution control in Mexico City"
October 2004	**University of Wisconsin, Chaos and Complexity Seminar Series**, Madison WI Seminar, "CO_2 air-sea flux variability: Ocean models and atmospheric inversions"
October 2004	**SOLAS Science 2004**, Halifax, Canada Poster, "Atmospheric Ar/N_2: A Tool for Constraining Atmosphere and Ocean Models"
June 2004	**NOAA GCC Workshop: Understanding North Pacific Carbon-cycle Changes**, Seattle WA Invited plenary, "Modeled North Pacific carbon cycle variability"
May 2004	**Geophysical Fluid Dynamics Laboratory**, Princeton NJ Seminar, "CO_2 air-sea flux variability: Ocean models and atmospheric inversions"
March 2004	**Princeton Environmental Institute Postdoctoral Colloquium**, Princeton NJ Seminar, "Local and global benefits of air pollution control in Mexico City"
December 2003	**American Geophysical Union, Fall Meeting**, San Francisco CA Oral, "Local and global benefits of air pollution control in Mexico City"
June 2003	**World Congress on Risk**, Brussels, Belgium Poster, "Mexico City Co-Benefits: Air pollution health risk reduction from GHG emission controls"
June 2003	**MIT, Department of Earth, Atmospheric & Planetary Sciences,** Cambridge MA Seminar, "Mexico City Co-Benefits: Air pollution health risk reduction from GHG emission controls"
May 2003	**University of Wisconsin, Department of Atmospheric and Oceanic Sciences,** Madison WI Invited seminar, "CO_2 air-sea flux variability: ocean models and atmospheric inversions"
May 2003	**JGOFS Open Science Conference**, Washington DC Poster, "Mechanisms of CO_2 air-sea flux variability in the North Atlantic and Equatorial Pacific"
April 2003	**National University of Mexico, Center for Atmospheric Sciences,** Mexico City Seminar, "Carbon sink variability from ocean models and atmospheric inversions" (in Spanish)
July 2002	**Princeton University, Atmosphere and Ocean Sciences Program,** Princeton NJ Invited seminar, "Interannual variability of air-sea fluxes of carbon dioxide and oxygen"
February 2002	**AGU/ASLO/TOS Ocean Sciences 2002,** Honolulu HI Poster, "Interannual variability in air-sea fluxes of CO_2 and O_2"
December 2000	**American Geophysical Union, Fall Meeting**, San Francisco CA Oral, "A novel approach to export parameterization with application to air-sea fluxes of O_2 and CO_2"
February 2000	**American Geophysical Union, Ocean Sciences**, San Antonio TX Oral, "Interannual variability of the air-sea flux of oxygen in the North Atlantic"
January 1999	**JGOFS Arabian Sea Symposium,** Bangalore, India Poster, "Interannual variability of the air-sea flux of oxygen in the North Atlantic" (best poster award)

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TEACHING

Columbia University / Lamont-Doherty Earth Observatory New York, NY / Palisades, NY

Semester Courses and Seminars

2022, 25 *Climate Prediction Challenges (DEES 4243, joint with STAT 5243/4243)*
Graduate / undergraduate project-based course applying machine learning to climate science problems.

2018, 21, 24 *Humans and the Carbon Cycle (EESC GU4020)*
Graduate / undergraduate course on the global carbon cycle and its connections to climate.

2019, 20, 22 *The Climate System (EESC UN2100)*
Intensive undergraduate survey course on climate science, with weekly laboratory session.

2019,21,23,25 *Idealized Models of Climate Processes (EESC GU6926)*
Graduate course on applying idealized models to coupled physical-chemical-climate processes.

2026 *What's New in Earth, Environmental and Climate Sciences (EESC UN1006)*
Undergraduate seminar covering the wide range of research at Lamont-Doherty Earth Observatory.

2026 *Seminar in Biogeosciences: Geoengineering (EESC GU9523)*
Graduate / LDEO staff seminar on Solar Radiation Management and Carbon Capture and Storage

University of Wisconsin - Madison Madison, WI

Semester Courses

2016 *Physical-Biogeochemical Coupling in the Ocean and Lakes (ATM OCN 750)*
Mechanisms of physical-biogeochemical coupling in oceans and lakes; hands-on data and modeling

2015, 2016 *The Science of Climate Change (ATM OCN 323)*
Quantitative treatment of climate processes for science and engineering, non-AOS, students

2013,15,17 *Global Warming: Science and Impacts (ATM OCN 332)*
Undergraduate intermediate level course on the science and expected impacts of climate change

2007-2014 *Introduction to Physical Oceanography (ATM OCN 660)*
Graduate introduction to the physical structure and dynamics of the ocean

2004-2010 *Global Climate Processes (ATM OCN 425)*
Global energy balance, circulation of the atmosphere and ocean, climate and climate modeling

2008-2016 *Laboratory in Rotating Fluid Dynamics (ATM OCN 801, 615)*
Use rotating tank and data analysis to elucidate key principles of geophysical fluid dynamics

2005,06,14 *Dynamics of the Atmosphere and Ocean II (ATM OCN 311)*
Intermediate geophysical fluid dynamics for undergraduate majors

Semester Seminars

2012, 2017 *Ocean Biogeochemical Cycles (ATM OCN 965)*

Spring 2008 *Threats to Wildlife from Global Warming (ATM OCN 980)*

Fall 2006 *The Ocean Carbon Cycle (ATM OCN 925)*

Spring 2005,06 *Senior Capstone Seminar (ATM OCN 405)*

Spring 2006 *Climate Change: Science and Impacts (ATM OCN 980)*

ADVISING

Columbia University / Lamont-Doherty Earth Observatory New York, NY / Palisades, NY

Graduate Students

2025-present	Abby Shaum, Earth and Environmental Sciences (PhD expected 2030)
2018-2024	Lauren Moseley, PhD 2024 in Earth and Environmental Sciences (now at CarbontoSea)
2020-2023	Suki Wong, PhD 2023 in Earth and Environmental Sciences (now scientist at atdepthMRV)
2017-2020	Sean Ridge, PhD 2020 Earth and Environmental Sciences (now data scientist at Millenium)
2017-2020	Lucas Gloege, PhD 2020 Earth and Environmental Sciences (now scientist at Yale University)

Undergraduate and Masters Student Researchers

2026	Tanish Patel, Data Science Institute Scholar (MS expected 2026)
2026	Anna Chen, undergraduate researcher (Class of 2027, Climate Science and Applied Math)
2026	Catherine Pierson, undergraduate researcher (Class of 2028 Barnard, Environmental Science)
2025	Arvind Nagabhirava, Data Science Institute Scholar (MS 2025)
2025	Nicoline Joensen, undergraduate researcher (Class of 2026, Physics)
2024	Amelie Sharples, undergraduate researcher (Class of 2025, Astrophysics and Computer Science)
2024	Junfu Su (Data Science Institute Scholar, MS 2024)
2022	Devan Samant (Data Science Institute Scholar, MS 2023, now at Federal Energy Reg. Commission)
2021	Tomislav Galjanic (Data Science Institute Scholar, MS 2022, now at Institute of Int'l Education)
2021	Aditya Koduri (Data Science Institute Scholar, MS 2022, now at JP Morgan)
2020	Jake Stamell (Data Science Institute Scholar, MS 2021, Statistics, now at Instacart)
2020-2022	Rea Rustagi, undergraduate researcher (Class of 2022, Applied Math)
2019	Monica Yan (Data Science Institute Scholar, MS 2020, now at JP Morgan)
2018	Leonard Boncenne, summer student intern (ENSTA ParisTech)

Postdoctoral Scholars

2024-present	Dr. Ce Bian
2024-2025	Dr. Lauren Moseley
2022-2023	Dr. Thea Heimdal (now Associate Research Scientist in McKinley group, Columbia/LDEO)
2023	Dr. Suki Wong
2020-2022	Dr. Val Bennington (UW-Madison CCR, 2012-14; Epic, 2014-20; now Makai Ocean Engineering)

GALEN A. MCKINLEY

ADVISING
University of Wisconsin – Madison Madison, WI

Graduate Students

2015-2017	Sean Ridge, MS AOS 2017 (PhD 2020 Columbia Earth and Environmental Sciences)
2014-2017	Lucas Gloege, MS AOS 2017 (PhD 2020 Columbia Earth and Environmental Sciences)
2016-2017	Collin Tuttle, MS AOS 2018 (US Coast Guard)
2010-2015	Darren Pilcher, PhD AOS 2015 (now research scientist at U. Washington/NOAA PMEL)
2010-2015	Haidi Chen, PhD AOS 2015 (Princeton University, 2015-2019, now Brevan Howard, Hong Kong)
2011-2014	Alexis Ritzer, MS AOS 2014 (Luminant Energy Services)
2010-2012	Jennifer Phillips, MS Envi. & Resources 2012 (Ass't Sec. Climate Change, CA Nat'l Res.Agency)
2009-2012	Jesse Roberts, MS AOS 2012
2008-2010	Amanda Fay, MS AOS 2010 (Researcher with McKinley)
2005-2010	Valerie Bennington, PhD AOS 2010 (now at Makai Ocean Engineering, Hawaii)
2005-2007	David Ullman, MS AOS 2008 (PhD Geoscience 2013; 2016-2025, Professor at Northland College, WI)

Undergraduate Student Researchers

2015-2017	Gabriela Negrete (BS Chemistry 2017, PhD 2023 Scripps/UCSD; now research scientist NOAA GFDL)
2012-2015	James Kralj (BS Microbiology 2015, MS 2018 U. Washington);
2012-2015	Melissa Breeden (BS AOS 2013, PhD AOS 2018; now research scientist at NOAA PSL)
2009-2010	Victoria Vasys (BS AOS 2010)
2007-2008	Jennifer Koch (BS AOS '08, EPA'08-11, MS Portland State '13, Rhodeside & Harwell '14-present)

Postdoctoral Scholars

2010-2011	Dr. Val Bennington (UW-Madison CCR, 2012-14; Epic, 2014-20; now Makai Ocean Engineering)
2009-2010	Dr. Colleen Mouw (Professor, University of Rhode Island; 2016 PECASE awardee)
2007-2009	Dr. Nazan Atilla (UW-Madison Department of Zoology)
2007	Dr. Nobuaki Kimura (Kyushu University, Japan)

Visiting Students

2008-2009	Nsikak Benson, Fulbright Scholar (Nigeria)

STUDENT COMMITTEES (* = McKinley students)

Columbia University / Lamont-Doherty Earth Observatory New York, NY / Palisades, NY
PhD Thesis Committees
Ms. Annie Leal (PhD expected 2026)
Ms. Abby Shaum* (PhD expected 2030)

PhD Theses at Columbia University / Lamont-Doherty Earth Observatory
Dr. Lauren Moseley* (PhD Earth and Environmental Sciences 2024)
Dr. Suki Wong* (PhD Earth and Environmental Sciences 2023)
Dr. Colleen Baublitz (PhD Earth and Environmental Sciences 2021)
Dr. Sean Ridge* (PhD Earth and Environmental Sciences 2020)
Dr. Lucas Gloege* (PhD Earth and Environmental Sciences 2020)
Dr. Takaya Uchida (PhD Earth and Environmental Sciences 2019)

PhD Theses at University of Wisconsin - Madison Madison, WI
Dr. Erin Thomas (PhD AOS 2017)
Dr. Cristian Martinez (PhD AOS 2016)
Dr. Malgorzata Golub (PhD Freshwater and Marine Science 2016)
Dr. Jiaxu Zhang (PhD AOS 2016)
Dr. Benjamin Kraemer (PhD Freshwater and Marine Science 2015)
Dr. Darren Pilcher* (PhD AOS 2015)
Dr. Haidi Chen* (PhD AOS 2015)
Dr. Katherine Holman (PhD AOS 2013)
Dr. Benjamin Sulman (PhD AOS 2012)
Dr. Justin Bagley (PhD AOS 2011)
Dr. Fung He (PhD AOS 2011)
Dr. Wei Liu (PhD AOS 2011)
Dr. Val Bennington* (PhD AOS 2010)
Dr. Claudia Cyganowski (PhD Astronomy 2010)
Dr. Jerry Tjiputra (PhD AOS 2007)

Masters Theses at University of Wisconsin - Madison Madison, WI
Mr. Lucas Gloege* (MS AOS 2017)
Mr. Sean Ridge* (MS AOS 2017)
Ms. Nicole Colasacco-Thumm (MS AOS 2015)
Ms. Amanda Stone (MS Freshwater and Marine Science, 2012)
Mr. Jesse Roberts* (MS AOS 2012)
Ms. Jennifer Phillips* (MS Environment and Resources 2012)
Ms. Alexis Santos-Ritzer* (MS AOS 2012)
Ms. Amanda Fay* (MS AOS 2010)
Dr. David Ullman* (MS AOS 2008; PhD UW-Madison Geoscience 2013)
Mr. William Ahue (MS AOS 2008)
Ms. Erin Hokanson (MS AOS 2006)

Delta Teaching & Learning Internship Advisees at University of Wisconsin - Madison Madison, WI
Dr. Andrew Winters (PhD AOS 2015, now Associate Professor, University of Colorado-Boulder)

PhD External Committees
PhD Committee Member
Dr. Cory McDonald (PhD Michigan Technological University, 2010)
PhD or MS External Evaluator
Dr. Laique Merlin Djeutchouang (PhD University of Cape Town, 2023)
Mr. Parsa Gooya (MS University of Victoria, 2022)
Dr. Precious Mongwe (PhD University of Cape Town, 2018)
Dr. Peisheng Huang (PhD University of Western Australia, 2010)

GALEN A. MCKINLEY

OUTREACH, INTERVIEWS and EDITORIALS

2009 to present **Lead developer for Carbon/Climate educational website, with interactive carbon budget applet**
English: carboncycle.ldeo.columbia.edu (re-launched 2018. ~2,000 users in 2025)
Spanish: carboncycle_spanish.ldeo.columbia.edu (re-launched 2018. ~8,000 users in 2025)
From 2009-2017: carboncycle.aos.wisc.edu and carboncycle.es.wisc.edu

June 2025 **Earth Observations: Conversations with Lamont Scientists** New York, NY
Invited talk, "Understanding the ocean carbon sink"

May 2025 **Weather and Climate Livestream, Part 9,** online
Talk, "Ocean carbon and biogeochemistry"
https://www.youtube.com/watch?v=r58FtmM4sDY (final 30 minutes)

October 2024 **Walden**, New York NY
Informal consultant to an off-broadway play on climate change

April 2022 **CFA (Chartered Financial Analyst) Society New York Sustainable Investing Group**, NY, NY
Invited speaker on climate and carbon science

April 2022 **Hunter College High School**, New York NY
Invited speaker for Climate Day programming

February 2021 **Roundtable on internalizing climate risk**, Columbia University, New York NY
Invited speaker for financial services workshop from Columbia Center on Sustainable Investment

October 2020 **Carbon Dioxide | Present and Future,** Columbia University, New York NY
Invited panelist for public event of LDEO/Earth Institute Open House

June 2020 **Radio Universidad Nacional de Mar del Plata**, Mar del Plata, Argentina
Recorded interview, aired 27 June 2020, S. Buján (in Spanish; http://www.programa-ecos.com.ar)

April 2020 **Earthx2020 Women's conference**, online
Invited panelist

December 2019 **Field trip for Fieldston Ethical Culture High School,** Columbia University, New York NY
Hosted Climate and Weather class for rotating tank experiments

April 2019 **College Club of Northern New Jersey**, Ridgewood NJ
Invited speaker "Carbon, climate and the oceans"

October 2017 **LDEO Open House**, Columbia University, New York / Palisades NY
Speaker for "A year in a life of a scientist"

February 2017 **Field trip for Randall School 4th Grade**, Madison WI
Hosted 56 4th graders for rotating tank experiments and "science on a sphere" presentations

January 2017 **Perpetual Notion, WORT**, Madison WI
On-air interview on "Stability of the Atlantic Meridional Overturning Circulation", 19 Jan 2017

December 2016 **Central Time, Wisconsin Public Radio**, Madison WI
On-air interview on "Global warming snapshot for 2016", 22 Dec 2016

December 2016 **The Buzz, WORT**, Madison WI
On-air interview on "NASA contributions to Earth Science", 5 Dec 2016

November 2016 **WISC TV 3 / Channel3000.com**, Madison WI
On-air interview on "The Record Warmth of 2016" (http://tinyurl.com/hy4pqb7), 16 Nov 2016

October 2016 **Nelson Institute and University of Wisconsin News**
Q&A on climate change "Explaining 'terrifying' trends of climate change: Q&A" J. Peek

February 2016 **UW News, Science Daily, Insurance Journal, phys.org, Eureka Alert, Nature News & Views**
Various articles associated with McKinley et al. (2016), *Nature doi:10.1038/nature16958*

December 2015 **The Daily Climate,** Charlottesville VA
"Acid trip: Great Lakes could face similar acidification risks as the seas" B. Bienkowski

November 2015 **Yale Environment 360,** New Haven CT
"On thin ice: Big northern lakes are being rapidly transformed" C. Katz

October 2015 **Wisconsin Science Festival,** Madison WI
Invited plenary talk "Keeping the Great Lakes Great"

July 2015 **Wisconsin Public Radio,** Madison WI
Guest on "Joy Cardine Show", 9 July 2015

June 2015 **Capital Times,** Madison WI
Op-ed, "Scott Walker, Legislature should stop swinging hammers at education"

December 2014 **BioHouse, UW-Madison,** Madison WI
Evening seminar speaker on the ocean and climate change

October 2014	**Wisconsin Science Festival,** Madison WI Invited plenary talk "Ocean Acidification: The other CO_2 problem"
September 2014	**National Geographic News,** Washington DC "New reports offer clearest picture yet of rising greenhouse gas emissions" B.C. Howard
June 2014	**Radio Ciudad,** Buenos Aires, Argentina Radio interview on the new US EPA carbon rules (in Spanish)
December 2013	**Climate Change: What it means for Wisconsin's economy and natural resources,** Madison WI Invited Panelist for Forum hosted by Wisconsin Legislature (Representatives Clark and Mursau) and Wisconsin Academy of Sciences, Arts and Letters (http://tinyurl.com/mhzlxem)
November 2013	**Adhoc Committee on Climate Change and Fossil Fuel Use, UW-Madison,** Madison WI Panelist, Town Hall
October 2013	**Wisconsin Energy Institute, UW-Madison,** Madison WI Panelist, IPCC Report and EPA Rules
April, Oct 2013	**Bradley Learning Center, UW-Madison,** Madison WI Dinner speaker on climate change science and impacts
April 2013	**Wisconsin Gazette,** Shorewood WI "Extreme Wisconsin: Warmer, wetter, weirder weather ahead" L. Neff
September 2012	**Women in Science and Engineering, UW-Madison,** Madison WI Dinner speaker for living group supporting freshman women planning on STEM majors
April 2012	**Aldo Leopold Nature Center**, Monona WI Presenter on Antarctic response to climate change; Climate Education Center Grand Opening
November 2011	**Wisconsin State Journal**, Madison WI "Curiosities: Why does warm Coke go flat so much faster than cold Coke?" J. Sakai
September 2011	**WORT**, Perpetual Notion Machine, Madison WI Interview on air September 1, 2011 (archive.wort-fm.org/mp3/wort_110901_190001science.mp3)
July 2011	**Voice of America**, Washington DC **"**Study: Ocean Less Able to Mitigate Climate Change" R. Skirble
July 2011	**CNN International**, London, UK "Ocean carbon sinks feeling the heat" M. Knight
June 2011	**In Common, Nelson Institute for Environmental Studies**, UW-Madison, Madison WI "Illuminating water's role in the carbon cycle and future climate" M. Lepisto
Jan-Aug 2011	**Mini Workshop for Carbon Cycle Applet Lesson Plans,** Madison WI Organizer. Detailed G6-12 lesson plans developed to accompany carboncycle.aos.wisc.edu
January 2011	**Climate Ambassadors Workshop, University of Wisconsin - Madison,** Madison WI Lecturer, "Climate and Climate Change: Science Basics"
December 2010	**NASA Television,** http://www.youtube.com/watch?v=hXg4ugCajkE "NASA Science on the Road: Oceans, Carbon, and Climate" S. Cole
August 2010	**Chicago Tribune,** Chicago IL "Sink or source? Figuring Great Lakes' role in climate change" and "Could acidification threaten Great Lakes?" D. Lockwood
June 2010	**Climate Ambassadors Workshop, University of Wisconsin - Madison,** Madison WI Lecturer, "Climate and Climate Change: Science Basics"
April 2010	**Whiteside Forum,** Morrison IL Invited panelist for community forum on the oceans
November 2009	**New York Times, Wisconsin Week, Science Daily, Bloomberg** Reports, interviews on Nature Geoscience paper, Desai et al. (2009)
November 2009	**Wisconsin Public Radio,** Superior WI "Increasing winds over the Great Lakes" M. Simonson
September 2009	**Badger Herald, University of Wisconsin - Madison,** Madison WI "2050: Temperature to increase by 4 degrees" K. Mianulli
July 2009	**AOS & CIMSS, University of Wisconsin - Madison,** Madison WI Organizer and lead lecturer, Carbon Cycle and Climate Modeling - A Teacher's Workshop
July 2008	**CIMSS, University of Wisconsin - Madison,** Madison WI Invited lecturer, Geosciences Time Scales and Global Climate Change Teacher's Workshop
April 2008	**Daily Cardinal, University of Wisconsin - Madison,** Madison WI "Report finds public transit key to curb global warming in state", C. Brace

January 2008	**"The Pulse" WTDY 1670AM**, Madison WI Interview with host S. Wisniewski on the science of global climate change (on air 1/20/08)
October 2007	**Wisconsin State Journal**, Madison WI "Why is The Ocean Salty", J. Sakai. Also appeared in Science Daily
October 2007	**Second Annual Wisconsin Climate Change Forum**, Madison, WI Invited panelist
July 2007	**CIMSS, University of Wisconsin - Madison,** Madison WI Invited lecturer, Remote Sensing Applications in the Geosciences Teacher's Workshop
June 2007	**Capital Times**, Madison WI "Local scientist calls global warming theory 'hooey'", S.K. Derby
February 2007	**Capital Times**, Madison WI "City lakes offer lesson in climate change – The winter's freeze was second latest", A. Weier
October 2006	**First Annual Wisconsin Climate Change Forum**, Madison WI Invited panelist
September 2006	**Women In Science and Engineering, UW-Madison,** Madison WI Dinner speaker for living group supporting freshman women planning on STEM majors
September 2005	**The Why Files**, Madison WI "Hurricanes: The Heat is On", D. Tannebaum
March 2005	**Capital Times,** Madison WI "Global warming debate is over, UW prof says – Calls new study as solid proof as that smoking causes cancer", A. Nathans
March 2005	**Daily Cardinal, University of Wisconsin - Madison,** Madison WI "Greenhouse gases further implicated in global warming", P. Dohnal