Laura C. Slivinski

University of Colorado Boulder
Cooperative Institute for Research in Environmental Sciences
National Oceanic and Atmospheric Administration
Physical Sciences Laboratory
Earth System Research Laboratories
325 Broadway
Boulder, CO 80305
(303) 497-6489 | laura.slivinski@noaa.gov

EDUCATION

2014	**Ph.D., Applied Mathematics,** Brown University Advisor: Prof. Björn Sandstede Title: *Lagrangian Data Assimilation and its Applications to Geophysical Fluid Flows*
2010	**M.S., Applied Mathematics,** Brown University, Providence, RI
2009	**B.S., Mathematics,** University of Maryland, College Park

PROFESSIONAL EXPERIENCE

2015 – present	**Research Scientist**, CIRES & NOAA Physical Sciences Laboratory, Boulder, CO. *Sparse-input global atmospheric reanalysis; observation impact studies using data-denial experiments; global hourly-updating data assimilation; coupled data assimilation.*
2014 – 2015	**Postdoctoral Investigator**, Woods Hole Oceanographic Institution; Dept. of Physical Oceanography, Woods Hole, MA. *Lagrangian data assimilation for parameter estimation*
Summer 2013	**Graduate Student Visitor**, National Center for Atmospheric Research; Mesoscale and Microscale Meteorology Laboratory, Boulder, CO. *Applications of particle filters to high-dimensional nonlinear systems*
Summer 2010	**Graduate Intern**, MIT Lincoln Laboratory, Lexington, MA. *Compressive sensing techniques for communications algorithms*
2009 – 2014	**Graduate Research Assistant**, Brown University, Division of Applied Mathematics, Providence RI. *Lagrangian data assimilation and dynamical systems*
Summer 2008	**Undergraduate Intern**, Mathematics Summer Employment Program, National Security Agency. *Analysis of metadata files using Perl for intelligence applications.*

HONORS & AWARDS

2020	CIRES Silver Medal *For creating a 200-year Historic Reanalysis dataset of global weather and extremes from only surface pressure and sea surface temperature observations*
2020	NOAA Boulder Outreach Gold Star Award
2015	AWM-NSF Mathematics Travel Grant for Women Researchers
2014	Stella Dafermos Prize from the Division of Applied Mathematics at Brown University
2006 – 2009	University of Maryland Gemstone Program *(interdisciplinary undergraduate team research project, culminating in a thesis defense)*
2005 – 2009	University of Maryland Presidential Scholarship, Distinguished Scholar, Orbital Science's Kelly H. Burke Scholarship, National Society of Collegiate Scholars, Mortar Board Honor Society

TEACHING EXPERIENCE

2019	**Guest lecturer,** University of Colorado Boulder Applied mathematics course on data assimilation "Inflation and localization in practice: Reconstructing 200 years of weather"
2010 – 2011	**Teaching assistant**, Brown University Probabilistic and Deterministic Models for Operations Research, Statistical Inference I
2007 – 2009	**Tutor**, University of Maryland Algebra I, Calculus I, Calculus II
2007 – 2008	**Teaching assistant**, University of Maryland Algebra I and II

PROFESSIONAL SERVICE

May – Jul. 2021	**Writing Mentor**, Significant Opportunities in Atmospheric Research and Science (SOARS) undergraduate research program
Feb. 2020	**Panelist**, Boulder High School visit to NOAA ESRL
Oct. 2019 – Dec. 2020	**Mentor,** U. of Maryland Gemstone Alumni Mentor & Partner Program
Jul. 2019	**Poster judge**, UCAR Summer Intern Research Poster Session

2018 – present	**Co-administrator**, Advancing Reanalysis website (reanalyses.org)
Jul. 2018	**Invited speaker,** UNAVCO's intern career circle
Mar. 2017, 2018	**Volunteer and career mentor**, Denver Museum of Nature and Science's Girls and Science Day
Dec. 2016, 2018	**Outstanding Student Presentation Award judge**, AGU Fall Meeting
Feb. 2016	**Session moderator**, AGU Ocean Sciences Meeting
May 2015	**Mini-symposium organizer**, "Applications of Ensemble Data Assimilation Methods to Climate Processes" at the SIAM Conference on Applications of Dynamical Systems (approx. 15 people in attendance)
Apr. 2014	**Mini-symposium co-organizer**, "Data Assimilation in Atmospheric and Oceanographic Processes" at the SIAM Conference on Uncertainty Quantification (approx. 15 people in attendance)
2014 – present	**Peer-reviewer** for *Monthly Weather Review, Journal of Climate, Ocean Modelling, Journal of Advances in Modeling Earth Systems, Climate Dynamics, Atmosphere*; **internal reviewer** for NOAA/PSL; **grant proposal reviewer** for NSF and SNSF**.**

PEER-REVIEWED PUBLICATIONS

Slivinski, L. C., G. P. Compo, P. D. Sardeshmukh, J. S. Whitaker, and 36 coauthors, 2021: An evaluation of the performance of the 20th Century Reanalysis version 3. *J. Climate* 34(4): 1417–1438. https://doi.org/10.1175/JCLI-D-20-0505.1

Fogt, R.L., C.P. Belak, J.M. Jones, **L.C. Slivinski**, and G.P. Compo, 2021: An assessment of early 20th century Antarctic pressure reconstructions using historical observations. *Int. J. Climatol.* 41 (Suppl. S1): E672–E689. https://doi.org/10.1002/joc.6718

Robertson, F. R., J.B. Roberts, M.G. Bosilovich, A. Bentamy, C.A. Clayson, K. Fennig, M. Schröder, H. Tomita, G.P. Compo, M. Gutenstein, H. Hersbach, C. Kobayashi, L. Ricciardulli, P. Sardeshmukh, and **L.C. Slivinski**, 2020: Uncertainties in Ocean Latent Heat Flux Variations over Recent Decades in Satellite-Based Estimates and Reduced Observation Reanalyses. *J. Climate* 33: 8415–8437. https://doi.org/10.1175/JCLI-D-19-0954.1

Slivinski, L.C., G.P. Compo, J.S. Whitaker, P.D. Sardeshmukh, and 42 coauthors, 2019: Towards a more reliable historical reanalysis: Improvements for version 3 of the Twentieth Century Reanalysis system. *Quarterly Journal of the Royal Meteorological Society* 145:2876-2908. https://doi.org/10.1002/qj.3598 *[Invited.]*

Slivinski, L.C., G.P. Compo, J.S. Whitaker, P.D. Sardeshmukh, J.-W. A. Wang, K. Friedman, C. McColl, 2019: What is the impact of additional tropical observations on a modern data assimilation system? *Monthly Weather Review* 147, 2433-2449. https://doi.org/10.1175/MWR-D-18-0120.1

Wang, J.-W. A., P.D. Sardeshmukh, G.P. Compo, J.S. Whitaker, **L.C. Slivinski**, C.M. McColl, and P.J. Pegion, 2019: Sensitivities of the NCEP Global Forecast System. *Monthly Weather Review* 147, 1237 – 1256. https://doi.org/10.1175/MWR-D-18-0239.1

Slivinski, L.C., 2018: Historical reanalysis: what, how, and why*? Journal of Advances in Modeling Earth Systems* 10, 1736 – 1739. https://doi.org/10.1029/2018MS001434 *[Invited.]*

Dole, R.M., J.R. Spackman, M. Newman, G.P. Compo, C.A. Smith, L.M. Hartten, J.J. Barsugli, R.S. Webb, M.P. Hoerling, R. Cifelli, K. Wolter, C.D. Barnet, M. Gehne, R. Gelaro, G.N. Kiladis, S. Abbott, E. Akish, J. Albers, J.M. Brown, C.J. Cox, L. Darby, G. de Boer, B. DeLuisi, J. Dias, J. Dunion, J. Eischeid, C. Fairall, A. Gambacorta, B.K. Gorton, A. Hoell, J. Intrieri, D. Jackson, P.E. Johnston, R. Lataitis, K.M. Mahoney, K. McCaffrey, H.A. McColl, M.J. Mueller, D. Murray, P.J. Neiman, W. Otto, O. Persson, X. Quan, I. Rangwala, A.J. Ray, D. Reynolds, E.R. Dellaripa, K. Rosenlof, N. Sakaeda, P.D. Sardeshmukh, **L.C. Slivinski**, L. Smith, A. Solomon, D. Swales, S. Tulich, A. White, G. Wick, M.G. Winterkorn, D.E. Wolfe, and R. Zamora, 2018: Advancing science and services during the 2015-16 El Niño: The NOAA El Niño Rapid Response field campaign. *Bulletin of the American Meteorological Society*, 99, 975 – 1001. https://doi.org/10.1175/BAMS-D-16-0219.1

Thorne, P., R.J. Allan, L. Ashcroft, P. Brohan, R.J. Dunn, M.J. Menne, P.R. Pearce, J. Picas, K.M. Willett, M. Benoy, S. Bronnimann, P.O. Canziani, J. Coll, R. Crouthamel, G.P. Compo, D. Cuppett, M. Curley, C. Duffy, I. Gillespie, J. Guijarro, S. Jourdain, E.C. Kent, H. Kubota, T.P. Legg, Q. Li, J. Matsumoto, C. Murphy, N.A. Rayner, J.J. Rennie, E. Rustemeier, **L.C. Slivinski**, V. Slonosky, A. Squintu, B. Tinz, M.A. Valente, S. Walsh, X.L. Wang, N. Westcott, K. Wood, S.D. Woodruff, and S.J. Worley, 2017: Toward an integrated set of surface meteorological observations for climate science and applications. *Bulletin of the American Meteorological Society*, 98, 2680 – 2702. https://doi.org/10.1175/BAMS-D-16-0165.1

Slivinski, L.C., L.J. Pratt, I.I. Rypina, M.M. Orescanin, B. Raubenheimer, J. MacMahan, and S. Elgar, 2017: Assimilating Lagrangian data for parameter estimation in a multiple-inlet system. *Ocean Modelling*, 113, 131 – 144. https://doi.org/10.1016/j.ocemod.2017.04.001

Xia, C., C. Cochrane, J. DeGuire, G. Fan, E. Holmes, M. McGuirl, P. Murphy, J. Palmer, P. Carter, **L.C. Slivinski**, and B. Sandstede, 2017: Assimilating Eulerian and Lagrangian data in traffic-flow models. *Physica D*, 346, 59 – 72. https://doi.org/10.1016/j.physd.2017.02.004

Slivinski, L.C., and C. Snyder, 2016: Exploring practical estimates of the ensemble size necessary for particle filters. *Monthly Weather Review*, 144(3), 861 – 875. https://doi.org/10.1175/MWR-D-14-00303.1

Slivinski, L.C., E.T. Spiller, A. Apte, and B. Sandstede, 2015: A hybrid particle-ensemble Kalman filter for Lagrangian data assimilation. *Monthly Weather Review*, 143(1), 195 – 211. https://doi.org/10.1175/MWR-D-14-00051.1

OTHER PUBLICATIONS & DATASETS

Compo, G. P., **L.C. Slivinski**, et. al. (2019): *The International Surface Pressure Databank version 4*. Research Data Archive at the National Center for Atmospheric Research, Computational and Information Systems Laboratory. http://rda.ucar.edu/datasets/ds132.2/. Accessed 31 Oct. 2019.

Slivinski, L. C., et al. 2019. *NOAA-CIRES-DOE Twentieth Century Reanalysis Version 3*. Research Data Archive at the National Center for Atmospheric Research, Computational and Information Systems Laboratory. https://doi.org/10.5065/H93G-WS83. Accessed 31 Oct. 2019.

Slivinski, L.C., E.T. Spiller, and A. Apte, 2015: A hybrid particle-ensemble Kalman filter for high-dimensional Lagrangian data assimilation. *Dynamic Data-Driven Environmental Systems Science*. Ed. Sai Ravela, Adrian Sandu. Volume 8964 of Lecture Notes in Computer Science, pp 263-273. Springer International Publishing. https://doi.org/10.1007/978-3-319-25138-7_24

Slivinski, L.C., A.R. Margetts, and D.W. Bliss, 2011: Sparse space-time equalization with l1 norm. *Asilomar Conference on Signals, Systems, and Computers*. Pacific Grove, CA. https://doi.org/10.1109/ACSSC.2011.6190282

Cigna, J., P. Davé, C. Hickey, J. Holzberger, M. Kuhn, S. Kwok, B. O'Haver, E. Ryan, and **L. Slivinski**, 2009: Specializing pedestrian maps to address the needs of people using wheelchairs: A case study in community-sustainable information systems. *(Undergraduate Thesis.)* Available from the Digital Repository at the University of Maryland (http://hdl.handle.net/1903/9076).

INVITED PRESENTATIONS

Slivinski, L.C., G.P. Compo, J.S. Whitaker, P.D. Sardeshmukh, P. Brohan, B. Giese, C. McColl, and R. Allan, 2019: **Capturing nearly 200 years of storms in the 20th Century Reanalysis version 3.** Talk. *South America C3S Data Rescue Capacity Building Workshop and ACRE Meeting*, UTN, Buenos Aires, Argentina.

Slivinski, L. C., A. Apte, E. Spiller, and B. Sandstede, 2018: **Recent applications of the hybrid particle-ensemble Kalman filter in Lagrangian data assimilation**. Talk. *Applied Math Department Dynamics Seminar*, Univ. of Colorado, Boulder, CO, USA.

Slivinski, L.C., G. P. Compo, J. S. Whitaker, and P. D. Sardeshmukh, 2017: **Status of, and plans for, the 20th Century Reanalysis**. Talk. *The 10th Atmospheric Circulation Reconstructions over the Earth Workshop*, Auckland, New Zealand.

Slivinski, L.C., G. P. Compo, J. S. Whitaker, and P. D. Sardeshmukh, 2017: **Improvements in the 20th Century Reanalysis version 3**. Talk. *5th International Conference on Reanalysis*, Rome, Italy.

Slivinski, L.C., G. P. Compo, P. D. Sardeshmukh, J. S. Whitaker, J.-W. A. Wang, K. Friedman, and C. McColl, 2017: **The impact of observations on data assimilation: Results from data-denial experiments**. Talk. *NOAA EN3R PSD-NCEP Workshop*, College Park, MD, USA.

Slivinski, L.C., G. P. Compo, J. S. Whitaker, and P. D. Sardeshmukh, 2017**: Opportunities for improvement in the Twentieth Century Reanalysis**. Talk. *Banff International Research Station Workshop*, Banff, Alberta, Canada.

Slivinski, L.C., 2016: **An application of Lagrangian data assimilation to Katama Bay, MA**. Talk. *Mathematics and Climate Research Network webinar*.

Slivinski, L.C., 2016: **Discussion on data assimilation**. Panelist. *Meeting on Mathematical Issues in Sea-Ice Modeling and Data Assimilation*, Nansen Environmental and Remote Sensing Center, Bergen, Norway.

Slivinski, L.C., 2015: **Extracting the most from drifter trajectories: A method for Lagrangian data assimilation**. Talk. *Midwest Mathematics and Climate Conference*, Lawrence, KS, USA.

OTHER SELECTED PRESENTATIONS

Slivinski, L.C., J.S. Whitaker, D. Lippi, J. Carley, G.P. Compo, C. Alexander, 2021: **Global Hourly-Updating Data Assimilation: A Work in Progress**. Talk. *American Meteorological Society Annual Meeting,* virtual.

Slivinski, L.C., G.P. Compo, J.S. Whitaker, and P.D. Sardeshmukh, 2020: **Assimilating 200 Years of Weather: The Twentieth-Century Reanalysis Version 3 System**. Talk. *American Meteorological Society Annual Meeting*, Boston, MA, USA.

Slivinski, L.C., G.P. Compo, J.S. Whitaker, P.D. Sardeshmukh, P. Brohan, B. Giese, C. McColl, and R. Allan, 2018: **Capturing more than 100 years of storms in the 20th Century Reanalysis version 3.** Talk. *AGU Fall Meeting*, Washington, D.C., USA.

Slivinski, L.C., A. Apte, and E. Spiller, 2018: **Recent applications of the hybrid particle-ensemble Kalman filter in Lagrangian data assimilation**. Talk. *The 8th EnKF Data Assimilation Workshop*, Montreal, Quebec, Canada.

Slivinski, L.C., G.P. Compo, J.S. Whitaker, and P.D. Sardeshmukh, 2017: **Quantifying uncertainty in the 20th Century Reanalysis version 2c, and improvements in version 3.** Poster. *AGU Fall Meeting*, San Francisco, CA, USA.

Slivinski, L.C., G.P. Compo, J.S. Whitaker, and P.D. Sardeshmukh, 2016: **Biases in the 20th Century Reanalysis version 2c and a comparison to version 3.** Talk. *9th ACRE Workshop and Historical Weather and Climate Data Forum*, University of Maynooth, Ireland.

Slivinski, L.C., L. Pratt, I. Rypina, M. Orescanin, S. Elgar, and B. Raubenheimer, 2016: **An application of Lagrangian data assimilation to Katama Bay, MA**. Poster. *AGU Ocean Sciences Meeting*, New Orleans, LA, USA.

Slivinski, L.C., L. Pratt, and I. Rypina, 2015: **An application of Lagrangian data assimilation to Katama Bay, MA**. Talk. *SIAM Conference on Applications of Dynamical Systems*, Snowbird, UT, USA.

Slivinski, L.C., L. Pratt, and I. Rypina, 2014: **An application of Lagrangian data assimilation to Katama Bay using ensemble methods**. Talk. *MURI 3D+1 Workshop*, Miami, FL, USA.

Slivinski, L.C., A. Apte, E. Spiller, and B. Sandstede, 2014: **A hybrid particle-ensemble Kalman filter scheme for Lagrangian data assimilation.** Talk. *SIAM Conference on Uncertainty Quantification*, Savannah, GA, USA.

Slivinski, L.C. and C. Snyder, 2013: **Particle filtering for nonlinear systems: Proposals and scalability.** Talk. *IMA Hot Topics Workshop: Predictability in Earth Systems Processes*, University of Minnesota, MN, USA.

Slivinski, L.C., A. Apte, E. Spiller, and B. Sandstede, 2013: **Lagrangian data assimilation and its applications to geophysical fluid flows**. Poster. *Sixth WMO Symposium on Data Assimilation*, College Park, MD, USA.

Slivinski, L.C., A. Apte, E. Spiller, and B. Sandstede, 2013: **Lagrangian data assimilation and its applications to geophysical fluid flows**. Poster. *SIAM Annual Meeting*, San Diego, CA, USA.

Slivinski, L.C., A. Apte, E. Spiller, and B. Sandstede, 2013: **Lagrangian data assimilation and its applications to geophysical fluid flows**. Talk. *SIAM Conference on Applications of Dynamical Systems*, Snowbird, UT, USA.

Slivinski, L.C., A. Apte, E. Spiller, and B. Sandstede, 2012: **Lagrangian data assimilation and its applications to geophysical fluid flows**. Talk. *Colloquium,* TIFR-CAM, Bangalore, India.

Slivinski, L.C., A.R. Margetts, and D.W. Bliss, 2011: **Sparse space-time equalization with *l*1 norm**. Poster. *IEEE Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, USA

PROFESSIONAL DEVELOPMENT

Spring 2018	American Meteorological Society Summer Policy Colloquium
	10-day immersion in science policy, Washington, D.C.

Spring 2015	National Network for Ocean and Climate Change Interpretation *Study Circle Science Fellow*
Summer 2013	Interdisciplinary Summer School: Data Assimilation in the Geosciences, University of Maryland, College Park
Summer 2012	International Summer School on Advanced Data Assimilation for Geosciences, Les Houches, France.

MEMBERSHIPS & OTHER INFORMATION

Member of the American Meteorological Society and the American Geophysical Union.

Former member of the Society for Industrial and Applied Mathematics, the Mathematics and Climate Research Network, the Postdoctoral Association of WHOI *(Secretary, Dept. Representative)*, the Rose Whelan Society of Brown, and Women in Math at the University of Maryland *(Secretary, Undergraduate Representative)*.

Languages: English, LaTeX, MATLAB, Python, NCL.

Experience with Unix/Linux, Fortran, R, Perl.