Laura C. Slivinski

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EDUCATION

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

PROFESSIONAL EXPERIENCE

Apr 2023 – pres.	**Research Mathematical Statistician** *(ZP-1529-4)* NOAA Physical Sciences Laboratory Modeling and Data Assimilation Division Reanalysis and Data Assimilation Team *Sparse-input global reanalysis; observation impact studies using data-denial experiments; global hourly-updating data assimilation; coupled data assimilation.*
Sept 2015 – Apr 2023	**Research Scientist**, CU Boulder's Cooperative Institute for Research in Environmental Sciences (CIRES) at NOAA PSL, Boulder, CO.
Sept 2014 – Jul 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

2025 *(nom. 2018)*	Presidential Early Career Award for Scientists and Engineers
2022	CIRES Cash-in-a-Flash Award *For outstanding service and dedication to the Reanalysis and Data Assimilation Team*
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, 2021	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

GRANTS AWARDED

2019 – 2022	*Principal Investigator* (co-PI Gilbert P. Compo). "Development of a Global Hourly Updating Data Assimilation System", National Oceanic and Atmospheric Administration; $877,892.00.

PROFESSIONAL MEMBERSHIPS

Former member of the American Meteorological Society, the American Geophysical Union, 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)*.

PEER-REVIEWED PUBLICATIONS

Slivinski, L. C., Whitaker, J. S., Frolov, S., Smith, T. A., & Agarwal, N., 2025: Assimilating observed surface pressure into ML weather prediction models. *Geophysical Research Letters*, 52, e2024GL114396. https://doi.org/10.1029/2024GL114396.

Sun, L., A. Apte, **L. C. Slivinski**, E. T. Spiller, 2025: Exploring the Potential of Strongly Coupled Lagrangian Data Assimilation in an Ocean-Atmosphere System. *Mon. Wea. Rev.* **153**, 425–445, https://doi.org/10.1175/MWR-D-23-0284.1.

Stammer, D., . . ., **L. C. Slivinski**, et al., 2024: Earth System Reanalysis in Support of Climate Model Improvements. *Bull. Amer. Meteor. Soc.*, https://doi.org/10.1175/BAMS-D-24-0110.1.

Stanley, Z., C. Draper, S. Frolov, **L. C. Slivinski**, W. Huang, J. S. Whitaker and H. R. Winterbottom, 2024: Vertical localization for strongly coupled data assimilation: experiments in a global coupled atmosphere-ocean model. *J. Adv. Model. Earth Syst.*, e2023MS003783, https://doi.org/10.1029/2023MS003783.

Storto, A., Frolov, S., **Slivinski, L.**, and Yang, C.: Correction of Air-Sea Heat Fluxes in the NEMO Ocean General Circulation Model Using Neural Networks, *Geosci. Model Dev. Discuss.* [preprint], https://doi.org/10.5194/gmd-2024-185, in review, 2024.

Trent, ..., **L. C. Slivinski**, et al., 2024: Evaluation of Total Column Water Vapour Products from Satellite Observations and Reanalyses within the GEWEX Water Vapour Assessment. *Atmos. Chem. Phys.*, **24**, 9667–9695, https://doi.org/10.5194/acp-24-9667-2024

Frolov, S., C. S. Rousseaux, T. Auligne, D. Dee, R. Gelaro, P. Heimbach, I. Simpson, and **L. Slivinski**, 2023. Road Map for the Next Decade of Earth System Reanalysis in the United States. *Bull. Amer. Meteor. Soc.*, 104, E706–E714, https://doi.org/10.1175/BAMS-D-23-0011.1

Hawkins, E., P. Brohan, S. Burgess, S. Burt, G. Compo, S. Gray, I. Haigh, H. Hersbach, K. Kuijjer, O. Martinez-Alvarado, C. McColl, A. Schurer, **L. Slivinski**, and J. Williams, 2023. Rescuing historical weather observations improves quantification of severe windstorm risks. *Nat. Hazards Earth Syst. Sci.*, 23, 1465–1482, https://doi.org/10.5194/nhess-23-1465-2023

Yu, B., X.L. Wang, Y. Feng, R. Chan, G.P. Compo, **L.C. Slivinski**, P.D. Sardeshmukh, M. Wehner, and X.-Y. Yang, 2022. Northern Hemisphere Extratropical Cyclone Activity in the Twentieth Century Reanalysis Version 3 (20CRv3) and Its Relationship with Continental Extreme Temperatures. *Atmosphere* 13 (8): 1166. https://doi.org/10.3390/atmos13081166

Lorrey, A.M., P.R. Pearce, R. Allan, C. Wilkinson, J.-M. Woolley, E. Judd, S. Mackay, S. Rawhat, **L.C. Slivinski**, S. Wilkinson, E. Hawkins, P. Quesnel, G.P. Compo, 2022: Meteorological data rescue: Citizen science lessons learned from Southern Weather Discovery. *Patterns* 3(6). https://doi.org/10.1016/j.patter.2022.100495

Slivinski, L.C., D.E. Lippi, J.S. Whitaker, G. Ge, J.R. Carley, C. Alexander, G.P. Compo, 2022: Overlapping Windows in a Global Hourly Data Assimilation System. *Monthly Weather Review* 150(6). https://doi.org/10.1175/mwr-d-21-0214.1

Broennimann, S., P. Stucki, J. Franke, V. Valler, Y. Brugnara, R. Hand, **L.C. Slivinski**, G.P. Compo, P.D. Sardeshmukh, M. Lang, 2022: Influence of warming and atmospheric circulation changes on multidecadal European flood variability. *Climate of the Past* 18(4). https://doi.org/10.5194/cp-18-919-2022

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

PUBLISHED 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.

CONFERENCE PROCEEDINGS

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 *l*1 norm. *Asilomar Conference on Signals, Systems, and Computers*. Pacific Grove, CA. https://doi.org/10.1109/ACSSC.2011.6190282

INVITED PRESENTATIONS

Slivinski, L.C., G.P. Compo, J.S. Whitaker, P.D. Sardeshmukh, 2024: **Sparse-Input Reanalysis: How the 20th Century Reanalysis (20CR) captures 200 years of weather using surface observations.** Talk. *6th International Conference on Reanalysis,* Tokyo, Japan.

Slivinski, L.C. and G.P. Compo, 2022: **Overview of different periods for reanalysis.** Talk. *CLIVAR Workshop on Future US Earth System Reanalysis*, Boulder, CO, USA.

Slivinski, L.C., G.P. Compo, J.S. Whitaker, P.D. Sardeshmukh, P. Brohan, R. Allan, et al., 2021: **The 20th Century Reanalysis.** Talk (virtual). *26th UN Climate Change Conference of the Parties (COP26)*. Glasgow, United Kingdom.

Slivinski, L.C., G.P. Compo, P.D. Sardeshmukh, J.S. Whitaker, 2021: **A synoptic to decadal evaluation of the 20th Century Reanalysis version 3**. Talk. *U. Bern Institute of Geography's Colloquium in Climatology, Climate Impact and Remote Sensing*. Bern, Switzerland.

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, N. Agarwal, S. Frolov, T. Smith, 2024: **Assimilating real observations with ML-based models.** Talk. *International Symposium on Data Assimilation*. Kobe, Japan.

Slivinski, L. C., D. E. Lippi, J. S. Whitaker, G. Ge, J. R. Carley, C. Alexander, G. P. Compo, 2022: **Overlapping Windows in a Global Hourly Data Assimilation System.** Talk. *International Symposium on Data Assimilation.* Fort Collins, CO, USA.

Slivinski, L. C., D. E. Lippi, J. S. Whitaker, G. Ge, J. R. Carley, C. Alexander, G. P. Compo, 2022: **Overlapping Windows in a Global Hourly Data Assimilation System.** Talk. *American Meteorological Society Annual Meeting*. virtual.

Slivinski, L. C., D. E. Lippi, J. S. Whitaker, G. Ge, J. R. Carley, C. Alexander, G. P. Compo, 2021: **Progress towards a global hourly-updating data assimilation system.** Talk. *WCRP-WWRP Symposium on Data Assimilation and Reanalysis.* virtual.

Slivinski, L. C., G. P. Compo, P. D. Sardeshmukh, and J. S. Whitaker, 2021: **A synoptic to decadal evaluation of the 20th Century Reanalysis Version 3**. Talk. *WCRP-WWRP Symposium on Data Assimilation and Reanalysis.* 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, 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. 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.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 SERVICE *(last ten years)*

Aug. 2022 – pres.	**Seminar committee member**, NOAA Physical Sciences Laboratory
Oct. 2024	**Scientific Organizing Committee member,** 6th International Conference on Reanalysis
Oct. 2022	**Session chair**, "Reanalysis"; International Symposium on Data Assimilation – Online
2022 – 2023	**Mentor**, CIRES Mentoring Program
July 2022	**Career panelist**, Research Experience for Community College Students (RECCS); CU Boulder
May 2022	**Scientific Organizing Committee member**, CLIVAR Workshop on Future US Earth System Reanalysis
Jan. 2022	**Session chair**, "Data Assimilation Methodology Advancement for Numerical Weather Prediction" at the AMS Annual Meeting
Sept. 2021	**Panelist**, Science Career Paths panel at the NOAA booth; CU Denver Career Fair
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 – pres.	**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
2014 – pres.	**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**.**

PROFESSIONAL DEVELOPMENT *(last ten years)*

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*