ZOFIA STANLEY

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EDUCATION

Doctor of Philosophy | ***Applied Mathematics*** — Aug. 2017 – Aug. 2021
University of Colorado, Boulder — Boulder, CO
Advisors: Ian Grooms, William Kleiber

Master of Science | ***Applied Mathematics*** — Aug. 2017 – Dec. 2020
University of Colorado, Boulder — Boulder, CO

Bachelor of Science | ***Mathematics*** — Aug. 2011 – May 2015
Brown University — Providence, RI

Semester Abroad — Jan. 2014 – May 2014
Budapest Semesters in Mathematics — Budapest, Hungary

RESEARCH EXPERIENCE

Research Scientist — Sep. 2021 – Present
Cooperative Institute for Research in Environmental Sciences — Boulder, CO

- Modeling air-sea covariances for strongly coupled data assimilation in NOAA's Unified Forecast System.
- Assimilating SMAP observations of soil moisture and assessing the impact on predicted 2-m air temperature.

Graduate Research Assistant — May 2018 – Aug. 2021
University of Colorado, Boulder, Department of Applied Mathematics — Boulder, CO

- Constructed multivariate localization functions for use in strongly coupled data assimilation.
- Developed stochastic correction to error in large scale density field in ocean models.
- Collaborated on multidisciplinary team with physical oceanographers and ocean modelers.

Graduate Research Assistant — June 2017 – Aug. 2017
University of Colorado, Boulder, Department of Applied Mathematics — Boulder, CO

- Related motion of cells during wound healing to motion of particles in a fluid.

Undergraduate Researcher — June 2014 – Aug. 2014
Research Experience for Undergraduates (REU), San Diego State University — San Diego, CA

- Studied factorization theory in numerical monoids analytically and numerically.
- Discovered a novel way to generate numerical monoids with delta set of size one.

FELLOWSHIPS

National Science Foundation Graduate Research Fellowship — Sep. 2019 – Aug. 2021

Figueroa Family Fellowship — Jan. 2019

PUBLICATIONS

1. Grooms, I., Renaud, C., **Stanley, Z.**, & Yang, L. (2022). Analog Ensemble Data Assimilation in the Quasigeostrophic Coupled Model. *Submitted to QJRMS*
2. Kenigson, J. S., Adcroft, A., Bachman, S. D., Castruccio, F., Grooms, I., Pegion, P., & **Stanley, Z.** (2022). Parameterizing the impact of unresolved temperature variability on the large-scale density field: 2. Modeling. *Journal of Advances in Modeling Earth Systems*, 14, e2021MS002844. doi.org/10.1029/2021MS002844
3. **Stanley, Z.**, Grooms, I., & Kleiber, W. (2021). Multivariate localization functions for strongly coupled data assimilation in the bivariate Lorenz 96 system, *Nonlin. Processes Geophys.*, 28, 565–583, doi.org/10.5194/npg-28-565-2021, 2021.

4. Naumenko, D. J., Dykes, J., O'Connor, G. K., **Stanley, Z.**, Affara, N., Doel, A. M., Drammeh, S., Dunger, D. B., Faal, A., Ong, K. K., Sosseh, F., Prentice, A. M., Moore, S. E., & Bernstein, R. M. (2021). A Novel method for the identification and quantification of weight faltering. *American Journal of Physical Anthropology*, 175(1), 282–291. doi.org/10.1002/ajpa.24217

5. **Stanley, Z.**, Grooms, I., Kleiber, W., Bachman, S. D., Castruccio, F., & Adcroft, A. (2020). Parameterizing the Impact of Unresolved Temperature Variability on the Large-Scale Density Field: Part 1. Theory. *Journal of Advances in Modeling Earth Systems*, 12(12). doi.org/10.1029/2020MS002185

6. **Stanley, Z.**, Bachman, S. D., & Grooms, I. (2020). Vertical Structure of Ocean Mesoscale Eddies with Implications for Parameterizations of Tracer Transport. *Journal of Advances in Modeling Earth Systems*, 12(10). doi.org/10.1029/2020MS002151

7. North, J., **Stanley, Z.**, Kleiber, W., Deierling, W., Gilleland, E., & Steiner, M. (2020). A statistical approach to fast nowcasting of lightning potential fields. *Advances in Statistical Climatology, Meteorology and Oceanography*, 6(2), 79–90. doi.org/10.5194/ascmo-6-79-2020

Selected Presentations & Posters

1. Z. Stanley, I. Grooms, W. Kleiber, Aug. 2022: **Multivariate Localization Functions for Use in Strongly Coupled Data Assimilation**. Invited Talk. *Joint Statistical Meetings,* Washington D.C., USA

2. Z. Stanley, C. Draper, S. Frolov, W. Huang, L. Slivinski, J. Whitaker, H. Winterbottom, June 2022: **Localization for Strongly Coupled Data Assimilation: Experiments with LETKF and GETKF**. Poster. *8th International Symposium on Data Assimilation,* Fort Collins, CO, USA

3. Z. Stanley, J. Kenigson, A. Adcroft, S. Bachman, F. Castruccio, I. Grooms, P. Pegion, Dec 2021: **A Stochastic Correction to the Large Scale Density Field in Ocean Models: Theory and Dynamical Effects.** Invited Talk. *AGU Fall Meeting,* Virtual

4. Z. Stanley, I. Grooms, W. Kleiber, May 2021: **Multivariate Localization Functions for Strongly Coupled Data Assimilation.** Talk. *International Symposium on Data Assimilation - Online,* Virtual

5. Z. Stanley, A. Adcroft, S. Bachman, F. Castruccio, I. Grooms, W. Kleiber, Aug. 2020: **Modeling Stochastic Density Errors in Ocean Models.** Talk. *SIAM Mathematics of Planet Earth,* Virtual

6. Z. Stanley, A. Adcroft, S. Bachman, F. Castruccio, I. Grooms, W. Kleiber, Feb. 2020: **A Stochastic Model of the Isopycnal Slope for Use in the Gent-McWilliams Parameterization.** Talk. *AGU Ocean Sciences Meeting,* San Diego, CA, USA

7. Z. Stanley, A. Adcroft, S. Bachman, F. Castruccio, I. Grooms, W. Kleiber, Jan. 2020: **A Stochastic Model of the Isopycnal Slope for Use in the Gent-McWilliams Parameterization.** Talk. *COMMODORE Meeting,* Hamburg, Germany

8. Z. Stanley, A. Adcroft, S. Bachman, F. Castruccio, I. Grooms, W. Kleiber, Sep. 2019: **A Stochastic Model of the Isopycnal Slope for Use in the Gent-McWilliams Parameterization.** Talk. *SIAM Northern States Section Meeting,* Laramie, WY, USA

9. Z. Stanley, A. Adcroft, S. Bachman, F. Castruccio, I. Grooms, W. Kleiber, June 2019: **A Stochastic Model of the Isopycnal Slope for Use in the Gent-McWilliams Parameterization.** Talk. *Ocean Model Working Group Meeting,* NCAR, Boulder, CO, USA

10. Z. Stanley, I. Grooms, W. Kleiber, June 2019: **A Stochastic Model of Eddy Velocity and Density Anomalies.** Poster. *22nd Conference on Atmospheric and Oceanic Fluid Dynamics,* Portland, ME, USA

11. B. Sandstede, Z. Stanley, July 2018: **A Course on "Race and Gender in the Scientific Community".** Talk. *SIAM Conference on Applied Mathematics Education*, Portland, OR, USA

12. A. Butcher, D. Parker, A. Plummer, Z. Stanley, J. Watson-Daniels, Mar. 2015: **Undergraduate-driven Interventions to Increase Inclusivity in Science.** Talk. *National Diversity Summit,* Brown University, Providence, RI, USA

13. Z. Stanley, V. Ponomarenko, Jan. 2015: **Delta Sets of Numerical Semigroups.** Poster. *Undergraduate Poster Session, Joint Mathematics Meetings,* San Antonio, TX, USA

Teaching Experience

Graduate Teaching Assistant Aug. 2017 – May 2018
University of Colorado, Boulder, Department of Applied Mathematics Boulder, CO

- Calculus I and II

Graduate Instructor Aug. 2017 – May 2018
University of Colorado, Boulder, Department of Applied Mathematics Boulder, CO

- Calculus I and II Workgroups

AmeriCorps Math Fellow Aug. 2016 – May 2017
Merrill Middle School Denver, CO

- Designed and implemented math curriculum for in-school, small-group instruction to close the opportunity gap in a public middle school.

Site Leader Sep. 2015 – May 2016
Open World Learning Denver, CO

- Led an after school program where I taught computer science and used technology to ignite a love of learning in elementary school students.

Academic Service and Leadership

Organizing Committee Member Aug. 2022 – Aug. 2024
International Symposium on Data Assimilation - Online Virtual

Working Group Member Aug. 2021 – Aug. 2023
NEMO Eddy Closure Working Group Virtual

Graduate Student Representative Aug. 2020 – July 2021
University of Colorado, Boulder, Department of Applied Mathematics Boulder, CO

President, Association for Women in Mathematics June 2019 – May 2020
University of Colorado, Boulder Boulder, CO

Vice President, Association for Women in Mathematics Jun. 2018 – June 2019
University of Colorado, Boulder Boulder, CO

Statistical Collaborator Jan. 2018 – Aug. 2021
Laboratory for Interdisciplinary Statistical Analysis, University of Colorado, Boulder Boulder, CO

University Educator Aug. 2017 – Jan. 2018
Partnerships for Informal Science Education in the Community, Sunset Middle School Longmont, CO

Technical Skills

Programming: Python, MATLAB, R, Mathematica, Java
Document Creation: Microsoft Office Suite, LaTeX, Markdown