# Rebecca Elizabeth Morrison

Department of Computer Science
1111 Engineering Drive
ECOT 717, 430 UCB
Boulder, CO 80309

**phone:** +1 303-735-6139
**email:** rebeccam@colorado.edu
**webpages:** www.colorado.edu/cs/rebecca-morrison
rebeccaem.github.io

## Position

Assistant Professor, Department of Computer Science, University of Colorado Boulder, 08/18 - present

## Education

Massachusetts Institute of Technology, Postdoc in Aeronautics and Astronautics, Advisor: Dr. Youssef Marzouk, 02/16 – 07/18

The University of Texas at Austin, Ph.D. in Computational Science, Engineering, and Mathematics, Advisor: Dr. Robert Moser, Dissertation: *On the representation of model inadequacy: A stochastic operator approach*, 01/16

The University of Texas at Austin, M.S. in Computational and Applied Mathematics, 05/12

Scripps College, B.A. in Physics, Advisor: Dr. Adam Landsberg, 05/08

## Grants & Awards

NASA Space Weather with Quantified Uncertainties: *Ensemble Learning for Accurate and Reliable Uncertainty Quantification* (Co-PI), with Dr. Enrico Camporeale (PI), and Drs. Curt de Koning, Eric Adamson, and Thomas Berger (Co-PIs) $2,891,954, 10/20 – 09/23

Johnson&Johnson Women in STEM2D Award: *Discovering Dynamic Structure from Data* (PI), $150,000, 08/19 – 07/22

Association for Women in Mathematics/NSF Travel Grant, $600, 2017

Computational and Applied Mathematics Fellowship, UT Austin, 09/09 – 08/13

## Publications

* Co/first authors

15. R. Baptista,* R. E. Morrison,* O. Zahm, Y. Marzouk. *Learning non-Gaussian graphical models via Hessian scores and triangular transport.* (In revision)
arxiv.org/abs/2101.03093

14. P. W. Marcy, R. E. Morrison. *"Stochastic Inverse Problems" and Changes-of-Variables.* (In review)
arxiv.org/abs/2211.15730

13. T. Price-Broncucia, R. Morrison. *Ultra-short time batching and unscented Kalman inversion for calibration of expensive chaotic models.* United States National Congress on Computation Mechanics 2023, Albuquerque, NM. **Invited to submit full-length paper for student paper competition (Submitted).**

12. T. Price-Broncucia, R. Morrison. *Multi-time unscented Kalman inversion for calibration of expensive chaotic models.* 14th International Conference on Applications of Statistics and Probability in Civil Engineering 2023, Dublin, Ireland.

11. R. Bandy, R. Morrison. *Quantifying model form uncertainty in spring-mass-damper systems.* Proceedings of IMAC-XLI Conference and Exposition 2023, Austin, TX. **Best Paper Award.**

10. R. E. Morrison, R. Baptista, E. Basor. *Diagonal nonlinear transformations preserve structure in covariance and precision matrices.* Journal of Multivariate Analysis, 104983 (2022).

9. M. Tosin, E. Dantas, A. Cunha, R. E. Morrison. *ARBO: Arbovirus Modeling and Uncertainty Quantification Toolbox.* Software Impacts 12, 100252 (2022).

8. R. E. Morrison. *Exact reduction of the generalized Lotka-Volterra equations via integral and algebraic substitutions.* Computation 2021 (9)5, 49.

7. R. E. Morrison. *Data-driven corrections of partial Lotka-Volterra models.* Entropy 2020 (22)11, 1313.

6. R. E. Morrison, A. Cunha. *Embedded discrepancy operators: A case study of Zika modeling.* Chaos: An Interdisciplinary Journal of Nonlinear Science, 30(5):051103 (2020).

5. R. E. Morrison, T. A. Oliver, R. D. Moser. *Representing model inadequacy: A stochastic operator approach.* ASA/SIAM Journal on Uncertainty Quantification 6 (2), 457-496 (2018).

4. R. E. Morrison, R. Baptista, Y. Marzouk. *Beyond normality: Learning sparse probabilistic models in the non-Gaussian setting.* Advances in Neural Information Processing Systems 30 (NIPS 2017), 11 pages.

3. R. E. Morrison, C. M. Bryant, G. Terejanu, S. Prudhomme, K. Miki. *Data partition methodology for validation of predictive models.* Computers and Mathematics with Applications, 66 (10), 2114-2125 (2013).

2. R. E. Morrison, C. M. Bryant, G. Terejanu, K. Miki, S. Prudhomme. *Optimal data split methodology for model validation.* Proceedings of the World Congress on Engineering and Computer Science 2011, p1038-1043. **Best Student Paper Award.**

1. R. E. Morrison, A. S. Landsberg, E. J. Friedman. *Combinatorial games with a pass: A geometric approach.* Chaos 21, 043108 (2011).

## Selected Talks

ICERM Workshop on Optimal Transport in Data Science, 5/11/23; Colorado School of Mines, Seminar in Department of Applied Mathematics and Statistics, 5/5/23; MIT Workshop on Space Weather with Quantification of Uncertainty (with R. Bandy, poster), 3/23; SIAM Conference on Mathematics of Data Science, 09/22; USACM UQ for Machine Learning Integrated Physics Modeling (with T. Price-Broncucia), 08/22; SIAM Conference on Uncertainty Quantification, 04/22; USACM TTA UQ and Probabilistic Modeling (invited to give first talk of new seminar series), 2021; Colloquium in CS Department, Rio de Janeiro State University, 08/25/21; Caltech CMX (Computational Mathematics + X) Seminar, 12/9/20; Potsdam Institute for Climate Impact Research, Workshop on Uncertainties in Data Analysis (Keynote), 10/1/20; Computing Research Association 2020 Virtual Conference Lightning Talk; Argonne National Laboratory LANS (Laboratory for Applied Mathematics, Numerical Software, and Statistics) Seminar, 05/20/20; APPM Seminar, CU Boulder, 09/19; SIAM Conference on Dynamical Systems (with R. Bandy, poster), 05/19; SAMSI Workshop on Statistical Perspectives on Uncertainty Quantification, 05/17/19; SIAM Conference on Computational Science & Engineering, 03/19; World Congress on Computational Mechanics, 07/18; SIAM Conference on Uncertainty Quantification, 04/18; Workshop on Computational Uncertainty Quantification, Banff Internation Research Station, 10/17; Stanford, Institute for Computational Mathematics and Engineering, *Talks Seminar, 05/1/17

## Courses Taught

CSCI 4830/7000: The Writing of Science (Graduate Writing Workshop) (F21)

CSCI 7000: Validation and Uncertainty Quantification for Computational Models (F18, S20)

CSCI 5822: Probabilistic Models of Human and Machine Intelligence (S21, S23)

CSCI 4802/5802: Data Science Team (F20, S21)

CSCI 2820: Linear Algebra with Computer Science Applications (S19, F19, F22)

Faculty Sponsor for UPSCALE (Uncertainty, Probability, Scientific Computing And LEearning) Reading Group (F19 – present)

## Professional Service

NSF Reviewer, 2023

Reviewer for NCWIT 2020, 2021, 2023 Award for Aspirations in Computing

Secretary for SIAM UQ Activity Group, 1/21 – 12/22

Poster judge at SIAM Mathematics of Data Science 9/22

Organizer for the Workshop Celebrating Diversity (SIAM), 03/19 and 07/20

Mentor at Rocky Mountain Celebration of Women in Computing, 11/18

Reviewed articles for:
Advances in Neural Information Processing Systems (NeurIPS), Chaos, Computer Methods in Applied Mechanics and Engineering, Discrete Applied Mathematics, Entropy, Games of No Chance, IEEE/ACM Transactions on Networking, International Conference on Machine Learning (ICML), International Journal of Uncertainty Quantification, Mathematical Reviews, Mathematics, Nature Computational Science, Nonlinear Dynamics, Pattern Recognition Letters, Physica D, SIAM Journal on Scientific Computing, SIAM/ASA Journal on Uncertainty Quantification

Co/Organizer for minisymposia at:
ECCOMAS (6/22), SIAM UQ (4/22), USNCCM (7/21)

## University Service

CS Faculty Search Committee member, AY22–23

Representative for the CS Junior Faculty Assembly, 10/21 – 09/22

Faculty Mentor for the BOLD Center RedShirt S-STEM Program, 10/19 – 12/20

ECEE Faculty Search Committee member, AY20–21

CS Graduate Curriculum Committee member, 01/20 – 10/21

CS Undergraduate Curriculum Committee member, 08/18 – 12/19

Reviewer for Johnson&Johnson WiSTEM2D 2020 and 2021 awards (internal CU Boulder review)

School of Computing Task Force member, Spring 2019

## Membership

Society for Industrial and Applied Mathematics (SIAM)

Association for Women in Mathematics (AWM)

United States Association for Computational Mechanics (USACM)