

Rebecca Morrison

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POSITION

Assistant Professor, Department of Computer Science, University of Colorado Boulder, 8/18 – present

EDUCATION

Massachusetts Institute of Technology, Postdoc in Aeronautics and Astronautics, Advisor: Dr. Youssef Marzouk, 2/16 – 7/18

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*, 1/16

The University of Texas at Austin, M.S. in Computational and Applied Mathematics, 5/12

Scripps College, B.A. in Physics, Advisor: Dr. Adam Landsberg, 5/8

GRANTS & AWARDS

NASA Space Weather with Quantified Uncertainties: *Ensemble Learning for Accurate and Reliable Uncertainty Quantification* (Co-PI), with Dr. Enrico Camporeale (PI) and Dr. Thomas Berger (Co-PI) \$2,891,954 (My portion: \$469,299), 10/20 – 9/23

Johnson&Johnson Women in STEM2D Award: *Discovering Dynamic Structure from Data* (PI), \$150,000, 8/19 – 7/22

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

Computational and Applied Mathematics Fellowship, UT Austin, 9/9 – 8/13

PUBLICATIONS

* Co-first authors, [†] Graduate students; Primary author listed first

Journal articles

11. R. Bandy,[†] R. Morrison. Stochastic model corrections for reduced Lotka-Volterra models exhibiting mutual, competitive, and predatory interactions. (In review) *Chaos: An Interdisciplinary Journal of Nonlinear Science*.
10. R. Baptista,* R. E. Morrison,* O. Zahm, Y. Marzouk. Learning non-Gaussian graphical models via Hessian scores and triangular transport. (In review) *Journal of Machine Learning Research*. arxiv.org/abs/2101.03093
9. P. W. Marcy, R. Morrison. “Stochastic Inverse Problems” and Changes-of-Variables. (In review) *Inverse Problems*. arxiv.org/abs/2211.15730
8. R. E. Morrison, R. Baptista, E. Basor. Diagonal nonlinear transformations preserve structure in covariance and precision matrices. *Journal of Multivariate Analysis*, 104983 (2022).
7. M. Tosin, E. Dantas, A. Cunha, R. E. Morrison. ARBO: Arbovirus Modeling and Uncertainty Quantification Toolbox. *Software Impacts* 12, 100252 (2022).

6. R. E. Morrison. Exact reduction of the generalized Lotka-Volterra equations via integral and algebraic substitutions. *Computation* 2021 (9)5, 49.
5. R. E. Morrison. Data-driven corrections of partial Lotka-Volterra models. *Entropy* 2020 (22)11, 1313.
4. 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).
3. 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).
2. 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).
1. R. E. Morrison, A. S. Landsberg, E. J. Friedman. Combinatorial games with a pass: A geometric approach. *Chaos: An Interdisciplinary Journal of Nonlinear Science* 21, 043108 (2011).

Peer-reviewed conference papers

5. 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 (1 of 12 slots, submitted).**
4. 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.
3. 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.**
2. 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 (NuerIPS 2017)*, 11 pages. (Acceptance rate: 21%)
1. 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.** (Acceptance rate: 53%)

PRESENTATIONS & OTHER WORKSHOPS

Invited Talks

Institute for Computational and Experimental Research in Mathematics (ICERM), Workshop on Optimal Transport in Data Science, Providence, RI, 5/11/23

Colorado School of Mines, Applied Mathematics and Statistics Colloquium, Golden, CO, 5/5/23

USACM TTA (Technical Thrust Area) on UQ and Probabilistic Modeling Seminar (first talk of new seminar series), (Virtual) 2/10/21

Rio de Janeiro State University, Computer Science Colloquium, (Virtual) 8/25/21

Caltech CMX (Computational Mathematics + X) Colloquium, (Virtual) 12/9/20

Potsdam Institute for Climate Impact Research, Workshop on Uncertainties in Data Analysis **Keynote**, (Virtual) 10/1/20

Computing Research Association (CRA) 2020 Virtual Conference Lightning Talk (selected to appear on CRA website after competition)

Argonne National Laboratory, Laboratory for Applied Mathematics, Numerical Software, and Statistics (LANS) Seminar, (Virtual) 5/20/20

CU Boulder, Applied Math Colloquium, Boulder, CO, 9/27/19

Statistical and Applied Mathematical Sciences Institute (SAMSI), Workshop on Statistical Perspectives on Uncertainty Quantification, Research Triangle Park, NC, 5/17/19

Johnson & Johnson Women in STEM2D Scholars Award Symposium, New Brunswick, NJ, 4/24/19

Banff International Research Station, Workshop on Computational Uncertainty Quantification, Banff, Canada, 10/9/17

Stanford, Institute for Computational Mathematics and Engineering, *Talks Seminar, Palo Alto, CA, 5/1/17

CU Boulder, Computer Science Colloquium, Boulder, CO, 4/13/17

MIT, Aerospace Computational Design Laboratory Seminar, Cambridge, MA, 2/26/16

UT Austin, Babuška Forum Seminar Series at The Oden Institute, Austin, TX, 9/28/12

Sandia National Laboratories, Org. 1544 (Validation and UQ) Seminar, Albuquerque, NM, 8/15/12

Conference Presentations

SIAM Conference on Mathematics of Data Science, San Diego, CA, 09/29/22

SIAM Conference on Uncertainty Quantification, (Virtual) 04/15/22

International Conference of the Engineering Mechanics Institute, (Virtual) 3/24/21

SIAM Conference on Computational Science & Engineering, Spokane, WA, 03/01/19

World Congress on Computational Mechanics, New York City, NY, 07/24/18

SIAM Conference on Uncertainty Quantification, Lausanne, Switzerland, 04/18/18

SIAM Conference on Computational Science & Engineering, Atlanta, GA, 03/01/17

Probabilistic Mechanics and Reliability Conference, Nashville, TN, 05/24/16

SIAM Conference on Uncertainty Quantification, Lausanne, Switzerland, 04/07/16

APS Division of Fluid Dynamics Annual Meeting, Boston, MA, 11/24/15

SIAM Workshop Celebrating Diversity, Salt Lake City, UT, 03/16/15

SIAM Conference on Computational Science & Engineering, Salt Lake City, UT, 03/14/15

APS Division of Fluid Dynamics Annual Meeting, San Francisco, CA, 11/25/14

SIAM Conference on Uncertainty Quantification, Savannah, GA, 04/01/14

SIAM Conference on Uncertainty Quantification, Raleigh, NC, 04/05/12

The World Congress on Engineering and Computer Science 2011, Berkeley, CA, 10/20/11

SIAM Conference on Dynamical Systems, Snowbird, UT, 5/19/09

Posters

Reducing Dimensions and Cost for UQ in Complex Systems Workshop, Newton Institute, Cambridge, England, 3/5/18

Neural Information Processing Systems (NeuRIPs), Long Beach, CA, 12/4/17

Uncertainty Quantification Workshop, ICERM, Providence, RI, 10/10/12

Uncertainty Quantification Summer School, The University of Southern California, Los Angeles, CA, 8/23/12

Predictive Science Academic Alliance Program (PSAAP) Meeting, University of Michigan, Ann Arbor, MI, 8/9/12

Large-Scale Inverse Problems and Quantification of Uncertainty Workshop, Institute for Mathematics and its Applications (IMA), Minneapolis, MN, 6/8/11

Uncertainty Quantification for Multiphysics and Multiscale Systems Workshop, The University of Southern California, Los Angeles, CA, 3/7/11

Other Workshops, etc.

Scientific Machine Learning Workshop, Banff International Research Station, Banff, Canada, 6/(19-23)/23

Space Weather with Quantification of Uncertainty Workshop, MIT, Cambridge, MA, 3/(9-10)/23

Climate Informatics Workshop, National Center for Atmospheric Research, Boulder, CO, 9/(20-21)/18

MIT Statistics and Data Science Center Day (SDSCon 2017), Cambridge, MA, 4/21/17

Uncertainty Quantification and Data-driven Modeling Workshop, Sandia/The Oden Institute, UT Austin, TX, 3/(23-24)/17

Integrated Analysis for Agricultural Management Strategies Workshop, American Institute of Mathematics (AIM), San Jose, CA, 5/(4-8)/15

Large-Scale Inverse Problems and Quantification of Uncertainty: Big Data Meets Big Models Workshop, Santa Fe, NM, 5/(22-24)/13

Association for Women in Mathematics (AWM) Research Symposium, Santa Clara University, CA, 3/(16-17)/13

Uncertainty Quantification School taught by Tony O'Hagan, UT Austin, TX, 10/(3-4)/11

SAMSI/Sandia Summer School on Uncertainty Quantification, Albuquerque, NM, 6/(20-24)/11

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 LEarning) Reading Group (F19 – present)

Independent Study (F18, S21)

TEACHING & PROFESSIONAL DEVELOPMENT

Fall 2020 Diversity and Inclusion Summit, CU Boulder, 11/10/20

“What’s Your Plan? A Symposium on Education for Fall 2020,” College of Engineering and Applied Science, CU Boulder, 7/27/20

2020 Career Mentoring Workshop, Computing Research Association (CRA), Washington DC, 2/(27-28)/20

Introductory Leadership Training Workshop, Leadership Education for Advancement & Promotion (LEAP), CU Boulder, 1/(8-9)/20

New Assistant Professor Program Certificate, Faculty Teaching Excellence Program (FTEP), CU Boulder, 2018-19

Kaufman Teaching Certificate Program (Intensive 2-Week Course), MIT, 5/29 – 6/15/18

NSF CISE CAREER Proposal Writing Workshop, Washington, DC, 4/(9-10)/18

PROFESSIONAL SERVICE

Faculty Mentor with Peak to Peak Charter School Outreach Activities, Lafayette, CO, 5/23 – present

NSF Reviewer, 2023

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

Secretary for SIAM UQ Activity Group, 2021 – 22

Poster Judge at SIAM Mathematics of Data Science, San Diego, CA, 9/28/22

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

“Breakfast Mentor” at Rocky Mountain Celebration of Women in Computing, 11/2/18

Reviewer for Journals:

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), SIAM Annual (7/20), SIAM CSE (3/19)

UNIVERSITY SERVICE

CS Faculty Search Committee Member, AY22 – 23

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

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

ECEE Faculty Search Committee Member, AY20 – 21

Reviewer for Johnson&Johnson WiSTEM2D 2020 and 2021 Awards (Internal CU Boulder Review)

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

Covid-19 CEAS Working Group Member, Summer '20

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

School of Computing Task Force Member, Spring '19

MEMBERSHIP

Association for Women in Mathematics (AWM)

Mathematical Association of America (MAA)

Society for Industrial and Applied Mathematics (SIAM)

United States Association for Computational Mechanics (USACM)