Alexander C Murph

Collaborative applied statistician who builds rigorous, deployable uncertainty quantification and forecasting methods across scientific domains, from infectious disease and stochastic simulation to modeling Solar Energetic Particle events.
murph@lanl.gov ○ website: sirmurphalot.github.io

Education

August 2023	**University of NC at Chapel Hill**, Chapel Hill, NC Doctor of Philosophy in Statistics & Operations Research ○ Advisors: Jan Hannig (UNC), Jonathan P Williams (NC State), & Curtis B Storlie (Mayo Clinic)
May 2018	**Bucknell University**, Lewisburg, PA BS in Mathematics, BA in Computer Science, Minor in Women's & Gender Studies ○ Thesis Advisors: Assoc. Prof. Abby Flynt, Assoc. Prof. Brian King

Professional Positions

July 2024 - Present	Los Alamos National Laboratory, *Staff Scientist*
Sep 2023 - Present	Mayo Clinic Kern Center, *Research Consultant*
June 2023 - July 2024	Los Alamos National Laboratory, *Postdoctoral Research Associate*
Aug 2021 - Sep 2023	Mayo Clinic Kern Center, *Visiting Graduate Student* ○ Responsible for PhD program funding Aug 2021 through graduation
May 2021 - Aug 2021	Mayo Clinic Kern Center, *Intern*
Aug 2019 - Aug 2023	University of NC at Chapel Hill, *Research Assistant*
Jun 2020 - Dec 2020	University of NC at Chapel Hill, *Course Instructor*
Aug 2016 - May 2018	Bucknell University, *Lead Residential Advisor*
Aug 2016 - May 2018	Geisinger Heath Center, *Research Apprentice*
May 2017 - Aug 2017	Nielsen, *Professional Services Analyst Intern*

Publications

† Graduate student working under my supervision. ⋆ Co-first authors.

13. A.C. Murph⋆, L.J. Beesley⋆, G.C. Gibson, L.A. Castro, S.Y. Del Valle, & D.A. Osthus (2026). Beyond Equal Weights: A Disease-agnostic Approach to Ensemble Learning for Infectious Disease Forecasting. **Accepted to Nature Communications.**

12. A.C. Murph, J.P. Williams, & J. Hannig (2025). Generalized fiducial inference on differentiable manifolds. **International Journal of Approximate Reasoning**, p.109618, ISSN 0888-613X

11. A.C. Murph, M.F. Dorn, S. Bhat, A. Nachtsheim, K.J. Kuhn, A.C. Olson, S.M. Andrade, & L. Tandon (2025). Unique & challenging aspects of plutonium metal standards exchange program for actinide measurements. **Journal of Radioanalytical and Nuclear Chemistry**.

10. A.C. Murph, G.C. Gibson, L.B. VanDervort, N. Panda, L.A. Castro, S.Y. Del Valle, C.A. Manore, & D.A. Osthus (2025). Mapping incidence and prevalence peak data for SIR forecasting applications. **Journal of Mathematical Biology**, 91(70).

9. A.C. Murph⋆, G.C. Gibson⋆, E.B. Amona†, L.B. VanDervort, L.A. Castro, S. Y. Del Valle, & D.A. Osthus (2025). Synthetic method of analogues for emerging infectious disease forecasting. **PLOS Computational Biology**, 21(6): e1013203.

8. Y. Liu, J. Hannig, & A.C. Murph (2025). A Geometric Perspective on Bayesian and Generalized Fiducial Inference, **Statistical Sciences** 40(2), 219-234.

7. J.D. Strait, K.R. Moran, A.C. Murph, J.D. Hyman, H.S. Viswanathan & P. Stauffer (2025). Covariate-informed multi-fidelity bias correction of distributions, **Accepted to SIAM/ASA Journal on Uncertainty Quantification.**

6. J.D. Hyman, A.C. Murph, L. Boampong, A. Navarre-Sitchler, G. Srinivasan, J.W. Carey, & H.S. Viswanathan (2024). Determining the dominant factors for carbon mineralization in three-dimensional fracture networks, **International Journal of Greenhouse Gas Control**, 139, 104-265.

5. A.C. Murph, J.D. Strait, K.R. Moran, J.D. Hyman, H.S. Viswanathan, & P.H. Stauffer (2024). Sensitivity analysis in the presence of intrinsic stochasticity for discrete fracture network simulations, **Journal of Geophysical Research: Machine Learning and Computation**, 1, e2023JH000113.

4. A.C. Murph, J.D. Strait, K.R. Moran, J.D. Hyman, & P.H. Stauffer (2024). Visualisation and outlier detection for probability density function ensembles, **Stat**, 13(2), e662.

3. A.C. Murph, J. Hannig, & J.P. Williams (2023). Introduction to generalized fiducial inference. In J. Berger, X. Meng, N. Reid, & M. Xie (Eds.) **Handbook of Bayesian, Fiducial, and Frequentist Inference** (Ch. 13). Chapman & Hall.
2. E. Faden, A. Mitchell, A.C. Murph, T. Myers, & N. Ryan (2021). Mr. Hulot's invisible gorilla: Jacques Tati and inattentional blindness, **Projections**, 15(2), 1-29.
1. A.C. Murph, A. Flynt, & B.R. King (2021). Comparing finite sequences of discrete events with non-uniform time intervals, **Sequential Analysis**, 40(3), 291-313.

Manuscripts in review/preparation:

- A.C. Murph, C.B. Storlie, P.M. Wilson, J.P. Williams, & J. Hannig (202x). Bayes Watch: Bayesian change-point detection for process monitoring with fault detection, In Review.
- E.C. Lawrence, A.C. Murph, S.A. Vander Wiel, & C. Liu (202x). A New Method for Multinomial Inference using Dempster-Shafer Theory. R & R at JRSS-B.

Professional Services

Reviewing:

- Referee for PLOS Computational Biology ..... *1 manuscript*
- Referee for Communications Medicine ..... *1 manuscript*
- Referee for Journal of Data Science ..... *1 manuscript*
- Referee for Environmental & Ecological Statistics ..... *1 manuscript*
- Referee for Chapman & Hall Handbook on BFF inference ..... *1 manuscript*

Departmental:

- LANL Statistical Sciences Department Awards Committee ..... *Chair*
  Successful awards applications written:
  1. *Fellow of the American Statistical Association*, Nominee: Dr. Brian Weaver, 2025

  Successful awards written by the committee:
  2. *ASA Statistics in Physical Engineering Sciences Award*, Nominee: Drs. Rumsey and Vander Wiel, 2025
  1. *Gerald J. Hahn Q&P Achievement Award*, Nominee: Dr. Vander Wiel, 2025

Advising

1. Dr. Elizabeth Amona, VCU – currently at Brown Cancer Center

Talks and Presentations

Dec 2025	Residential Colleges Symposium, *Bucknell University, PA*	**Keynote Speaker**
Nov 2025	Epidemics, *San Diego, CA*	*Poster Presentation*
Feb 2025	Conference on Data Analysis, *Santa Fe, NM*	*Poster Presentation*
Jan 2025	Joint Mathematics Meetings, *Seattle, WA*	*Invited Speaker*
Apr 2024	Los Alamos National Lab Statistical and Data Sciences Seminar, *Los Alamos, NM* ..	*Invited Speaker*
Feb 2024	SIAM Conference on Uncertainty Quantification, *Trieste, Italy*	*Speaker*
June 2022	IEEE International Conference on Healthcare Informatics 10, *Rochester, MN*	*Poster Presentation*
May 2022	NISS Graduate Student Research Conference, *Virtual*	*Speaker*
May 2022	Bayesian, Fiducial, & Frequentist 7, *Toronto, Canada*	*Poster Presentation*
Nov 2021	The Classification Society Annual Meeting, *Bucknell University, PA*	*Poster Presentation*
Mar 2017	AMIA 2017 Joint Summits on Translational Science, *San Francisco, CA*	*Poster Presentation*
Nov 2016	EPaDel Mathematics Conference, *Villanova University, PA*	*Student Speaker*

Scholarships & Funding

Apr 2022	Raj Chandra Bose Student Travel Award ($ 750)
Aug 2021	SAMSI RA Fellowship NSF funding to allow me to focus entirely on research for Fall 2021.
Aug 2014	Bucknell Mathematics Scholarship ($ 40,000) The Bucknell Mathematics Scholars Program recognizes a very limited number applicants with strong potential to excel as students of mathematics.
Aug 2014	Cancer for College ($ 5,000) Non-profit organization that grants scholarships to cancer survivors wanting to obtain an undergraduate degree

Software & Computer Skills

CRAN packages written:	sawnuti, bayesWatch, DeBoinR
Software developed:	autoGFD
Basic proficiency:	html, Photoshop
Intermediate proficiency:	Java, Julia, Perl, TensorFlow, Mathematica
Advanced proficiency:	R, C/C++, LAPACK, STAN, Python, Matlab, Git, LaTeX, HPC Environments, Linux

Teaching & Course Development

Aug 2020	Data Science for COVID-19 *Course Instructor* Created a course covering how a data scientist might approach the problems that arise in a global catastrophe like the COVID-19 pandemic. We had speakers from South Korea, England, and South Africa, as well as local scholars from the US. This international roster of speakers mirrored what was a fully international classroom; we had over 100 students hailing from 12 countries taking the class in 12 different timezones.
Jun 2020	Introduction to Data Analysis *Course Instructor* Designed and taught an introductory statistics course. Focused on making the difficult and sudden transition to remote learning as painless as possible for my students, while still demanding diligence and genuine mastery of the material.
Jan 2020	Machine Learning *Teaching Assistant* Assisted a graduate-level Machine Learning class with Dr. Andrew Nobel. I wrote all computing assignments for this class using the R programming language.

Honors

Eagle Scout

Honors Societies: Phi Beta Kappa, Pi Mu Epsilon

Bucknell Awards: Bucknell Class Award of Excellence '18, Bucknell Mathematics Award