

# Adam Spannaus

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## Research Interests

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- Computational Statistics, Topological and Geometric Methods for Data Analysis
- Foundations of Data Science related to Bioinformatics and Cancer Surveillance
- Machine Learning, Bayesian Modeling, and Monte Carlo Methods

## Education

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<b>University of Tennessee</b> <i>Ph.D. Mathematics</i>	<b>Knoxville, TN</b> 2020
<b>University of Tennessee</b> <i>M.S. Mathematics</i>	<b>Knoxville, TN</b> 2017
<b>University of Michigan</b> <i>B.F.A. Jazz Studies</i>	<b>Ann Arbor, MI</b> 2001

## Professional Appointments

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<b>Oak Ridge National Laboratory</b> <i>Research Scientist</i>	<b>Oak Ridge, TN</b> 2022 – current
<b>University of Tennessee, Bredesen Center for Interdisciplinary Research</b> <i>Joint Faculty Assistant Professor</i>	<b>Knoxville, TN</b> 2023 – current
<b>Oak Ridge National Laboratory</b> <i>Postdoctoral Research Associate</i> Focus area: Topological interpretability methods for cancer surveillance models.	<b>Oak Ridge, TN</b> 2020 – 2022

## Publications

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1. **A. Spannaus**, H. Hanson, L. Penberthy, G. Tourassi, “Topological Interpretability for Deep-Learning.” Submitted to *BMC Bioinformatics*, 2023. <https://arxiv.org/abs/2305.08642>
2. **A. Spannaus**, et al., “FrESCO: Framework for Exploring Scalable Computational Oncology.” Submitted to *Journal of Open Source Software*, 2023. <https://doi.org/10.11578/dc.20230227.2>
3. A. Peluso, I. Danciu, H. Yoon, **A. Spannaus**, J. Yusof, T. Bhattacharya, N. Schaefferkoetter, E. Durbin, X. Wu, A. Stroup, J. Doherty, S. Schwartz, C. Wiggins, L. Coyle, L. Penberthy, G. Tourassi, S. Gao, “Uncertainty quantification for deep learning models for clinical text classification”, *Journal of Biomedical Informatics*, submitted with revisions, 2023.
4. **A. Spannaus**, T. Papamarkou, S. Erwin, J. Christian, “Inferring the spread of COVID-19: the role of time-varying reporting rate in epidemiological modelling.” *Scientific Reports*, 2022. <https://doi.org/10.1038/s41598-022-14979-0>.

5. **A. Spannaus**, K. J. H. Law, D. J. Keffer, V. Maroulas, et al. "Materials Fingerprinting Classification." *Computer Physics Communications*, 2021. <https://doi.org/10.1016/j.cpc.2021.108019>.
6. V. Maroulas, C. Micucci, **A. Spannaus**, "A Stable Cardinality Distance for Topological Classification." *Advances in Data Analysis and Classification*, 2019. <https://doi.org/10.1007/s11634-019-00378-3>.
7. **A. Spannaus**, K. J. H. Law, D. J. Keffer, V. Maroulas, "Bayesian Point Set Registration." *2017 MATRIX Annals*, 2018. [https://doi.org/10.1007/978-3-030-04161-8\\_8](https://doi.org/10.1007/978-3-030-04161-8_8).
8. **A. Spannaus**, "Testing for New Better than Used: Oxygen Monitoring at the Spallation Neutron Source as a Test Case." *SIAM Undergraduate Research Online*, 2015. <http://dx.doi.org/10.1137/15S014010>.

## Awards

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- **2020**: Travel Award – SIAM Mathematical Aspects of Material Science (cancelled due to Covid-19)
- **2020**: Anne Mayhew Endowed Travel Fund – University of Tennessee (cancelled due to Covid-19)
- **2019**: Travel Award – American Mathematical Society
- **2019**: Travel Award – University of Tennessee Department of Mathematics
- **2019**: Summer Fellowship – University of Tennessee Department of Mathematics
- **2018**: Academic Incentive Fellowship – University of Tennessee Department of Mathematics
- **2018**: Travel Award – University of Tennessee Department of Mathematics
- **2018**: Travel Award – University of Tennessee Graduate Student Senate
- **2015**: Yueh-er, Hong-hsu and Clarence Cheng Kuo Fellowship Endowment – University of Tennessee Department of Mathematics

## Presentations

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- **Invited Presentations**
  1. Topological Interpretability for Deep-Learning, NCI Cancer Moonshot series, August 2023.
  2. Topological Interpretability for Deep-Learning, Monterey Data Conference, August 2023.
  3. FrESCO: Framework for Exploring Scalable Computational Oncology, NAACCR Annual Conference, June 2023.
  4. University of Tennessee Department of Mathematics Data Science Seminar, November 2022.
  5. Privacy Considerations within Biomedical Deep Learning, Digital Futures Workshop: Privacy-Preserving Data Analysis, Manchester, UK May 2022.
  6. University of Tennessee Bredesen Center Energy Science and Engineering Seminar, April 2022.
  7. Topological Interpretation of Deep Learning Models, Computational Approaches for Cancer Workshop, SC21, St. Louis, MO, November 2021.
  8. Topological Interpretation of Deep Learning Models, Oak Ridge Postdoctoral Research Symposium, July 2021.
  9. Variational Inference for Atomic Level Structure, SIAM Mathematical Aspects of Materials Science, Bilbao, Spain, May 2021.
  10. University of Tennessee Data Science Seminar, October 2020.
  11. Topological Classification of Crystal Structures through Statistical Learning. Oak Ridge Chapter of the ASM. Knoxville, TN, October, 2019.
  12. Uncertainty Quantification Minisymposium, SIAM Annual Meeting Portland, OR, July 2018.

13. Data Analysis and Workflows for Structural Descriptions of Complex Materials SIAM Conference on Computational Science and Engineering, Atlanta, GA, February 2017.

○ **Contributed Presentations**

- 1. Applied Topology: Theory and Applications. AMS Southeast Sectional Meeting, Gainesville, FL, November 2019.
- 2. Accelerator Reliability Workshop, Knoxville, TN, April 2015.

## Professional Service

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Mentoring.....

- Hashan Fernando, Ph.D, University of Tennessee, 2023 – Current.

Conference and mini-symposia organization.....

- Organizer of Advanced Computing for Health Sciences Seminar Series at ORNL (2021 – 2022).
- Co-organizer of Multi-Scale Statistical Descriptors of Materials at SIAM Mathematics of Materials Science, Bilbao, Spain, May 2021 (online).

Journal Reviewer.....

- Foundations of Data Science
- IEEE Access
- Journal of Biological Systems
- Rapid Reviews: COVID - 19
- Statistics and Computing

## Programming Languages/Libraries

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**Programming Languages:** C, Python, C++,  $\LaTeX$ , CUDA, R, Matlab

**Software/Packages:** Numpy, Scipy, Scikit-learn, MPI, Keras, PyTorch, TensorFlow, Valgrind

## Membership

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- AMS
- SIAM