

Hassan H. Abdallah

Curriculum Vitae
a3hassan@ucsd.edu

Education

Visiting Ph.D. student, University of California, San Diego	September 2025 - Present
Ph.D. in Mathematics (<i>In Progress</i>), Wayne State University	August 2021 - Present
M.S. Student in Biostatistics, University of Michigan, Ann Arbor	August 2020 - May 2021
M.A. in Applied Mathematics, Wayne State University	May 2020
B.S. in Mathematics, Wayne State University	May 2017

Selected Employment

Ph.D. Research Intern Oak Ridge National Laboratory, Computational Sciences and Engineering Division	May 2025 - Present
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National Science Foundation RTG Graduate Fellow National Science Foundation	August 2023 - May 2025
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Graduate Teaching Assistant Wayne State University, Department of Mathematics	August 2021 - May 2023
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Ph.D. Intern Lawrence Livermore National Laboratory, Machine Intelligence Group	May 2022 - August 2022
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Senior Systems Software Engineer Wayne State University, High Performance Computing	January 2018 - August 2021
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Papers

Publications:

1. **H. Abdallah**, A. Salch. *Products in spin^c-cobordism* International Mathematics Research Notices (IMRN) <https://doi.org/10.1093/imrn/rnaf291> (2025)
2. **H. Abdallah**, A. Regalski, M. Kang, M. Berishaj, N. Nandi, A. Chowdury, V. Diwadkar, A. Salch. *Statistical Inference for Persistent Homology applied to simulated fMRI time series data* Foundations of Data Science <https://doi.org/10.3934/fods.2022014> (2023)
3. A. Salch, A. Regalski, **H. Abdallah**, R. Suryadevara, M. Catanzaro, V. Diwadkar. *From Mathematics to Medicine: A practical primer on topological data analysis (TDA) and the development of related analytic tools for the functional discovery of latent structure in fMRI data* PLOS One <https://doi.org/10.1371/journal.pone.0255859> (2021)
4. **H. Abdallah**, A. Liyanaarachchi, M. Saigh, S. Silvers, S. Arslanturk, D. Taatjes, L. Larsson, B. Jena, D. Gatti. *Res-CR-Net, a residual network with a novel architecture optimized for*

the semantic segmentation of microscopy images Machine Learning: Science and Technology
<https://doi.org/10.1088/2632-2153/aba8e8> (2020)

Preprints:

5. **H. Abdallah**, Z. Halladay, Y. Kamel. *On the nonexistence of a Green functor with values $spin^c$ -bordism and spin-bordism* [Preprint](#). Under review at Bulletin of the London Mathematical Society. (2025)
6. R. Bremseth-Vining, V. Borda, D. Craig, J. Ruterbusch, J. Boerner, J. Fucinari, R. Ali-Fehmi, M. Elshaikh, **H. Abdallah**, G. L. Maxwell, K. M. Darcy, G. Dyson, T. Conrads, N. W. Bateman, M. L. Cote, T. D. O'Connor. *The relationships between genetic ancestry, somatic mutation frequency, and histologic subtypes in high-grade endometrial cancer* [Preprint](#). Under review at Cancer Research (2023)
7. H. Abdulah, B. Huber, **H. Abdallah**, L. Palese, H. Soltanian-Zadeh, D. Gatti. *A Hybrid Pipeline for Covid-19 Screening Incorporating Lungs Segmentation and Wavelet Based Pre-processing of Chest X-Rays* [Preprint](#). (2022)
8. H. Abdulah, B. Huber, S. Lal, **H. Abdallah**, L. Palese, H. Soltanian-Zadeh, D. Gatti. *CXR-Net: An Artificial Intelligence Pipeline for Quick Covid-19 Screening of Chest X-Rays* [Preprint](#). (2021)
9. H. Abdulah, B. Huber, S. Lal, **H. Abdallah**, H. Soltanian-Zadeh, D. Gatti. *Lung Segmentation in Chest X-rays with Res-CR-Net* [Preprint](#). (2020)

Talks

Invited:

- *Some Fivebrane Bordism Groups at the Prime 2*, Topology Seminar, University of South Florida, March 2025
- *Stable Homotopy Theory and Cobordism*, Mathematics Colloquium, University of South Florida, March 2025
- *Graph Sensitivity of High Dimensional Morse Complexes*, Topological Data Analysis Seminar, Michigan State University, November 2022
- *Statistical Approaches to Topological Data Analysis applied to functional Magnetic Resonance Imaging (fMRI)*, Advanced Computing for Health Sciences Seminar, Oak Ridge National Laboratory, December 2021
- *Topological Data Analysis of Time Series Data: Methods and Applications*, Student Math & Applications Seminar, Wayne State University, Detroit, MI, September 2019

Contributed:

- *Fivebrane Bordism Groups at the Prime 2*, Midwest Topology Seminar, Indianapolis, Indiana, May 2025
- *Some Calculations of the $Spin^c$ Cobordism Ring*, Midwest Topology Seminar, Champaign, Illinois, September 2023
- *Identification of vascular substructures with Topological Data Analysis*, San Diego Supercomputing Summer Institute, San Diego, CA, August 2018

Poster Presentations

- **H. Abdallah**, H. Hanson, A. Spannaus. *Environmental Exposure and Cancer Mortality: A Topological Study of Louisiana's Industrial Corridor*, Computational Approaches for Cancer Workshop, Supercomputing (SC25), St. Louis, MO, USA, November 2025 (upcoming)

- **H. Abdallah**, A. Salch, J. Kopchick, V. Diwadkar. *A novel mathematical construction for identifying attractors from task-driven fMRI data* Organization For Human Brain Mapping Annual Meeting, Seoul, Korea, June 2024
- **H. Abdallah**, S. Liu, I. Kim, P.T. Bremer. *Morse Complex Dynamics over Filtered Graphs*. Young Topologist's Meeting, École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland, July 2023.
- **H. Abdallah**, A. Regalski, M. Kang, M. Berishaj, N. Nandi, A. Chowdury, V. Diwadkar, A. Salch. *Statistical Inference for Persistent Homology applied to simulated fMRI time series data*. Algebraic Topology: Methods, Computation, & Science, Oxford University, UK, June 2022.
- M. Cote, G. Dyson, D. Craig, J. Ruterbusch, J. Boerner, M. Elshaikh, T. Conrads, N. Bate-man, G. Maxwell, K. Darcy, S. Makohon-Moore, T. O'Connor, **H. Abdallah**, L. Corey, M. Kheil, R. Ali-Fehmi. *Whole exome sequencing of uterine serous carcinomas reveals racial differences in known and novel driver mutations*. American Association of Cancer Research Annual Meeting, New Orleans, USA, April 2022.
- **H. Abdallah**, A. Regalski, M. Berishaj, A. Salch. *A Statistical Procedure for Identifying Persistent Vines*. Algebraic Topology: Methods, Computation, & Science, Ohio State University, June 2020 (Postponed due to COVID-19).
- A. Regalski, **H. Abdallah**, M. Berishaj, M. Kang, A. Salch. *Dynamics of topologically-characterized structures within fMRI signal*. Organization for Human Brain Mapping Annual Meeting, Montreal, Canada, July 2020 (Withdrew due to COVID-19).
- **H. Abdallah**, A. Regalski, M. Berishaj, M. Kang, A. Salch. *Statistical inference from persistent homology of fMRI signals*. Organization for Human Brain Mapping Annual Meeting, Montreal, Canada, July 2020(Withdrew due to COVID-19).

Awards and Grants

- Rumble Fellowship, Department of Mathematics, Wayne State University, 2025-2026
Awarded to final year Ph.D. candidates demonstrating the most promise in research and scholarship.
- The M.F. Janowitz Award, Department of Mathematics, Wayne State University, 2025-2026
- Outstanding Graduate Student, Department of Mathematics, Wayne State University, 2024
- NSF electronic Computational Homotopy Theory (eCHT) RTG Graduate Fellowship 2023-2024, 2024-2025
- William Martin Borgman Endowed Scholarship in Mathematics, Department of Mathematics, Wayne State University, 2023-2024, 2024-2025
- University of Michigan School of Public Health Tuition Scholarship, Department of Biostatistics, University of Michigan, Ann Arbor, 2020 - 2021.
- Robert and Nancy Irvan Endowed Scholarship, In recognition of academic excellence in Master's program. Department of Mathematics, Wayne State University, 2020
- National Science Foundation Travel Grant, \$2500. Funding to attend Summer Conference on Topology and its Applications. Johannesburg South Africa, July 2020.
- National Science Foundation Travel Grant, \$400. Funding to attend Graduate Student Topology and Geometry Conference. Champaign IL, March 2019.

Teaching

- MAT 2030 (Calculus III), Summer 2024, Wayne State University, *Primary Instructor*
- eCHT Stable Homotopy Theory Course, Winter 2024, *Teaching Assistant*
- eCHT Kan Seminar, Fall 2023, Fall 2024, Winter 2025 *Teaching Assistant*
- MAT 2020 (Calculus II), Summer 2023, Wayne State University, *Primary Instructor*
- MAT 2030 (Calculus III), Fall 2022, Wayne State University, *Primary Instructor*
- MAT 2020 (Calculus II), Winter 2022, Wayne State University, *Primary Instructor*

Service

- Co-Organizer, eCHT Research Seminar Reading Group, Fall 2023, Winter 2024
- Graduate Assistant, eCHT Research Seminar, Fall 2023, Winter 2024, Fall 2024
- Co-organizer, Graduate Seminar on Lurie's Higher Algebra, Winter 2023
- Co-organizer, Graduate Seminar on ∞ -Categories, Fall 2021