Hassan Abdallah

Curriculum Vitae
Department of Mathematics
Wayne State University
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Education

Ph.D. in Mathematics (*In Progress*), 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

Relevant Coursework: Bioinformatics, Statistical Models And Numerical Methods In Human Genetics, Computational Genomics, Advanced Statistics Theory, Data Mining

Related Employment

Graduate Teaching Assistant   August 2021 - Present
Wayne State University, Department of Mathematics

Senior Systems Software Engineer   January 2018 - August 2021
Wayne State University, High Performance Computing
Assisted in supporting and maintaining a 9k+ core high performance computing cluster. Consulted research groups across campus to facilitate and optimize their use of computing platforms and advanced scientific software. Developed parallel computing pipelines for research utilizing R, Java, and Python, among others. Lead the data analytics arm of our team, synthesizing usage statistics and platform diagnostics to determine optimal configurations of hardware and software. Utilized specialized knowledge of Linux/CentOS to assist with installing, configuring, and troubleshooting software, compilers, libraries, build tools, and maintaining respective modules for research applications.

High Performance Computing Assistant   August 2016 - December 2017
Wayne State University, Computing & Information Technology
Supported high perfomance computing activity under the direction of lead software engineers.

Clinical Research Assistant   August 2015 - March 2016
Michigan Spine & Brain Surgeons
Interviewed patients post-spinal surgery with standardized and validated outcome-instruments. Developed suite of SQL scripts to maintain and query outcome results. Assisted neurosurgery residents with various research projects.

Technical Skills

Computing Tools
Linux, OpenMP, MPI, PBS, Slurm.

Computer Languages
Extensive experience with R, C++, SQL, bash, Python, and LaTeX. Some experience with SAS and

Java.

Papers/Preprints

1. **H. Abdallah**, A. Regalski, M. Kang, M. Berishaj, N. Nandi, A. Chowdury, R. Suryadevara, V. Diwadkar, A. Salch. *Statistical Inference for Persistent Homology applied to simulated fMRI time series data.* (2021) Submitted.

2. 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* (2021) PLOS One https://doi.org/10.1371/journal.pone.0255859

3. 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* (2021) Submitted to IEEE Journal of Biomedical and Health Informatics Preprint.

4. H. Abdulah, B. Huber, S. Lal, **H. Abdallah**, H. Soltanian-Zadeh, D. Gatti. *Lung Segmentation in Chest X-rays with Res-CR-Net* (2020) Preprint.

5. **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.* (2020) Machine Learning: Science and Technology https://doi.org/10.1088/2632-2153/aba8e8

Talks

Invited:

- *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:

- *Identification of vascular substructures with Topological Data Analysis*, San Diego Supercomputing Summer Institute, San Diego, CA, August 2018

Tutorials:

- *Introduction to Topological Data Analysis with R in HPC*, Topological Data Analysis course, Wayne State University, Detroit MI, March 2019

- *Fundamentals of High Performance Computing*, Wayne State University, Detroit MI, September 2018

Poster Presentations

- **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).

Conferences

- Summer Conference on Topology and its Applications, University of Witwatersrand, July 2019.

- Graduate Student Topology and Geometry Conference,University of Illinois, Urbana Champaign March 2019.

- Supercomputing 18, Dallas TX, November 2018.

- San Diego Supercomputing Summer Institute: HPC and Data Science, University of California, San Diego, August 2018.

- Data Science: Tools and Methods Workshop, Chicago, IL, July 2018.

- Big Data and Business Analytics Symposium, Wayne State University, March 2018.

- Data Science for Social Good Conference, University of Chicago, September 2018.

- Michigan Institute for Data Science Annual Symposium, University of Michigan, Ann Arbor, September 2017.

Awards and Grants

- University of Michigan School of Public Health Tuition Scholarship, Department of Biostatistics, University of Michigan, Ann Arbor, August 2020 - May 2021.

- Robert and Nancy Irvan Endowed Scholarship, In recognition of academic excellence in Master's program. Department of Mathematics, Wayne State University, April 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.