Kevin Michael McCoy

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Research Interests

I am passionate about using statistics and computer science principles to solve pressing biomedical problems. My particular research interests include Data Science, Computational Statistics, Machine Learning, and Statistical Applications in Biomedicine, Engineering, and Imaging.

Education

William Marsh Rice University — Houston, TX
Ph.D. in Statistics — August 2022 – May 2027 (expected)

Georgia Institute of Technology — Atlanta, GA
B.S. in Biomedical Engineering, GPA: 3.97/4.0 — August 2018 – May 2022

Research Experience

Peterson Lab — Christine Peterson, PhD — Houston, TX
Research Assistant — May 2023 – Present

- Construct machine learning algorithms to accurately find venous structures in CT scan images and improve scan quality of cancer patients at MD Anderson.

Laboratory for Pathology Dynamics — Cassie S. Mitchell, PhD — Atlanta, GA
Technical Team Lead — Cardiovascular Disease Team — March 2021 – May 2022

- Lead a diverse research team of undergraduate and graduate students.
- Develop novel network clustering algorithms and text mining systems.
- Identify relationships that could better predict the impact of favorable stem cell precursors for patients with cardiovascular disease or congenital heart disease.
- Presented research at Undergraduate Research Opportunities Program 2021 Spring Symposium.

Technical Team Lead — COVID-19 Team — May 2020 – March 2021

- Led a research team of 10 undergraduate students.
- Used machine learning techniques to predict repurposed drugs and risk factors for COVID-19.
- Visualized data to provide quickly understandable insights for front-line healthcare workers.
- Published a first-author paper, titled "Biomedical Text Link Prediction for Drug Discovery: A Case Study with COVID-19," in the journal Pharmaceutics.

Serpooshan Lab — Vahid Serpooshan, PhD; Holly Bauser-Heaton, MD-PhD — Atlanta, GA
Research Assistant — January 2019 – April 2020

- Used 3D bioprinting techniques to advance the understanding of hypoplastic left heart syndrome, pulmonary atresia, and other congenital heart defects.
- Created accurate models of the developing heart and conducted computational fluid dynamics and in vivo simulations in order to better understand the etiology of congenital heart defects.

- Trained in CAD, 3D printers and 3D bioprinters, creation of bioinks, cell culture growth, and bright field and fluorescence microscopy.
- Published work in high-impact journals including Advanced Healthcare Materials.

Publications

[1] S. A. Allegri, **K. McCoy**, and C. S. Mitchell, "Compositeview: A network-based visualization tool", *Big data and cognitive computing*, vol. 6, no. 2, p. 66, 2022.

[2] A. Kirkpatrick, C. Onyeze, D. Kartchner, S. Allegri, D. Nakajima An, **K. McCoy**, E. Davalbhakta, and C. S. Mitchell, "Optimizations for computing relatedness in biomedical heterogeneous information networks: Semnet 2.0", *Big Data and Cognitive Computing*, vol. 6, no. 1, 2022, ISSN: 2504-2289.

[3] **K. McCoy**, S. Gudapati, L. He, E. Horlander, D. Kartchner, S. Kulkarni, N. Mehra, J. Prakash, H. Thenot, S. V. Vanga, *et al.*, "Biomedical text link prediction for drug discovery: A case study with covid-19", *Pharmaceutics*, vol. 13, no. 6, p. 794, 2021.

[4] M. L. Tomov, L. Perez, L. Ning, H. Chen, B. Jing, A. Mingee, S. Ibrahim, A. S. Theus, G. Kabboul, K. Do, R. S. Bhamidipati, J. Fischbach, **K. McCoy**, *et al.*, "A 3d bioprinted in vitro model of pulmonary artery atresia to evaluate endothelial cell response to microenvironment", *Advanced Healthcare Materials*, p. 2 100 968, 2021.

[5] A. S. Theus, M. L. Tomov, A. Cetnar, B. Lima, J. Nish, **K. McCoy**, M. Mahmoudi, and V. Serpooshan, "Biomaterial approaches for cardiovascular tissue engineering", *Emergent Materials*, vol. 2, no. 2, pp. 193–207, 2019.

Presentations

- **Using Unsupervised Machine Learning Techniques and 3D Visualization Tools to Better Understand Cardiovascular Disease**
  Undergraduate Research Opportunities Program Spring Symposium *April 2021*
- **Using Text Mining Link Prediction to Expedite COVID-19 Research**
  Biomedical Engineering Society *October 2020*
- **3D Bioprinted Hemodynamic Flow Models of the Developing Heart to Study Congenital Heart Disease**
  Undergraduate Research Opportunities Program Spring Symposium *April 2019*

Teaching Experience

- **Teaching Assistant** at Rice University — August 2022 – Present
  Statistics for Data Science (STAT 315)
- **Teaching Assistant** at Georgia Institute of Technology — January 2020 – May 2021
  Computing for Engineers (CS 1371)

Work Experience

Data Engineer — Atlanta, GA
Georgia Tech Office of Research — May 2021 – August 2021

- Used research administration data and research commercialization data to enhance visibility into campus research operations.
- Conducted data mining, data cleaning, and data wrangling on multiple data sources internal and external to Georgia Tech.

- Constructed a Neo4J graph database to store relational data and visualization tools to display graph data.
- Presented findings to senior leadership to guide strategic decision-making.

Engineering Technician Valhalla, NY
PepsiCo Research and Development June 2019 – August 2019

- Designed and carried out experiments for the Nitro Pepsi project to ensure that the new product met all customer demands.
- Analyzed data from these experiments and presented my findings to senior leadership in order to guide decision-making.
- Worked with other PepsiCo teams effectively to carry Nitro Pepsi to market.
- Troubleshot faulty fountain equipment, and trained in basic fountain system repair.

Relevant Graduate Coursework

Biostatistics	*Engineering Biostatistics*, Brani Vidakovic
Probability	*Statistical Inference*, George Casella and Roger L. Berger
Statistical Inference	*Statistical Inference*, George Casella and Roger L. Berger
Introduction to Machine Learning	*Elements of Statistical Learning*, Trevor Hastie et al.
Introduction to Analysis	*Principles of Mathematical Analysis*, Walter Rudin
Neural Machine Learning	*Neural Networks: A Comprehensive Foundation*, Simon Haykin
Applied Time Serie and Forecasting	*Time Series Analysis and Its Applications*, Shumway and Stoffer

Service and Outreach

Laboratory for Pathology Dynamics — Cassie S. Mitchell, PhD Atlanta, GA
Website Administrator January 2021 – May 2022

- Maintain the lab website by regularly publishing the research being done by a group of 40 lab members.
- Advertise ways for prospective members to get involved in the lab's research.

Event Coordinator August 2020 – December 2020

- Created, organized, and hosted learning opportunities and social events for the lab of 40 people.

Newtown Volunteer Ambulance Corp Newtown, CT
Emergency Medical Technician May 2018 – August 2020

- Responded to emergency 911 calls and delivered life-saving care to the critically ill and injured, and then transported patients to a nearby medical facility.
- Trained student EMTs to deliver a high standard of care to all patients.

Undergraduate Research Opportunities Program Atlanta, GA
Undergraduate Research Ambassador August 2019 – December 2020

- Mentored Georgia Tech students and connected them with the various research opportunities inside and outside the university.
- Developed workshops and informational sessions to educate the student body about research.
- Presented to first-year student seminar classes about how to find research opportunities, what is expected of student researchers, and how to present one's research.

Honors and Awards

- National Science Foundation Graduate Research Fellowship Program — March 2023
  - Amount Funded: $147,000
- Georgia Tech Department of Biomedical Engineering Outstanding Senior (link to article) — March 2022
- Georgia Tech 2022 Sigma Xi Best Undergraduate Research Award — March 2022
- The Ken Kennedy Institute Computational Science and Engineering Graduate Recruiting Fellowship — February 2022
  - Amount Funded: $15,000
- Georgia Tech Webpage Spotlight (link to article) — April 2021
- Faculty Honors — December 2018 – May 2022
- Con Edison Scholarship — May 2018

Skills

- **Programming Languages:** R, Python, MATLAB, HTML, CSS
- **Tools:** LaTeX, Git, Terminal, SQL, Tableau, Neo4j, Conda
- **Operating Systems:** MacOS, Linux, Windows
- **Libraries:** Pandas, NumPy, Matplotlib, Seaborn, Scikit-Learn, PyTorch
- **Languages:** English (Native Proficiency), German (Elementary Proficiency)

Memberships

- **American Statistical Association** — March 2022 – Present
- **Institute of Mathematical Statistics** — February 2022 – Present
- **Biomedical Engineering Society** — October 2020 – Present