JARED FRAZIER

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ACADEMIC AND CAREER INTERESTS

I am a second year MSc. Computational Science student at the University of Amsterdam who will graduate in August 2024. With experience ranging from colloidal quantum dot synthesis, trace explosive analysis, machine learning for tumor detection in CT scans, mathematical modeling and simulation, as well as high performance computing, I am eager to contribute skills from my diverse scientific background to a software engineering role.

EDUCATION

MSc. Computational Science (7.88/10; 3.7/4)	University of Amsterdam (UvA)/Vrije Universiteit (VU)	2024
B.S. Computer Science (4.00/4.00)	Middle Tennessee State University (MTSU)	2022

EXPERIENCE

MSc. Thesis: Discretization of Mechanical Metamaterials on Large-Scale Parallel Computers   *November 2023—Current*
- Co-developing distributed finite element and domain decomposition (e.g., balancing domain decomposition by constraints) methods for the modelling and simulation of linear elasticity in state-of-the-art materials. Will also include concurrent contributions to open source software (e.g., PartitionedArrays.jl).

National Institutes of Health Intern for Imaging Biomarkers and Computer-Aided Diagnosis   *June 2022—August 2022*
- Conducted full-time machine learning research funded by the National Institutes of Health as part of their Summer Internship Program in Biomedical Science. Independently developed state of the art computer vision models for 3D universal lesion detection in CT scans using the MMDetection framework.

B.S. Thesis: Machine Learning in Atmospheric Science   *August 2021—March 2022*
- Independently implemented linear regression, random forest, LSTM/GRU recurrent neural nets, and convolutional neural nets for multistep mean ambient temperature prediction on Mars using weather data publicly available from the Mars Curiosity Rover.

National Science Foundation: Machine Learning in Drug Design (University of Michigan)   *June 2021—August 2021*
- Conducted full-time research funded by the U.S.A's National Science Foundation in which I independently implemented three variational autoencoder algorithms for the mapping of discrete molecular representations to continuous representations.

Nano/Forensic Chemistry Research Assistant (MTSU)   *January 2019—August 2020*
- Over the course of one-and-a-half years, I helped design experiments and collect data revolving around the direct analysis in real time ambient ionization source coupled with mass spectrometry. Throughout this process, I authored two manuscripts and was a coauthor on several others (see publications).

SKILLS

Coding: Python*, Julia*, C*, C++*, Bash**, R**, Mathematica**, Matlab***, C#***, Javascript***
Misc: MPI, OpenMP, CUDA, Linux, Windows, TensorFlow, PyTorch, Git, Github, CMake, Valgrind, CI/CD
Languages: English (native), Dutch (B2.1[+]), Spanish (A2[++]), German (A1.2[++]),

PUBLICATIONS

1. **Frazier, J.,** Mathai, T.S., Liu, J., Paul, A., & Summers, R.M. (2023). *SPIE Medical Imaging* doi: 10.1117/12.2655250.
2. Mahjour, B., Bench, J., Zhang, R., **Frazier, J.,** & Cernak, T. (2023). *RSC: Digital Discovery.* doi: 10.1039/D3DD00008G
3. **Frazier, J.,** Cavey, K., Coil, S., Hamo, H., Zhang, M., & Van Patten, P. G. (2021). *Langmuir, 37* (50), 14703-14712.
4. Tilluck, R., Mohan N., Hetherington, C., Leslie, C., Sourav, S., **Frazier, J.,** Zhang, M., Levine, B., & Van Patten, G., Beck, W. (2021). *Journal of Physical Chemistry Letters*, *12*, 9677-9683.
5. Liang, J., Sun, J., Chen, P., **Frazier, J.,** Benefield, V., & Zhang, M. (2021). *Food Research International*, *140*, 109877.

*Proficient, **Somewhat Proficient, ***Limited Proficiency, [+]UvA Talen Online Assessment, [++]Estimated Proficiency

6. **Frazier, J.**, Benefield, V., & Zhang, M. (2020). *Forensic Chemistry*, *18*, 100233.

7. Liang, J., **Frazier, J.**, Benefield, V., Chong, N. S., & Zhang, M. (2019). *Analytical Chemistry*, *92*(2), 1925–1933.

CONFERENCE PRESENTATIONS

1. Frazier, J. (2021, April 12-14). *Blue Mars Initiative: Developing Linear Regression and Artificial Neural Network Models to Forecast Mesoscale Martian Weather Conditions*. [Conference Presentation]. National Council on Undergraduate Research. Virtual.

2. Frazier, J. (2020, February 26). *Practical Investigation of Direct Analysis in Real Time Mass Spectrometry for Fast Screening of Explosives* [Conference Presentation]. Posters at the Capitol, Nashville, Tennessee, United States.

3. Frazier, J. (2019, June 2-6). *Fast Screening of Explosives by Direct Analysis in Real Time Mass Spectrometry.* [Conference Presentation]. 67th Annual American Society for Mass Spectrometry Conference, Atlanta, Georgia, United States.

KEY GRADUATE LEVEL COURSEWORK

Uncertainty Quantification – 8.5/10	*September 2023—December 2023*
Bioinformatics I (Specialization: Dynamical Systems Modelling) – 8.5/10	*September 2023—November 2023*
Data Mining Techniques – 9/10	*April 2023—May 2023*
Programming Multi-Core (multithreading) and Many-Core (GPU) Systems – 7.5/10	*February 2023—March 2023*
Parallel Programming Practical – 8.0/10	*January 2023*
Numerical Algorithms – 8.5/10	*November 2022—December 2022*
Programming Large-Scale Parallel Systems – 8.5/10	*September 2022—November 2022*

ACADEMIC HONORS AND AWARDS

University of Amsterdam
- Amsterdam Merit Scholarship (2022 – 2024): The most prestigious and selective scholarship available for students from outside the European Union/European Economic Area. Awarded to only one or two students matriculating to a master's degree program in the Faculty of Science each year.

Barry Goldwater Scholarship and Excellence in Education Foundation
- Goldwater Scholarship (2020 – 2022): The Goldwater Scholarship Program, one of the oldest and most prestigious national scholarships in the natural sciences, engineering and mathematics in the United States, seeks to identify and support college sophomores and juniors who show exceptional promise of becoming this Nation's next generation of research leaders in these fields.

German Academic Exchange Service (DAAD)
- Research Internship in Science and Engineering (2020; Canceled due to COVID-19): Offered a scholarship position to conduct research with Team Electrosynthesis at Forschungszentrum Jülich / Helmholtz Institute Erlangen-Nürnberg for Renewable Energy (IEK-11).

MEDIA COVERAGE

MTSU True Blue Mars Magazine Feature   *July 2021*
- Article featuring discussion about my machine learning research as it relates to the hypothetical colonization of Mars.

MTSU Out of the Blue Interview – Blue Mars Initiative   *July 2021*
- Recorded interview between myself and MTSU Vice President for Marketing and Communications in which I discuss my machine learning research as it relates to the hypothetical colonization of Mars.

Goldwater Scholar Coverage by MTSU News and Rutherford Source   *April 2020*
- Local and MTSU newspapers interviewed me and published my achievements and research goals related to the prestigious Goldwater Scholarship.