Lisa Baek

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Education

Brown University Providence, RI

Bachelor of Science in Applied Math-Computer Science *Aug. 2022 – May 2026*

GPA: 3.7/4.0

Relevant Coursework: Object Oriented Programming, Data Structures and Algorithms, Statistical Inference, Numerical Optimization, Introduction to Computer Systems, Genetics, Deep Learning, Machine Learning, Operations Research: Probabilistic Models, Computer Vision, Design and Analysis of Algorithms

Teaching Assistant: Multivariable Calculus, Partial Differential Equations

Activities: Women in Computer Science, Association of Women in Mathematics

Experience

Undergraduate Researcher June 2024 – Present

Tufts University *Medford, MA*

- Designing CNN-based autoencoder with efficient use of feature extraction algorithms and hyperparameter optimization for unsupervised learning in the field of hyperspectral image clustering and unmixing.
- Implementing clear, efficient code and utilized state-of-the-art models, including multiscale 3D-CNN architecture, in image segmentation to reduce computational runtime

Undergraduate Researcher Jan 2024 – May 2024

Brown University *Providence, RI*

- Adapted and identified limitations of the 'synthpop' R package for synthetic data generation on the BRFSS 2022 datasets, performing advanced data analytics and modeling complex data trends
- Examined advantages and limitations of ML algorithms, modeling performance via regression models - RF, DT, KNN, SVM, Logistic regression

Undergraduate Researcher Jun 2023 – Aug 2023

ICERM *Providence, RI*

- Collaborated with faculty and undergraduates, applying concepts from prior research in DNA self-assembly and fundamental graph theoretical concepts to model 3D structures in 2D.
- Utilized core theories from linear algebra and properties of k-regular graphs to develop tighter bounds on specific graph formation
- Presented findings at various research symposiums and the Pi Mu Epsilon undergraduate session during Joint Mathematics Meetings (JMM) 2024.

Projects

GeoLDM | *Python, torch, Git* Mar 2024 – May 2024

- Developed generative model inspired by the Latent Diffusion Model to generate ground imagery conditional on satellite imagery
- Implemented variational autoencoder for ground image data processing and interpolation head for efficient geographic feature extraction

Database | *C, pthreads, Git* Nov 2023 – Dec 2023

- Designed and implemented a multi-threaded server to manage a key-value database over a network, supporting concurrent user interactions.
- Implemented features for querying, adding, removing, printing, and cleaning up database entries
- Ensured optimal performance, robust thread-safety and efficient signal handling through comprehensive testing and debugging of multi-threaded operations.

Technical Skills

Languages: Java, Python, C, C++, MATLAB, R, JS, HTML, CSS, SQL, Tableau
Frameworks: Node.js
Developer Tools: Git, Docker, Visual Studio, IntelliJ
Libraries: pandas, NumPy, Matplotlib, torch, TensorFlow