

Britney T. Forsyth

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EDUCATION

Columbia University | New York, NY
M.S. Data Science

Sep 2021 – Dec 2022

Pennsylvania State University | University Park, PA
B.S. Mathematics – Concentration in Statistics
B.S. Biomedical Engineering – Concentration in Biochemistry

Aug 2017 – May 2021

WORK EXPERIENCE

Data Scientist | New York, NY
Memorial Sloan Kettering Cancer Center

Jan 2023 - June 2025

- Built pipelines for preprocessing and quality control of single-cell RNA-seq data using Python, R, and workflow managers, such as Nextflow, on HPC clusters
- Applied unsupervised learning techniques (e.g., matrix factorization, clustering, dimensionality reduction, manifold learning, etc.) to uncover hidden patterns and structure in large-scale biological datasets
- Collaborated closely with interdisciplinary teams and effectively communicated research outcomes in team meetings and conferences

Machine Learning Researcher | New York, NY
Columbia University

Sep 2021 – Dec 2022

- Built end-to-end data pipelines in Python to convert time-series gaze data into image-aligned saliency maps for training supervised deep learning models
- Trained and optimized a hybrid Transformer–CNN model (TranSalNet) for visual attention prediction, achieving top benchmark scores (e.g., CC, NSS, KLD, SSIM)
- Fine-tuned model to enhance model accuracy, including increasing data collection, improving data quality, and modifying model architecture

Machine Learning Research Intern | Bethesda, MD
National Institutes of Health

May 2021 – Aug 2021

- Created and implemented a Python and MATLAB-based algorithm for classification and severity prediction of hemorrhagic transformation with human brain MRI images
- Collaborated with physicians, engineers, and lab technicians to compile a clinical stroke patient dataset of 100+ MRI images for algorithm training
- Achieved testing accuracy of 80% on testing dataset with novel implementation of a 3D CNN in TensorFlow

Undergraduate Research Assistant | University Park, PA
Pennsylvania State University

Dec 2017 – May 2021

- Designed, simulated, and tested microfluidic lab-on-chip devices with CAD and 3D printing
- Performed cell culture of bloodborne pathogens, including inoculation and maintenance of reagents in sterile conditions
- Conducted molecular analysis with Gram staining and PCR for identification of bacterial species and prepared cells for fluorescent imaging via staining with fluorescent dyes
- Optimized workflow for diagnosis of bloodstream infections to isolate blood-borne pathogens within 5-6 hours

Machine Learning Research Intern | Bethesda, MD
National Institutes of Health

May 2020 – Aug 2020

- COVID cancelled

Machine Learning Research Intern | Bethesda, MD
National Institutes of Health

May 2019 – Aug 2019

- Constructed image-quality-enhancement algorithms to improve 3D image quality, image reconstruction, procession, and analysis of 100+ diffusion-weighted MRI (DW-MRI) images in Python and C
- Collaborated and communicated with 7+ team of engineers, scientists, and physicians to determine proper correction of DW-MRI images for release of TORTOISE software
- Achieved better image quality, faster imaging speed and higher robustness of DW-MRI image quality for improved image analysis

PUBLICATIONS

Zang, M., Mukund, P., **Forsyth, B.**, Laine, A. F., & Thakoor, K. A. (2024). Predicting Clinician Fixations on Glaucoma OCT Reports via CNN-Based Saliency Prediction Methods. *IEEE open journal of engineering in medicine and biology*, 5, 191–197. <https://doi.org/10.1109/OJEMB.2024.3367492>

Lee, P. Y., Wei, H. J., Pouliopoulos, A. N., **Forsyth, B. T.**, Yang, Y., Zhang, C., Laine, A. F., Konofagou, E. E., Wu, C. C., & Guo, J. (2023). Deep Learning Enables Reduced Gadolinium Dose for Contrast-Enhanced Blood-Brain Barrier Opening. *ArXiv*, arXiv:2301.07248v1.

Zhu, N., Liu, C., **Forsyth, B.**, Singer, Z. S., Laine, A. F., Danino, T., & Guo, J. (2022). Segmentation with Residual Attention U-Net and an Edge-Enhancement Approach Preserves Cell Shape Features. *Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference*, 2022, 2115–2118. <https://doi.org/10.1109/EMBC48229.2022.9871026>

Forsyth, B. et al. “A Rapid Single-Cell Antimicrobial Susceptibility Testing Workflow for Bloodstream Infections.” *Biosensors* vol. 11,8 288. 22 Aug. 2021, <https://doi.org/10.3390/bios11080288>

CONFERENCE PRESENTATIONS

Jiang, Q., Raghavan, M., **Forsyth, B.**, et. al. ZFP36L2 orchestrates stress adaptive plasticity during injury repair and metastasis. Presented at: Proceedings of the American Association for Cancer Research Annual Meeting 2025. 2025 Apr 25–30; Chicago, IL.

Forsyth, B., Lallo, M., Jiang, Q., Ganesh, K., Chan, J. Understanding the Role of ISC-like Genes in Tumor Plasticity and Cell State Transitions in Colorectal Cancer. Presented at: Memorial Sloan Kettering’s Geoffrey Beene Conference. May 2024. New York, NY.

Forsyth, B., Woappi, Y. Predicting Wound Healing Trajectories of Single-Cell RNA-Sequencing Data with Generative Modeling. Poster presented at: Mount Sinai NY Skin Club Conference. Dec 2023. New York, NY.

Zhu, N., Liu, C., **Forsyth, B.**, Singer, Z., Danino, T., Laine, A., Guo, J. Segmentation with Residual Attention U-Net and An Edge-Enhancement Approach Preserves Cell Shape Features. Poster presented at: 44th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. July 2022. Glasgow, Scotland.

Forsyth, B., Torab, P., Lee, J. H., Wong, P. K. Developing A Diagnostic Workflow for Sepsis Detection: A Research-Based Experience in Penn State’s SEN Grant Program. Poster presented at: International Conference of University Service-Learning at University of Las Palmas de Gran Canaria. July 2021. Canaria, Spain.

Forsyth, B., Jackson, S., Latour, L., Luby, M. A Deep Learning Algorithm for Classification of Hemorrhagic Transformation in MRI. Poster presented at: National Institutes of Health Summer Poster Day. August 2021. Bethesda, MD.

Forsyth, B., Torab, P., Lee, J. H., Wong, P. K. A Rapid Antimicrobial Susceptibility Testing Workflow for Characterization of Bloodstream Pathogens. Poster presented at: Penn State Undergraduate Exhibition. May 2021. University Park, PA.

Forsyth, B., McIntyre, R., Wong, P. K. A Rapid Antimicrobial Susceptibility Testing Protocol for Sepsis Diagnosis. Poster presented at: Penn State Undergraduate Exhibition. May 2020. University Park, PA.

Forsyth, B., Thai, A., Pierpaoli, C., Irfanoglu, M. O. Motion and Eddy-Current Distortion Correction of Diffusion MRI with Python: TORTOISE in DIPY. Poster presented at: BMES Annual Meeting. October 2020. San Diego, CA.

Forsyth, B., Thai, A., Pierpaoli, C., Irfanoglu, M. O. Motion and Eddy-Current Distortion Correction of Diffusion MRI with Python: TORTOISE in DIPY. Poster presented at: National Institutes of Health Summer Poster Day. August 2019. Bethesda, MD.

Torab, P., **Forsyth, B.**, Malcolm, T., Lu, Y., Wong, P. K. Rapid Bacterial Enrichment for Sepsis Detection and Antimicrobial Susceptibility Testing. Poster presented at: BMES Annual Meeting. October 2019. Philadelphia, PA.

AWARDS, GRANTS, AND FELLOWSHIPS

2022 NSF Fellowship for 19th International Summer School on BIO-X
2021 Penn State SEN Remote Innovation Grant
2020 College of Engineering Equity REU Scholarship
2018 Collegiate Laws of Life Essay Winner
2017 Provost Scholarship

TEACHING EXPERIENCE

Organic Chemistry and Biology Tutor | Remote May 2019 – June 2023
Outside the Box Academy

- Tutored 5+ students in Organic Chemistry I, Calculus, Geometry, Physiology, and Biology
- Generated personalized lesson materials, lecture presentations, and homework assignments for 2+ hour sessions
- Collaborated with parents and tutors to generate student-specific lesson plans and identify content for review

Mathematics Grader and Exam Proctor | University Park, PA Dec 2017 – May 2020
Pennsylvania State University

- Graded weekly homework and quizzes for undergraduate courses of 50+ students in differential equations, matrices, and statistics
- Observed students for any violations in academic integrity for 100+ students in undergraduate math courses during exams
- Resolved grading disputes and liaised with professors, students, and mathematics department to generate feedback about course material

SKILLS

Programming: Python, R, MySQL, MATLAB, Bash, HTML/CSS

Development Tools: Git, GitHub, Jupyter Notebook, R Studio, Anaconda Navigator, VS Code, GitHub Copilot, Cursor, Nextflow, Snakemake

Software: Microsoft Office (Excel, PowerPoint, Word), Adobe (Photoshop, Illustrator, Premiere Pro), SPSS, SAS, COMSOL, CAD, ImageJ

COMMUNITY INVOLVEMENT

THON Donor and Alumni Relations Fundraising Specialist | University Park, PA Oct 2017 – May 2021

- Established and maintained relationships with 1000+ volume of potential, current, and past donors
- Served as the liaison between THON's 16,000 student volunteers and 25,000 annual alumni networks
- Fostered relationships between donors, alumni, and volunteers through presentations, THONvelope distribution, and guided tours of the arena during THON Weekend