ERIC J. SOUTH

Cambridge, MA 02139 | 571.340.0257
esouth@bu.edu | https://www.linkedin.com/in/eric-south-xyz/ | GitHub: github.com/e-south | Google Scholar

Education

Boston University, Boston, Massachusetts, USA — Start Date: Sept. 2020
PhD Candidate, Molecular Biology, Cell Biology, and Biochemistry (MCBB)
Advisors: Mary J. Dunlop (primary Ph.D. advisor)I
Thesis title: Molecular Sequence Design for Interfacing with Gene Regulatory Networks

Imperial College London, England, UK — Graduation: Sept. 2019
Master of Research, Systems & Synthetic Biology
Advisors: Rodrigo Ledesma Amaro (primary MRes advisor), Markus Ralser
Thesis title: A Screening Platform to Identify Synthetic Microbial Communities

James Madison University, Harrisonburg, Virginia, USA — Graduation: May 2018
Bachelor of Science, Biotechnology
GPA: 3.72 • Magna Cum Laude

Research Experience and Employment History

Boston University's Biological Design Center — 2020 – Present
PhD Candidate
Projects: Developing genetic circuits, high-throughput functional assays, and DNA sequence-to-expression models to steer cell physiology for synthetic biology applications.

LanzaTech: Synthetic Biology & Host Strain Engineering Team — Summer 2022 – Fall 2022
Engineering Biology Research Consortium Intern
Project: Genetic tool development for gas-fermenting strains in a biomanufacturing context
- Contributing to workflows for designing pooled DNA sequence libraries, conducting high-throughput screening, performing next-generation sequencing, and developing biosensors.

Imperial College's Centre for Synthetic Biology, The Francis Crick Institute — 2018 – 2020
MRes Student, Postgraduate Researcher
Project: High-throughput identification of metabolic cross-feeding yeast communities
- Implemented a high-throughput workflow using laboratory robotics to handle hundreds of microorganisms in parallel, which enabled a large-scale and rapid study of metabolic cross-feeding relationships in yeast.

SRI International: Center for Macromolecular Bioscience — 2017 – 2018
Student Associate
Project: Peptide drug-delivery systems for tissue-specific cancer therapies
- Analyzed how drug-candidate peptides would bind and internalize into mammalian cell lines through flow cytometry and western blotting and also supported the development of cell type-specific cancer therapies.

James Madison University, School of Integrated Sciences — 2014 – 2017
REU Undergraduate
Project: Characterization of a human Uba1 enzyme
- Purified Ubiquitin-like proteins out of *E. coli* through size-exclusion and ion-exchange chromatography.

Teaching

Summary of Courses as Teaching Fellow

Term	Course	Enrollment	Instructor Evaluation
Sp2021	BU – BE 209 Principles of Molecular Cell Biology and Biotechnology	45 (undergrad)	4.92 / 5.00
Fa2023	BU – BE 209 Principles of Molecular Cell Biology and Biotechnology	39 (undergrad)	4.53 / 5.00

Software and Experimental Skills Summary

Languages:	Python, R, Git
Frameworks:	Pandas, Numpy, Scikit-Learn, Matplotlib, Seaborn, PyTorch, TensorBoard, ggplot2, dplyr
Platforms:	Visual Studio Code, Jupyter Notebook, Spyder IDE, GitHub, Benchling, Geneious
Software Tools:	Inkscape, Excel
Systems and Synthetic Biology:	DNA assembly, metabolic engineering, genetic circuit design, genomic integration
Computational Biology:	Convolutional neural networks
High-throughput Lab Screening:	Pooled variant library design, use of automated liquid handlers and colony pickers, assay design
Next-Generation Sequencing:	16S-like amplicon sequencing
Microbiology:	Techniques in *E. coli*, *S. cerevisiae*, and *C. auto* including cloning, transformations, and conjugations
Anaerobic Systems:	Operation of anaerobic chambers, handling of pressurized bottles, gas fermentation techniques
Cell Biology and Biochemistry:	Mammalian tissue culture and protein purification
Immunology:	ELISAs and Western Blotting

Professional Affiliations, Management, and Service Experience

- Supervised three graduate rotation students on a one-on-one basis, 2022 – Present.
- Supervised a team of five BME undergraduates, where they developed a CNN-based image processing pipeline to analyze data related to microbial viability assays, Fall 2024 – Spring 2024.
- Organizer of Boston University's BDC SPIN (Student Program for Industry Networking), where I coordinated connections between dozens of PhD mentees and biotech industry mentors, 2022 – 2024.
- Industry Liaison for the Engineering Biology Research Consortium, where I organized industry panels focusing on business in biotech and data infrastructure within biotech organizations, 2021 – 2023.
- Outreach Manager for the Science Entrepreneur Club, where I jointly coordinated a biotech startup pitch competition with Merck Accelerator, 2018 – 2019.
- MRes Student Representative at Imperial College's Centre for Synthetic Biology, 2018 – 2019.
- Supervised two interns at SRI International, Summer 2018.
- President of James Madison's Student Biotechnology Association, 2017 – 2018.
- Executive Board member of James Madison's Biological Honor Society, Tri-Beta, 2016 – 2017.

Honors and Rewards

- **Biological Design Center Travel Grant Award** (2024)
- **EBRC Industry Internship Program Awardee** (2022) – Selected by the Engineering Biology Research Consortium from a pool of PhD applicants to participate in a 4-month internship with a partnering company.
- **NIH T32 Synthetic Biology and Biotechnology (SB2) Training Program Awardee** (2021) – Selected by the Biological Design Center at Boston University to engage in an interdisciplinary training environment designed for future leaders in synthetic biology.
- **Outstanding Student Award** (2019) – Selected by the Department of Life Sciences at Imperial College London for graduating at the top of my MRes class with distinction.
- **Excellence in Biotechnology Leadership Award** (2018) – Award from James Madison University faculty in recognition of accomplishments in student organizations, program marketing, and peer instruction.

Eric J. South

Peer-Reviewed Publications

- Simran Aulakh*, Lara Sellés Vidal*, **Eric J. South***, Sreejith Varma, Lucia Herrera Dominguez, Huadong Peng, Markus Ralser, Rodrigo Ledesma-Amaro. Spontaneously establishing syntrophic yeast communities improve bioproduction. Nat Chem Biol 19, 951–961 (2023). **[*Co-first author]**
- Jonghyeon Shin*, **Eric J. South***, and Mary J. Dunlop. Transcriptional Tuning of Mevalonate Pathway Enzymes to Identify the Impact on Limonene Production in *Escherichia coli*. ACS Omega 2022 7 (22), 18331-18338. **[*Co-first author]**
- Huadong Peng, Alexander P. S. Darlington, **Eric J. South**, Hao-Hong Chen, Wei Jiang, Rodrigo Ledesma Amaro. A molecular toolkit of cross-feeding strains for engineering synthetic yeast communities. Nat Microbiol 9, 848–863 (2024).
- Virgile Andreani*, **Eric J. South*,** Mary J. Dunlop. Generating information-dense promoter sequences with optimal string packing. PLoS Comput Biol. e1012276 (2024). **[*Co-first author]**

Conferences and Workshops

- Poster presentation at the **Gordon Research Conference in Microbial Stress Response**, 2024.
- Poster presentation titled "Generating Information-Dense Nucleotide Sequences with Optimal String Packing," at the **Biological Design Center Symposium** at Boston University, 2023.
- Poster presentation titled "Designing Stress-Responsive Promoters with Densely Packed Transcription Factor Binding Sites," **Gordon Research Conference in Synthetic Biology**, 2023.
- Poster presentation titled "Endogenous Versus External Regulation of the Bioproduction Pathways in *E. coli,*" **Synthetic Biology: Engineering, Evolution & Design (SEED)**, 2022.
- Participated in an ideation and entrepreneurial pitching competition in synthetic biology at the **SynbiCITE 4-Day MBA**, Imperial College Incubator, 2018.

References

- Dr. Mary J. Dunlop, Professor, Department of Biomedical Engineering, Boston University, mjdunlop@bu.edu
- Dr. Thomas Gilmore, Professor, Department of Biology, Boston University, gilmore@bu.edu
- Dr. Michael Köpke, Chief Innovation Officer, LanzaTech, michael.koepke@lanzatech.com
- Nick Fackler, Lead Scientist, Genome Engineering, LanzaTech, nick.fackler@lanzatech.com