Sofiya Vyshnya

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Education

Case Western Reserve University (CWRU), Department of Biomedical Engineering, Cleveland, OH — *June 2025 – present*
Doctor of Philosophy (PhD) in Biomedical Engineering

Case Western Reserve University, School of Medicine, Cleveland, OH — *July 2023 – present*
Doctor of Medicine (MD), Medical Scientist Training Program (MSTP)

Georgia Institute of Technology, Wallace H. Coulter Department of Biomedical Engineering, Atlanta, GA — *August 2018 – May 2023*
Bachelor of Science in Biomedical Engineering

Publications

S'Dravious, A. D.*, **Vyshnya, S***., Propsom, K., Gbotosho, O. T., Singh, A. S., Horning, R. Z., Sharma, M., Jegga, A. G., Niu, L., Botchwey, E. A., & Hyacinth, H. I. (2024). Neuroinflammation underlies the development of social stress induced cognitive deficit in male sickle cell mice. *Experimental Biology and Medicine*, *249*, 10361.

Vyshnya, S.*, Epperson, R.*, Giuste, F., Shi, W., Hornback, A., & Wang, M. D. (2024). Optimized clinical feature analysis for improved cardiovascular disease risk screening. *IEEE Open Journal of Engineering in Medicine and Biology*, *5*, 816-827.

S'Dravious, A. D.*, Ogle, M. E.*, **Vyshnya, S.**, Chiappa, N. F., Leitmann, B., Rudy, R., Day, A., Mortensen, L. J., Kurtzberg, J., Roy, K., & Botchwey, E. A. (2022). Characterizing human mesenchymal stromal cells' immune-modulatory potency using targeted lipidomic profiling of sphingolipids. *Cytotherapy*, *24*(6), 608-618.

Fernandez-Yague, M. A., Hymel, L. A., Olingy, C. E., McClain, C., Ogle, M. E., García, J. R., Minshew, D., **Vyshnya, S.**, Lim, H. S., Qiu, P., & Botchwey, E. A. (2022). Analyzing immune response to engineered hydrogels by hierarchical clustering of inflammatory cell subsets. *Science Advances*, *8*(8), eabd8056.

Turner, T. C., Sok, M. C. P., Hymel, L. A., Pittman, F. S., York, W. Y., Mac, Q. D., **Vyshnya, S.**, Lim, H.S., Kwong, G.A., Qiu, P., & Botchwey, E. A. (2020). Harnessing lipid signaling pathways to target specialized pro-angiogenic neutrophil subsets for regenerative immunotherapy. *Science Advances*, *6*(44), eaba7702.

*** indicates co-first authorship**

Conference Abstracts/Presentations

Vyshnya, S., S'Dravious, A. D., Chiappa, N. F., Roy, K., & Botchwey, E. A. Semi-Targeted Lipidomics Reveals Altered Metabolism of "Non-Traditional" Sphingolipids in the Brain in Sickle Cell Disease. Southeastern Regional Lipid Conference (SERLC) 2021.

Vyshnya, S., Selva, C., Nariani, S., Giuste, F.O., Shi, W., & Wang, M. D. Assessing the Impact of Holidays on COVID Transmission in the US Using a SIRD Model. IEEE BHI-BSN 2021.

Awards

S.K. Jain Outstanding Research Award — *May 2023*
President's Undergraduate Research Award — *July 2022*
Best Multidisciplinary Capstone Project at Georgia Tech 2021 Capstone Exposition — *December 2021*
Best Poster Award at Southeastern Regional Lipid Conference — *October 2021*

Experience

Graduate Research Assistant, Imaging Informatics for Interventions (INVent) Laboratory, Cleveland, OH *June 2025 – present*

- Creating novel radiomics tool for comprehensive assessment of treatment response following neoadjuvant therapy in rectal cancer and identifying patients that would benefit from non-surgical management.

Undergraduate Research Assistant, Bio-Medical Informatics and Bio-Imaging Laboratory (Bio-MIBLab), Atlanta, GA *October 2021 – May 2023*

- Developed a machine learning model for personalized cardiovascular disease risk prediction using electronic health record data.
- Implemented deep learning approaches for triaging patients with COVID based on disease severity using radiologic imaging (X-ray, CT).

Analytical R&D Intern, Analytical Chemistry Enabling Technology Merck, Kenilworth, NJ *May 2021 – August 2021*

- Assisted in optimizing the performance of the corona charged aerosol detector (CAD) for quantifying non-volatile small molecule drugs separated using high-performance liquid chromatography (HPLC).

Intern, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, GA *June 2019 – August 2019*

- Worked to document patient outcomes during the follow-up phase of TBTC Study 31 – a clinical trial assessing the efficacy of a shortened high-dose rifapentine regimen for treating tuberculosis in 13 countries in Africa, Asia, North America, and South America.
- Provided recommendations for improving the recruitment of adolescent subjects in future clinical trials. Worked on strategies to improve the enrollment and retention of subjects in future studies.

Undergraduate Research Assistant, Laboratory for Immunoregenerative Engineering (LIRE), Atlanta, GA *November 2018 – May 2023*

- Co-led a collaboration with another lab to investigate effects of social stress on cognitive function and neuroinflammation in mice with sickle cell disease.
- Mentored two undergraduate students.
- Investigated the impact of manufacturing process parameters on the therapeutic potency of mesenchymal stem/stromal cells (MSCs) for anti-inflammatory applications.
- Implemented supervised and unsupervised machine learning approaches for discovering novel cell populations involved in wound healing toward optimizing the design of regenerative biomaterials using protein expression data acquired via flow cytometry.

Mentorship and Outreach

Near Peer Mentor, CWRU School of Medicine, Cleveland, OH *September 2025 – present*

- Mentoring incoming MD-PhD students and assisting them with acclimating to medical school and finding research mentors.

Histopathology Student Instructor, CWRU School of Medicine, Cleveland, OH *July 2025 – August 2025*

- Taught histopathology to first-year medical students in small group classes during their first unit of the medical school curriculum.

Horizons, CWRU School of Medicine, Cleveland, OH *September 2023 – February 2025*

- Collaborated with other medical students on community outreach events (patient simulations, surgical skills workshops, career panels) to expose first-generation high-school and undergraduate students to careers in medicine.

Leadership

Student Leader, Neighborhood STEM *September 2025 – present*

- Developing programming for adults and students to foster dialogue about science in the community. Example events include lunch-with-a-scientist panels, reverse science fairs, and interactive demos at libraries and community events.
- Developing and maintaining collaborations with community partners and other organizations focused on outreach to promote our organization and engage both STEM professionals and community members.

Interview Coordinator, Medical Scientist Training Program (MSTP), *October 2025 – present*
CWRU School of Medicine, Cleveland, OH

- Will coordinate with MSTP administrators, current MSTP students, and applicants to plan interview day itineraries for applicants.
- Will lead student panels and Q&A sessions on interview days to engage applicants with the CWRU community and introduce them to our program, as well as the greater Cleveland area.

Volunteering

Recruitment, CWRU School of Medicine, Cleveland, OH *September 2023 – present*

- **University Program (MD):** participated in weekly interviews with applicants and provided recommendations to admissions committee (~3-6 hours/week, *September 2023 – February 2025*).
- **Medical Scientist Training Program (MD-PhD):** participating in student panels and Q&A sessions on interview days.

Cherokee Indian Hospital Authority, Cherokee, NC *January 2023 – May 2023*

- Communicated with patients during visit and prepared documentation summarizing patient encounter as a medical scribe.

Piedmont Atlanta Hospital, Atlanta, GA *June 2016 – March 2020*

- Assisted nurses with caring for patients.