Francine Graham

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PERSONAL STATEMENT

I am a current graduate student working at the novel junction between immunoengineering and neuroengineering to introduce immunomodulatory solutions to biological limitations of neural engineering therapeutics. I have a strong passion for regenerative medicine as a means to improve the lives of others. I have contributed significantly toward two publications to improve the state of regenerative medicine, and seek to produce more works to further extend the fields of regenerative medicine and immunoengineering.

EDUCATION

PhD, Biomedical Engineering, Case Western Reserve University August 2023-present
Degree in Progress, Expected Graduation: 2028
Cleveland, OH

B.S., Chemical Engineering, University of Notre Dame 2023
Notre Dame, IN GPA: 3.54

RESEARCH

PIs: Jeffrey Capadona, Efstathios Karathanasis, CWRU August 2023-present
Graduate Research Student (Jointly Mentored)

- Attenuation of the neuroinflammatory response to intracortical microelectrodes via lipid nanoparticle-mediated delivery of siRNA
- Implantation and treatment mice with lipid nanoparticle therapeutics
- Analysis of data from flow cytometry, immunohistochemistry, and neural recordings

PI: Donny Hanjaya-Putra, University of Notre Dame January 2022-May 2023
Undergraduate Research Assistant

- Ran my own projects on stem cell differentiation into lymphatic endothelial cells via lentiviral vectors and preservation of lymphatic endothelial cell phenotype *in vitro* using a hyaluronic acid-dopamine coating
    - These projects became major component of two papers published by the lab
- Continued projects for graduate students in their absence, and took on numerous additional responsibilities as needed

PUBLICATIONS

Donny Hanjaya-Putra Lab Notre Dame, IN

- Robust Differentiation of Human Pluripotent Stem Cells (iPSCs) into Lymphatic Endothelial Cells (LECs) Using Transcription Factors
    - Cells Tissues Organs
    - Second author

    - Published August 28, 2024
- Synthetic hyaluronic acid coating preserves the phenotypes of lymphatic endothelial cells (LECs)
    - Royal Society of Chemistry
    - Co-author
    - Published September 19, 2023

FELLOWSHIPS

NIH T32 Training Grant September 2023-present

- Integrated Engineering and Rehabilitation Training Grant
- Development of skills associated with neural stimulation and rehabilitation
- Improved upon existing lab techniques to improve neural interfacing therapeutics
- Covers tuition, mandatory fees, and annual stipend

NDNano Summer Fellowship June 2022-August 2022

- 40 hours per week of work in the Hanjaya-Putra lab for 10 weeks
- Ran a project on differentiating iPSCs into LECs through lentiviral transcription factors
- Presented findings and produced a report of the work that was done
- $6,000 fellowship awarded

ACTIVITIES

PRISM ND Trans and Nonbinary Experiences Committee, *Committee Chair* 2021-2023

- Developed strategies to create a more inclusive campus environment, especially for students whose gender identities do not conform to their gender assigned at birth
- Organized and oversaw events for transgender and nonbinary students to feel welcome and safe on campus
- Pushed for institutional changes regarding housing policies affecting transgender and nonbinary students, as well as improved curriculum to accommodate differences in gender identity
- As a result of this position, Notre Dame has improved accommodations offered for trans and nonbinary students, including establishing a path for students to move out of their single sex dorms, as well as having campus ID cards and class registries reflect students' preferred names

SKILLS

- Proficiency in Microsoft Office
- Proficiency in 3D CAD, MatLab, Python, R, and GDS
- Fluorescent microscopy (confocal, multiphoton, epifluorescence) on tissues, cells, live animals
- Cell culture (macrophages, iPSCs, blood and lymphatic endothelial cells)
- Animal handling (perfusion, implantation via craniotomy, organ processing)
- PCR, ELISA, MACS, and FACS operation and analysis