Jackson Powell, tentative—still working on getting the format right, suggestions welcome

Contact Information

jrp24@sas.upenn.edu (850) 559-4266

Brief Personal Statement

Ever since I was eight, I have only wanted to be a neurosurgeon. In the broad field of neuroscience, piquing my interest the most is the use of brain-computer interfaces in treating neural repair—including recovery after spinal cord injury, traumatic brain injury, stroke, and neurodegenerative diseases.

Through working in the Song Lab since 2021, I've had the chance to lead projects focused on axon regeneration under Dr. Yuanquan Song. Our work has uncovered genetic targets that can be manipulated to boost regeneration. Through my clinical experiences, I have seen the remarkable intersection of technology and neurosurgery—including in treatments like deep brain and spinal cord stimulation. I have focused thus far on physical sciences, through the Vagelos Molecular Life Sciences program under the guidance of Drs. Jeffery Saven and Elizabeth Rhoades, and independent applied math studies with Dr. Yoichiro Mori. Because of my coursework and Teaching Assistant positions in Laboratory Electronics under Dr. Bill Ashmanskas, I feel incredibly inspired and equipped to advance the technology used in neurosurgery. **None of my success would have been possible without great mentors.**

These experiences provide me with a unique perspective as I pursue a career as a physician-scientist. I believe brain-computer interfaces are the future of neuroscience and neurosurgery; I couldn't be more excited to help push this field forward.

Education

University of Pennsylvania 2020 – present
Biochemistry & Biology
Vagelos Molecular Life Sciences Scholar (link)

Chiles High School 2016 – 2020
Florida State University Dual Enrollment
Salutatorian

Honors and Awards

Vagelos Challenge Award (link) 2023
AXA Achievement Scholarship (link) 2020

Research

ORCiD: (link); Google Scholar: (link)
Interests: Brain-computer interfaces, neural regeneration, technology in neurosurgery

Song Lab (link) 2021 – present
Children's Hospital of Philadelphia
Led projects focused on axon regeneration

Rokyta Lab (link) Summer 2019
Florida State University
Sponsored by the Young Scholars Program (link)
Project focused on venom evolution

Teaching

Teaching Assistant

PHYS 3364, Laboratory Electronics (link)	Fall, 2023
BIOL 3310, Principles of Human Physiology (link)	Fall, 2023
PHYS 3364, Laboratory Electronics (link)	Spring, 2023

Tutoring

Philadelphia HS for Girls, Science Olympiad, weekly	Spring, 2023
Central HS, Science Olympiad, weekly	Fall, 2022

Science Olympiad

Science Olympiad at UPenn (SOUP) (link)
Invitational competition hosting ≈ 1000 high school students

Co-President / Tournament Director	2022 – 2023
Finance Director	2021 – 2022
Operations Committee	2020 – 2021
Finance Committee	2020 – 2021
Exam Writer	2020 – present

Chiles Science Olympiad
High school team, ranked 10 in Florida my final year

President	2018 – 2020
Co-President	2017 – 2018
Co-founder	2017

Clinical Experience

Shadowing

Dr. Iahn Cajigas, MD, PhD, Neurosurgeon	Fall 2023
Dr. Shih-Shan Lang Chen, MD, Pediatric neurosurgeon	Fall 2022
Dr. Casey Halpern, MD, Neurosurgeon	Summer 2022

Volunteering

Halpern Neurosurgery Clinic	Summer 2022
Azalea Gardens Alzheimer's Clinic	2018 – 2019
Capital Regional Med. Center	Summer 2018

Computer Science

GitHub: (link)

Courses On:
C++, Java, SAS, Unix; Soon: Python

Experience With:
LaTeX, MatLab, Verilog, Arduino, HTML

Publications (Peer Reviewed)

Shannon Trombley*, Jackson Powell*, Pavi Guttipatti*, Andrew Matamoros, Xiaohui Lin, Tristan O'Harrow, Tobias Steinschaden, Leann Miles, Qin Wang, Shuchao Wang, Jingyun Qiu, Qingyang Li, Feng Li, and Yuanquan Song. Glia instruct axon regeneration via a ternary modulation of neuronal calcium channels in *Drosophila*. *Nature Communications*, Oct. 14, 2023. DOI: https://doi.org/10.1038/s41467-023-42306-2
*Equally contributing

Leann Miles, Jackson Powell, Casey Kozak, and Yuanquan Song. Mechanosensitive Ion Channels, Axonal Growth, and Regeneration. *The Neuroscientist*, **Cover article**, Aug. 29, 2023. DOI: https://doi.org/10.1177/10738584221088575

In Review: Jackson Powell, Tobias Steinschaden, Rose Horowitz, Yuanquan Song. Inciting the calcium channels, peripheral glia's tug-of-war on axon regeneration. In Review at *Neural Regeneration Research*.

To Be Resubmitted: Qin Wang, Leanne Miles, Shuo Wang, Harun N. Noristani, Ernest J. Monahan Vargas, Jackson Powell, Sean J O'Rourke-Ibach, Shuxin Li, Yuanquan Song. Targeting and anchoring the mechanosensitive ion channel Piezo to facilitate its inhibition of axon regeneration. *Note: This work was recently rejected, and we are working to resubmit.*

(Non-Peer Reviewed / Opinion Pieces)

Keren Bismuth, Vandana Sharma, Jackson Powell, ..., John M. Dedyo. Historical introductions. *Science*, Oct. 6, 2023. DOI: https://doi.org/10.1126/science.adk8769

Ashley Barbara Heim, ..., Jackson Powell, ..., Anna Uzonyi. AI in search of human help. *Science*, July 14, 2023. DOI: https://doi.org/10.1126/science.adi8740

Garima Singh, ..., Jackson Powell, Sai Sarnala. The fruits of failure. *Science*, Jan. 5, 2023. DOI: https://doi.org/10.1126/science.adg1443

Rui Tang, ..., Jackson Powell, Samuel Nathan Kirshner. When internships disappoint. *Science*, Oct. 6, 2022. DOI: https://doi.org/10.1126/science.ade6397

Jackson Powell. Puzzling Topics in Neuroscience. *UPenn Career Services*, Jan. 19, 2022. (link)

Jackson Powell. Review: Harakiri. *Penn Moviegoer*, Nov. 18, 2021. (link)

Features

Peering beyond the haze of alien worlds, and how failures help us make new discoveries. *Science Magazine Podcast* (Jan. 12, 2023) (link)

Presentations

Jackson Powell. The mechanosensitive ion channel Piezo's role in the growth cone. *Center for Undergraduate Research & Fellowships Symposium*, (Sept. 18, 2023), (link)

Jackson Powell. The mechanosensitive ion channel Piezo's role in the growth cone. *Vagelos Molecular Life Sciences*, **10 mins**. (June 27, 2023)

Jackson Powell. Glial control of axon regeneration through voltage gated calcium channels. *Developmental Neuroscience*, **25 mins**. (Nov. 16, 2022)

Jackson Powell. Glial control of axon regeneration through neuronal voltage gated calcium channels. *Vagelos Molecular Life Sciences*, **10 mins**. (July 4, 2022)

Jackson Powell* & Kevin Bryan*. The Novel Role of Trpml and Btv in *Drosophila* Mechanosensation and Decision Making. *Children's Hospital of Philadelphia Poster Symposium*, (May 25, 2022)
*Equally contributing

Jackson Powell. Glial control of neuron regeneration. *Joint CCMT Lab Meeting*, **30 mins**. (April 27, 2022)

Jackson Powell*, Alec Fernandes*, Arianna Zhai*. The Venom of the *Dolomedes triton*: functional effects on allopatric and sympatric prey items. *Young Scholars Program Symposium*. (July 26, 2019) (link)

Song Lab Meetings: Jackson Powell, **60-90 mins each**. July 6, 2021; Oct. 12, 2021; Feb. 28, 2022; Aug. 2, 2022; Jan. 10, 2023; June 20, 2023.

Grants / Stipends

Vagelos Molecular Life Sciences	$10,000	Summer 2023
UPenn Common Research Grant	$1,000	2023
Vagelos Molecular Life Sciences	$11,000	Summer 2022
Ben Art Bucks	$250	2022
UPenn CURF	$4,500	Summer 2021
Young Scholars Program	$3,000	Summer 2019

Personal Projects

Below are some personal projects I've put quite a bit of time into. They're mostly for fun, and or, for the sake of learning. Perhaps they will turn into something, someday.

Brain-Spine-Muscle Interfaces Textbook (link)
This is effectively a massive notes document, where I am aggregating much of what I learn about electronics, neuroscience, and brain-computer interfaces.

Neuron / Ion Channel Modeling (link)
This is a modeling project / independent study I worked on under the guidance of Dr. Yoichiro Mori, aiming to model neurons and the ion channel Piezo.

Select References

Please feel free to contact the following references, or any of my previous professors, for more information about me.

Yuanquan Song, PhD, songy2@chop.edu
Principal Investigator, Children's Hospital of Philadelphia
Assistant Professor of Pathology and Laboratory Medicine, University of Pennsylvania

William Ashmanskas, PhD, ashmansk@hep.upenn.edu
Senior Lecturer in Physics, University of Pennsylvania

Yoichiro Mori, MD, PhD, y1mori@sas.upenn.edu
Applied Mathematics Graduate Chair, University of Pennsylvania
Co-Director, Center for Mathematical Biology
Calabi-Simons Professor in Mathematics and Biology

Elizabeth Rhoades, PhD, elizabeth.rhoades@sas.upenn.edu
Professor of Chemistry, University of Pennsylvania
Co-Chair, Biochemistry Undergraduate Major Program
Co-Director, Vagelos Molecular Life Sciences

Jeffery Saven, PhD, saven@sas.upenn.edu
Professor of Chemistry, University of Pennsylvania
Co-Chair, Biochemistry Undergraduate Major Program
Co-Director, Vagelos Molecular Life Sciences

Please feel free to reach out to me with questions or ideas for collaboration (email). It would be a pleasure to hear from you.