Tiger (Yu Kang) Xu

2621 Fleet Street, Baltimore, MD, USA, 21224 | 410-419-9931 | yxu130@jhmi.edu | website

EDUCATION

Johns Hopkins School of Medicine Baltimore, MD
Ph.D. candidate., Neuroscience, GPA: 4.00/4.00 2019 – Present

- Kavli NDI Distinguished Graduate Fellow (2022 – 2024)

McGill University, Faculty of Science Montreal, QC
B.Sc. Physiology First Class Honors, GPA: 3.98/4.00 2014 – 2018

RESEARCH EXPERIENCE

Johns Hopkins School of Medicine Baltimore, MD
PhD Candidate with Dr. Dwight Bergles 2019 – Present
Defining the rules governing myelin patterns and plasticity

- Designed a whole-brain clearing pipeline to visualize myelin patterns at single-cell resolution.
- Developed *DeepCellTrace* and *Oligo-Track*, deep learning tools for automated structural tracing and tracking of oligodendrocytes in fluorescent volumes.
- Identified a close association between oligodendrocyte progenitor cells and brain vasculature that highlights a differentiation-niche for progenitor cells.

Graduate Researcher – extended collaboration with Dr. Richard Huganir 2020 – 2023

- Designed a computational super-resolution algorithm (XTC) that enhanced low-quality two-photon images acquired *in vivo*.
- Applied XTC to super-resolve neuronal synapses *in vivo* and tracked dynamic changes across thousands of synapses in living animals.

McGill University Montreal, QC
Research Assistant with Dr. Jack Antel 2017 – 2019

- Developed a high-throughput therapeutic screening pipeline, using deep learning algorithms and automated microscopy to identify compounds for treating multiple sclerosis.

PUBLICATIONS

First Author Peer-Reviewed Publications:

Xu YKT*, Graves AR*, Coste GI, Huganir RL, Charles AS, Sulam J. “Cross-modality supervised image restoration enables nanoscale tracking of synaptic plasticity in living mice”. *Nature Methods*. (2023). *Contributed equally.

Xu YKT, Call CL, Sulam J, Bergles DE. “Automated *in vivo* Tracking of Cortical Oligodendrocytes.” *Frontiers in Cellular Neuroscience*. (2021).

Xu YKT, Chitsaz D, Brown RA, Cui QL, Dabarno MA, Antel JP, and Kennedy TE. “Deep Leaning for High Throughput Quantification of Oligodendrocyte Ensheathment at Single-Cell Resolution.” *Communications Biology*. (2019)

Publications in preparation:

Xu YKT, Bush A, Musheyev E, Kim A, Zhang S, Bernhardi JE, Sulam J, Bergles DE. “Brain-wide mapping of oligodendrocyte organization and oligodendrogenesis across the murine lifespan”. In submission to *Cell*.

Coauthored Peer-Reviewed Publications:

Drake SS, Charabti M, Simas T, **Xu YKT**, Maes E, Shi S, Antel JP, Prat A, Morquette B, Fournier A. "3-Dimensional immunostaining and automated deep-learning based analysis of nerve degeneration". *International Journal of Molecular Sciences*. (2022).

Chanoumidou K, Hernández-Rodríguez B, Windener F, [18 others, including **Xu YKT**], Kuhlmann T. "One-Step Reprogramming of Human Fibroblasts into Oligodendrocyte-like Cells by SOX10, OLIG2, and NKX6.2." *Stem Cell Reports* 16. (2021).

Starost L, Lindner M, Herold M, **Xu YKT**, [13 others], Kuhlmann T. "Extrinsic immune cell-derived, but not intrinsic oligodendroglial factors contribute to oligodendroglial differentiation block in multiple sclerosis." *Acta Neuropathologica*. (2020).

Mozafari S, Starost L, Blandine M, Beatriz G, **Xu YKT**, [10 others], Evercooren AB. "Multiple Sclerosis IPS-Derived Oligodendroglia Conserve Their Properties to Functionally Interact with Axons and Glia in Vivo." *Science Advances*. (2020).

Cui QL, Lin YH, **Xu YKT**, Fernandes MGF, Rao VTS, Kennedy TE, Antel JP. "Effects of Biotin on survival, ensheathment, and ATP production by oligodendrocyte lineage cells in vitro." *PLOS ONE*. (2020).

Kremer D, Gruchot J, Weyers V, Oldemeier L, Göttle P, Healy L, Jang JH, **Xu YKT**, Volsko C, Dutta R, Trapp BP, Perron H, Hartung H, Küry P. "pHERV-W envelope protein fuels microglial cell-dependent damage of myelinated axons in multiple sclerosis." *Proceedings of the National Academy of Sciences*. (2019).

INVITED AND SELECTED TALKS

Xu YKT, Bush A, Musheyev E, Call CL, Sulam J, Bergles DE. "Defining the myelinome: a brain-wide map of oligodendrocyte distribution and myelin patterning in health and disease". Myelin Gordon Research Conference (2024). Selected as most "stunning" presentation at the conference.

Xu YKT, Bush A, Call CL, Sulam J, Bergles DE. "Mapping brain-wide myelin patterns". Solomon H. Snyder Department of Neuroscience annual retreat, Johns Hopkins, MD. Sept. 2022. One of two graduate students invited to present.

Xu YKT, Bush A, Graves A, Charles AS, Sulam J, Huganir RL, Bergles DE. "Myelin mapping and tracking: DeepCellTrace and Cross-Trained CARE (XTC)". Dr. Bradley Hyman group meeting, Massachusetts General Hospital, MA. July 2022. Invited speaker.

POSTER PRESENTATIONS

Xu YKT, Bush A, Musheyev E, Call CL, Sulam J, Bergles DE. "Defining the myelinome: a brain-wide map of oligodendrocyte distribution and myelin patterning in health and disease". Myelin Gordon Research Conference and Seminar (2024).

Xu YKT, Chitsaz D, Cui QL, Brown RA, Dabarno MA, Kennedy TE, Antel JP. "Adaptable heuristic and deep learning algorithms for in vitro and in vivo quantification of oligodendrocyte ensheathment." Poster presented at the International Progressive MS alliance conference (2019).

Xu YKT, Chitsaz D, Cui QL, Brown RA, Dabarno MA, Kennedy TE, Antel JP. Automated pipeline using heuristic and deep learning algorithms for high-throughput quantification of oligodendrocyte ensheathment." Poster presented at the Society for Neuroscience conference (2018).

TEACHING AND LEADERSHIP EXPERIENCE

Johns Hopkins School of Medicine Baltimore, MD
Instructor, Hopkins Engineering Applications & Research Tutorials (HEART) Aug. – Nov. 2022

- Designed a 10-lecture freshman course: "*Transgenic, optical, and computational tools for brain mapping,*" that introduced students to the engineering tools used for whole brain analysis.
- Provided weekly lectures, interactive demos, and a lab tour for a class of 13 students.

Mentor, Life Design Lab 2021 - Present

- Mentoring undergraduate students in imaging informatics and computer vision research.
- Obtained grant funding to support student's summer internships.

Teaching Assistant, Neuroscience and Cognition I Sept. – Dec. 2020

- Assisted in preparation of weekly lectures and transition to online teaching.
- Provided students with support through review lectures and office hours.

McGill University Montreal, QC
Producer and Productions Manager 2013 – 2019

- Established a production company, *Two Gents of New West*, that supported aspiring artists in the performing arts through youth run shows, and annual workshops/events.
- Produced *Heathers: the musical* as part of McGill Theatre Society. Managed a cast/crew of 60 students.

AWARDS AND SCHOLARSHIPS

Kavli NDI Distinguished Graduate Student Fellowship, Johns Hopkins University 2022 - 2024

- $80,000 over 2 years

Kavli NDI Graduate Fellow, Johns Hopkins University 2019 - 2024
Boo Anderson Scholarship in Science, McGill University 2017
Emily Ross Crawford Scholarship for Academic excellence in Science, McGill University 2015
National Science Research Council Award (NSERC-USRA), University of British Columbia 2015
Sigma Chi Leadership Scholarship, McGill University 2014

REFERENCES

Dwight Bergles
Professor of Neuroscience
Johns Hopkins School of Medicine
dbergles@jmhi.edu

Richard Huganir
Director, Department of Neuroscience
Professor of Neuroscience
Johns Hopkins School of Medicine
rhuganir@jhmi.edu

Jeremias Sulam
Assistant Professor
Johns Hopkins Department of Biomedical Engineering
jsulam1@jhu.edu