

J. Alexander Bae

Ph.D. in Electrical and Computer Engineering and Neuroscience

E-mail: alexconnectome@gmail.com

LinkedIn: linkedin.com/in/jalexbae

Website: jabae.github.io

Education

Sep. 2015 ~ Jan. 2022	Ph.D. in Electrical and Computer Engineering and Neuroscience, Princeton University (<i>Gordon Y.S. Wu Fellow</i>)
Sep. 2015 ~ Sep. 2017	M.A. in Electrical and Computer Engineering, Princeton University (<i>Gordon Y.S. Wu Fellow</i>)
Feb. 2011 ~ Feb. 2015	B.S. in Electrical Engineering, Korea Advanced Institute of Science and Technology (KAIST) (<i>Summa Cum Laude</i>)

Experiences

Mar. 2025 ~	Research scientist	Zetta AI
Nov. 2021 ~ Feb. 2025	Postdoctoral researcher (<i>SNU Science Fellow</i>) Research Institute of Basic Sciences (Prof. Junho Lee)	Seoul National University
Apr. 2016 ~ Oct. 2021	Graduate student researcher Seung Lab (Prof. Sebastian Seung)	Princeton University
Mar. 2015 ~ Jun. 2015	Research assistant Communication Circuits and Systems Lab (Prof. SeongHwan Cho)	KAIST
Feb. 2014 ~ Feb. 2015	Undergraduate researcher Communication Circuits and Systems Lab (Prof. SeongHwan Cho)	KAIST
Jun. 2014 ~ Aug. 2014	Research intern Bouma Group (Prof. Brett Bouma), Wellman Center for Photomedicine	Massachusetts General Hospital

Publications

* First author / _ Corresponding author

J.A. Bae*, M. Choi*, S. Ahn, G. Ko, D.T. Choe, H. Yim, K.C. Nguyen, J.S. Kim et al. (2025). Structural diversity of mitochondria in the neuromuscular system across development revealed by 3D electron microscopy. *Advanced Science*.

H. Yim*, D.T. Choe*, **J.A. Bae***, H. Kang, K.C.Q. Nguyen, M. Choi, S. Ahn, S. Bahn et al. (2024). Comparative connectomics of dauer reveals developmental plasticity. *Nature Communications*.

N.L. Turner*, T. Macrina*, **J.A. Bae***, R. Yang*, A.M. Wilson*, C. Schneider-Mizell*, K. Lee*, R. Lu* et al. (2022). Reconstruction of neocortex: organelles, compartments, cells, circuits, and activity. *Cell*.

J.A. Bae*, S. Mu*, J.S. Kim*, N.L. Turner*, I. Tartavull, N. Kemnitz, C.S. Jordan, A.D. Norton et al. (2018). Digital Museum of Retinal Ganglion Cells with Dense Anatomy and Physiology. *Cell*.

MICrONS Consortium*, **J.A. Bae**, M. Baptiste, M.R. Baptiste, C.A. Bishop, A.L. Bodor, D. Brittain, V. Brooks et al. (2025). Functional connectomics spanning multiple areas of mouse visual cortex. *Nature*.

L. Elabbady*, S. Seshamani, S. Mu, G. Mahalingam, C. Schneider-Mizell, A.L. Bodor, **J.A. Bae**, D. Brittain et al. (2025). Perisomatic ultrastructure efficiently classifies cells in mouse cortex. *Nature*.

B. Celii*, S. Papadopoulos, Z. Ding, P.G. Fahey, E. Wang, C. Papadopoulos, A.B. Kunin, S. Patel, **J.A. Bae** et al. (2025). NEURD offers automated proofreading and feature extraction for connectomics. *Nature*.

C. Schneider-Mizell*, A.L. Bodor, D. Brittain, J. Buchanan, D.J. Bumbarger, L. Elabbady, C. Gamlin, D. Kapner, ..., **J.A. Bae** et al. (2025). Inhibitory specificity from a connectomic census of mouse visual cortex. *Nature*.

Z. Ding*, P.G. Fahey*, S. Papadopoulos*, E.Y. Wang, B. Celii, C. Papadopoulos, A. Chang, A.B. Kunin, ..., **J.A. Bae** et al. (2025). Functional connectomics reveals general wiring rule in mouse visual cortex. *Nature*.

C.R. Gamlin*, C. Schneider-Mizell, M. Mallory, L. Elabbady, N. Gouwens, G. Williams, A. Mukora, R. Dalley, ..., **J.A. Bae** et al. (2025). Connectomics of predicted Sst transcriptomic types in mouse visual cortex. *Nature*.

S. Dorkenwald*, C. Schneider-Mizell, D. Brittain, A. Halageri, C. Jordan, N. Kemnitz, M.A. Castro, W. Silversmith, ..., **J.A. Bae** et al. (2025). CAVE: Connectome Annotation Versioning Engine. *Nature Methods*.

M. Weis*, S. Papadopoulos, L. Hansel, T. Luddecke, B. Celii, P.G. Fahey, E.Y. Wang, **J.A. Bae** et al. (2025). An unsupervised map of excitatory neuron dendritic morphology in the mouse visual cortex. *Nature Communications*.

S. Dorkenwald*, A. Matsliah, A.R. Sterling, P. Schlegel, S. Yu, C.E. McKellar, A. Lin, M. Costa, ..., **J.A. Bae** et al. (2024). Neuronal wiring diagram of an adult brain. *Nature*.

S. Popovych*, T. Macrina*, N. Kemnitz, M. Castro, B. Nehoran, Z. Jia, **J.A. Bae**, E. Mitchell et al. (2024). Petascale pipeline for precise alignment of images from serial section electron microscopy. *Nature Communications*.

W. Silversmith*, A. Zlateski, **J.A. Bae**, I. Tartavull, N. Kemnitz, J. Wu, H.S. Seung (2023). Igneous:

Distributed dense 3D segmentation meshing, neuron skeletonization, and hierarchical downsampling. *Front. Neural Circuits*.

S. Dorkenwald*, C.E. McKellar*, T. Macrina*, N. Kemnitz*, K. Lee*, R. Lu*, J. Wu*, S. Popovych, ..., **J.A. Bae** et al. (2022). FlyWire: Online community for whole-brain connectomics. *Nature Methods*.

J. Wu*, N. Turner, **J.A. Bae**, A. Vishwanathan, H.S. Seung (2022). RealNeuralNetworks.jl: An Integrated Julia Package for Skeletonization, Morphological Analysis, and Synaptic Connectivity Analysis of Terabyte-Scale 3D Neural Segmentations. *Frontiers in Neuroinformatics*.

D. Wei*, K. Lee*, H. Li, R. Lu, **J.A. Bae**, Z. Liu, L. Zhang, M. dos Santos et al. (2021). AxonEM Dataset: 3D Axon Instance Segmentation of Brain Cortical Regions. *Medical Image Computing and Computer Assisted Intervention - MICCAI 2021*.

S. Popovych*, **J.A. Bae**, H.S. Seung (2020). Caesar: Segment-Wise Alignment Method for Solving Discontinuous Deformations. In *Proceedings of the IEEE 17th International Symposium on Biomedical Imaging (ISBI)*.

Honors and Awards

SNU Science Fellowship. *Seoul National University*.

Mar. 2022 ~ Feb. 2025

Gordon Y.S. Wu Fellowship. *Princeton University*.

Sep. 2015 ~ Aug. 2020

Statistics and Machine Learning Certificate. *Princeton University*.

Jan. 2022

Andrew Kim Memorial Foundation Engineering Award. *Andrew Kim Foundation*.

Mar. 2018

KFAS Undergraduate Student Scholarship. *Korea Foundation for Advanced Studies (KFAS)*.

Mar. 2012 ~ Feb. 2015

Jongha Scholarship. *Jongha Scholarship Foundation*.

Aug. 2013

National Science and Technology Scholarship. *Korea Student Aid Foundation (KOSAF)*.

Feb. 2011 ~ Feb. 2015

Scholarship for Academic Excellence. *KAIST*.

Mar. 2014 ~ Jun. 2014

Young Investigator Award. *ICKSMCB 2024*.

Oct. 2024

Best Presentation Award. *Ygnite 2019*.

Jan. 2019

Toward Large-scale Dense 3D Neuron Reconstruction using Artificial Intelligence.

Gold Paper Award. *IEEE Seoul Section Student Paper Contest*.

2014

How to Cope with Motion Artifact in Heart Rate Signal from Bio-Impedance Measurement System.

Honorable Mention (3rd Place). *GS Caltex-KAIST Outstanding Paper Contest.*

2012

Designing Best Arrangement of Modules in Wave Energy Farm to Maximize Wave Energy Efficiency.

Top Trainee. Republic of Korea Army.

2023

Teaching Experiences

Teaching Assistant. *Machine Learning and Pattern Recognition.* Princeton University.

Sep. 2016 ~ Jan. 2017

Mentor. *AI4All (Computer vision).* Princeton University.

Jul. 2018

Freshman Tutor. *Introduction to Programming (Python).* KAIST.

Mar. 2013 ~ Dec. 2014

Other Experiences

Graduate Engineering Council (President). Princeton University. Sep. 2018 ~ Sep. 2020

Korean Graduate Student Association (President). Princeton University. Jun. 2017 ~ May. 2018

Department Graduate Student Committee. Princeton University. Sep. 2016 ~ May. 2019

Volunteer. COVID Translate Project. Mar. 2020 ~ Jun. 2020

Volunteer. Raphael Clinic (Clinic for foreign immigrants). Jan. 2013 ~ Aug. 2015

Volunteer. The Special Olympics Winter Games 2013. Jan. 2013 ~ Feb. 2013