Eric G. Wu

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Google Scholar Profile

Machine learning, software, and hardware engineer with 6 years of research experience in computational photography, image processing, machine learning, image quality evaluation, and visual neuroscience. Proven track record building data pipelines for machine learning. Past research experience in electronics and MEMS. 15+ publications in top journals and conferences in neuroscience, machine learning, and electronics.

Education

2016–2024 **PhD, Electrical Engineering**, *Stanford University*

2016–2018 **MS, Electrical Engineering**, *Stanford University*

2012–2016 **BS, Electrical Engineering and Computer Science**, *University of California, Berkeley*

Work Experience

7/2024–present **Innovation Fellow**, *Defense Advanced Research Projects Agency (DARPA)*

- Entrepreneurial two-year postdoctoral fellowship developing, funding, and managing exploratory high-risk research and technology development.
- Co-lead for CRYSTAL program for atomistic-to-wafer-scale computational models of wafer bonding. Co-managed DUF program for high-throughput gene annotation. Government reviewer for DARPA programs in neuroscience and quantum computing.

Research

9/2018–4/2024 **PhD Candidate, NDSEG Fellow**, *Prof. EJ Chichilnisky group, Stanford University*

- Full-stack machine learning, computational neuroscience, software and hardware development for understanding primate vision and developing retinal BCI.
- Invented generative image decoder for reconstructing natural images from large-scale MEA recordings of macaque monkey retina with convex optimization and deep denoiser neural network image priors. Achieved state-of-the-art in image quality (first-author, NeurIPS), first super-resolution/blind motion deblurring demonstration with eye movements from retinal recordings (first-author, *Nature Communications*).
- Convex optimization and machine learning for identifying neuron cell types from recorded voltage signals (first-author, *Journal of Neural Engineering*).
- Built electrophysiology rig (mechanical, electrical, software development) for retinal recordings with 3D microelectrode arrays (second-author, *Science Advances*).
- Wrote ML data pipelines for wrangling large neural datasets and spike-sorting. Used by every member of the lab. Resulted in discovery of novel retinal neurons.

7/2016–8/2018 **PhD Candidate**, *Prof. Roger Howe group, Stanford University*

- Design, layout, process development, and nanofabrication of wafer-scale MEMS thermionic energy converter.

10/2014-7/2016 **Undergraduate Researcher**, *Prof. Ali Javey group, UC Berkeley*

- Drug delivery and sensor interface circuits for wearable sweat biochemical sensing (author in *PNAS*, *Advanced Materials*, *ACS Sensors*, and IEEE IEDM).
- Components for 3D-printed electronics (author in *ACS Sensors*, *Advanced Materials Technologies*).
- Wrote mobile application for controlling and interfacing with wearable sensor systems.

Internships

6/2014-8/2014 **Financial Software Developer Intern**, *Bloomberg LP*, New York, NY

- Tools for stock market simulation, database debugging, and settings management.

Teaching

1/2015-5/2016 **Teaching Assistant**, *UC Berkeley Electrical Engineering and Computer Science*

- Lab TA for EE16B and EE40 introductory courses in circuit design and signal processing.

Technical Skills

Software (ordered most-to-least experience): Python (Numpy, PyTorch), C/C++, Java, bash, CUDA

Hardware Electronics lab, circuit design, PCB, Verilog, AutoCAD, Solidworks, embedded systems, nanofabrication (lithography, CVD, wet/dry etch, sputtering, evaporation, wafer bonding)

Publications

[1] **Wu, E.G.**, Brackbill, N., Sher, A., Litke, A.M., Simoncelli, E.P., Chichilnisky, E.J. Maximum a posteriori natural scene reconstruction from retinal ganglion cells with deep denoiser priors. in Advances in Neural Information Processing Systems 35 (2022). doi:10.1101/2022.05.19.492737.

[2] **Wu, E.G.**, Brackbill, N., Rhoades, C., Kling, A., Gogliettino, A.R., Shah, N.P., Sher, A., Litke, A.M., Simoncelli, E.P., Chichilnisky, E.J. Fixational Eye Movements Enhance the Precision of Visual Information Transmitted by the Primate Retina. *Nature Communications* 15, 7964 (2024).

[3] **Wu, E.G.**, Rudzite, A.M., Bohlen, M.O., Li, P.H., Kling, A., Cooler, S., Rhoades, C., Brackbill, N., Gogliettino, A.R., Shah, N.P., Madugula, S.S., Sher, A., Litke, A.M., Field, G.D., Chichilnisky, E.J. Decomposition of retinal ganglion cell electrical images for cell type and functional inference. *Journal of Neural Engineering* 22, 046007 (2025).

[4] Wang, P., **Wu, E.G.**, Ulusan, H., Phillips, A.J., Hays, M.R., Kling, A., Zhao, E.T., Madugula, S.S., Vilkhu, R.S., Vasireddy, P.K., Hierlemann, A., Hong, G., Chichilnisky, E.J., Melosh, N.A. Direct-print three-dimensional electrodes for large-scale, high-density, and customizable neural interfaces. *Advanced Science* 12, 2408602 (2025).

[5] Kling, A., **Wu, E.**, Cooler, S., Rhoades, C., Brackbill, N., Litke, A., Sher, A., Chichilnisky, E.J. Unusual properties of novel ganglion cell and amacrine cell types in macaque and human retina. ARVO Annual Meeting 2022

[6] Cooler, S., Kling, A., **Wu, E.**, Rhoades, C., Brackbill, N., Sher, A., Litke, A.M., Chichilnisky, E.J. Automated identification of ganglion and amacrine cell types in a large primate retina dataset. ARVO Annual Meeting 2022

[7] Madugula, S.S., Gogliettino, A.R., Zaidi, M., Aggarwal, G., Kling, A., Shah, N.P., Brown, J.B., Vilkhu, R.S., Hays, M.R., Nguyen, H., Fan, V., **Wu, E.G.**, Hottowy, P., Sher, A., Litke, A.M., Silva, R.A., Chichilnisky, E.J. Focal electrical stimulation of human retinal ganglion cells for vision restoration. *Journal of Neural Engineering*, 19 (6). (2022).

[8] Zaidi, M., Aggarwal, G., Shah, N.P., Karniol-Tambour, O., Goetz, G., Madugula, S.S., Gogliettino, A.R., **Wu, E.G.**, Kling, A., Brackbill, N., Sher, A., Litke, A.M., Chichilnisky, E.J. Inferring light responses of primate retinal ganglion cells using intrinsic electrical signatures. *Journal of Neural Engineering*, 20 (4). (2023).

[9] Kling, A., Gogliettino, A.R., Shah, N.P., **Wu, E.G.**, Brackbill, N., Sher, A., Litke, A.M., Silva, R.A., Chichilnisky, E.J. Functional Organization of Midget and Parasol Ganglion Cells in the Human Retina. *bioRxiv* (2020)

[10] Gogliettino, A.R., Cooler, S., Vilkhu, R.S., Brackbill, N.J., Rhoades, C., **Wu, E.G.**, Kling, A., Sher, A., Litke, A.M., Chichilnisky, E.J. Modeling responses of macaque and human retinal ganglion cells to natural images using a convolutional neural network. *bioRxiv* (2024).

[11] Hofflich, B., Kling, A., Cooler, S., Raval, V., Brackbill, N., Rhoades, C., **Wu, E.**, Rieke, F., Manookin, M.B., Sher, A., Litke, A., Chichilnisky, E.J. Rapid ganglion and amacrine cell type classification using temporal cross-correlation in the macaque retina. ARVO Annual Meeting 2024.

[12] Kling, A., Hofflich, B., Cooler, S., Brackbill, N., Rhoades, C., **Wu, E.**, Litke, A., Sher, A., Chichilnisky, E.J. Diverse functional properties of polyaxonal amacrine cells in the primate retina. ARVO Annual Meeting 2024.

[13] Zaidi, M., Aggarwal, G., Shah, N.P., Karniol-Tambour, O., Goetz, G., Madugula, S., Gogliettino, A.R., **Wu, E.G.**, Kling, A., Brackbill, N., Sher, A., Litke, A.M., Chichilnisky, E.J. Inferring retinal ganglion cell light response properties from intrinsic electrical feature. ARVO Annual Meeting 2021).

[14] Emaminejad, S., Gao, W., **Wu, E.**, Davies, Z.A., Nyein, H.Y.Y., Challa, S., Ryan, S.P., Fahad, H.M., Chen, K., Shahpar, Z., Talebi, S., Milla, C., Javey, A., Davis, R.W. Autonomous sweat extraction and analysis applied to cystic fibrosis and glucose monitoring using a fully integrated wearable platform. *Proceedings of the National Academy of Sciences* 201701740. (2017).

[15] Ota, H., Chao, M., Gao, Y., **Wu, E.**, Tai, L.-C., Chen, K., Matsuoka, Y., Iwai, K., Fahad, H.M., Gao, W., Nyein, H.Y.Y., Lin, L., Javey, A. 3D Printed "Earable" Smart Devices for Real-Time Detection of Core Body Temperature. *ACS Sensors* 2 (7), 990-997. (2017).

[16] Gao, W., Nyein, H.Y.Y., Shahpar, Z., Tai, L.-C., **Wu, E.**, Bariya, M., Ota, H., Fahad, H.M., Chen, K., Javey, A. Wearable sweat biosensors. *IEDM 2016*.

[17] Ota, H., Emaminejad, S., Gao, Y., Zhao, A., **Wu, E.**, Challa, S., Chen, K., Fahad, H.M., Jha, A.K., Kiriya, D., Gao, W., Shiraki, H., Morioka, K., Ferguson, A.R., Healy, K.E., Davis, R.W., Javey, A. Application of 3D printing for smart objects with embedded electronic sensors and systems. *Advanced Materials Technologies*, 1 (1). doi:10.1002/admt.201600013. (2016).

[18] Tai, L.-C., Gao, W., Chao, M., Bariya, M., Ngo, Q.P., Shahpar, Z., Nyein, H.Y.Y., Sun, J., Jung, Y., **Wu, E.**, Fahad, H.M., Lien, D.-H., Ota, H., Cho, G., Javey, A. Methylxanthine Drug Monitoring with Wearable Sweat Sensors. *Advanced Materials*, 30 (23). (2018).

[19] Gao, W., Nyein, H.Y.Y., Shahpar, Z., Fahad, H.M., Chen, K., Emaminejad, S., Gao, Y., Tai, L.-C., Ota, H., **Wu, E.**, Bullock, J., Zeng, Y., Lien, D.-H., Javey, A. Wearable Microsensor Array for Multiplexed Heavy Metal Monitoring of Body Fluids. *ACS Sensors*, 1 (7), (2016).

[20] Li, X., Battle, A., Karczewski, K.J., Zappala, Z., Knowles, D.A., Smith, K.S., Kukurba, K.R., **Wu, E.**, Simon, N., Montgomery, S.B. Transcriptome sequencing of a large human family identifies the impact of rare noncoding variants. *The American Journal of Human Genetics*, 95 (3), (2014).

[21] **Wu, E.**, Nance, T., Montgomery, S.B. SplicePlot: a utility for visualizing splicing quantitative trait loci. *Bioinformatics*, 30 (7), 1025-1026. (2013).