Aravinthan D.T. Samuel, ***Curriculum Vitae***

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Education

Harvard University	Cambridge, MA	Neuroscience	Postdoctoral Fellow, 1999-2003
Harvard University	Cambridge, MA	Biophysics	Ph.D., 1999
Harvard University	Cambridge, MA	Physics	B.A. 1993

Professional Appointments

2010 – present	Professor of Physics, Harvard University
2008 – 2010	Associate Professor of Physics, Harvard University
2003 – 2008	Assistant Professor of Physics, Harvard University

Honors

2008	NIH Director's Pioneer Award
2007	Dana Foundation Award in Brain and Immuno-imaging
2006	Presidential Early Career Award for Scientists and Engineers
2005	NSF CAREER Award
2005	McKnight Scholar
2004	Alfred P. Sloan Foundation Research Fellow
2000	Amgen Fellow of the Life Sciences Research Foundation

Research

Freely-behaving animals constantly transform sensory inputs into internal representations, memories, and purposeful behavioral outputs. To do this, they use algorithms and circuits. Larger animals use brain circuits . Single-celled organisms use biochemical circuits and signal-transduction pathways.

To make progress, we use accessible biophysical models of organism behavior that can be studied from sensory input to motor output. We study bacterial chemotaxis using *E. coli*. We study navigational behaviors including chemotaxis, thermotaxis, and mating behaviors in the nematode *C. elegans*. We study thermosensory and olfactory behaviors in the *Drosophila* larva.

In all of our studies, we apply expertise in optics and light microscopy. We build microscopes that allow us to manipulate and monitor the circuits that underlie behavior in freely-moving organisms. We use advanced high-throughput electron microscopy to map entire brain circuits at synaptic resolution.

Teaching

I developed two courses that constitute my main teaching activities at Harvard University.

Freshman Seminar 51x	Changing Perspectives: The Science of Optics in the Visual Arts
Physics/Neuro 141	The Physics of Sensory Systems in Biology

Publications

>11000 citations, h-index=60

[98] C. F. Park, M. Barzegar-Keshteli, K. Korchagina, A. Delrocq, V. Susoy, C. L. Jones, A. D. T. Samuel, and S. J. Rahi, "Automated neuron tracking inside moving and deforming *C. elegans* using deep learning and targeted augmentation," *Nature Methods*, vol. 21, no. 1, pp. 142–149, 2024.

[97] B. G. Hosu, W. Hill, A. D. Samuel, and H. C. Berg, "Synchronized strobed phase contrast and fluorescence microscopy: The interlaced standard reimagined," *Optics Express*, vol. 31, no. 4, pp. 5167–5180, 2023.

[96] A. Lin, S. Qin, H. Casademunt, M. Wu, W. Hung, G. Cain, N. Z. Tan, R. Valenzuela, L. Lesanpezeshki, V. Venkatachalam, C. Pehlevan, M. Zhen, and A. D. Samuel, "Functional imaging and quantification of multineuronal olfactory responses in *C. elegans*," *Science Advances*, vol. 9, no. 9, eade1249, 2023.

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[93] V. Susoy and A. D. Samuel, "Evolutionarily conserved behavioral plasticity enables context-dependent mating in *C. elegans*," *Current Biology*, 2023.

[92] K. I. Brugman, V. Susoy, A. J. Whittaker, W. Palma, S. Nava, A. D. T. Samuel, and P. W. Sternberg, "Pezo-1 and trp-4 mechanosensors are involved in mating behavior in *C. elegans*," *PNAS Nexus*, vol. 1, no. 5, 2022.

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[89] B. Mulcahy, D. K. Witvliet, J. Mitchell, R. Schalek, D. R. Berger, Y. Wu, D. Holmyard, Y. Lu, T. Ahamed, A. D. Samuel, A. D. Chisholm, J. W. Lichtman, and M. Zhen, "Post-embryonic remodeling of the c. elegans motor circuit," *Current biology*, vol. 32, no. 21, 4645–4659.e3, 2022.

[88] C. Eschbach, A. Fushiki, M. Winding, B. Afonso, I. V. Andrade, B. T. Cocanougher, K. Eichler, R. Gepner, G. Si, J. Valdes-Aleman, R. D. Fetter, M. Gershow, G. S. Jefferis, A. D. Samuel, J. W. Truman, A. Cardona, and M. Zlatic, "Circuits for integrating learned and innate valences in the insect brain," *eLife*, vol. 10, 2021.

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