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Born: 30 May 1979, New York City

Research Statement

My lab develops new physical tools to study molecules and cells, and we apply these tools to make new measurements. We combine protein engineering, optics, microfluidics, electronics, and biochemistry to generate data; and we apply statistics and physical modeling to understand the data. Current projects include: development of fluorescent voltage-indicating proteins for all-optical electrophysiology; studies of bioelectrical pattern formation in developing embryos and engineered tissues; and development of tools for simultaneous recording from all neurons in a brain.

Employment

2007-present	Harvard University Chemistry and Chemical Biology and Physics Full Professor 2012 – John L. Loeb Associate Professor of the Natural Sciences 9/2011 – 6/2012 Asst. Prof. 2007 – 2011
2013-2020	Howard Hughes Medical Institute Investigator
2006-2007	Stanford University Postdoc in chemistry Advisor: W. E. Moerner

Education

2003 - 2006	Stanford University PhD in physics Thesis: “Trapping and manipulating single molecules in solution” Advisor: W. E. Moerner (Chemistry)
2001 – 2003	Cambridge University PhD in physics Thesis: “Nanoscale Mechanics” Advisors: Michael Pepper (Semiconductor Physics, Cambridge); Shaul Mukamel (Theoretical Chemistry, UC Irvine); L. Mahadevan (SEAS, Harvard)
1997 - 2001	Harvard University BA <i>summa cum laude</i> Major: chemistry and physics
1991 - 1997	Hunter College High School (New York, NY) First in a graduating class of 174

Honors and Awards

2023	Sackler Prize in Chemistry
2023	Falling Walls Science Summit, Finalist
2018	Vannevar Bush Faculty Fellowship
2014	ACS Pure Chemistry Award
2014	NIBIB Nagy New Investigator
2014	Blavatnik National Laureate in Chemistry
2012	Popular Science Brilliant 10: 10 most promising young scientists working today
2012	Dreyfus Teacher-Scholar Award
2011	Hunter College High School Distinguished Graduate Award
2010	Sloan Foundation Fellowship
2010	Presidential Early Career Award for Scientists and Engineers (PECASE)
2010	NIH New Innovator Award
2009	Defense Advanced Research Projects Agency Young Faculty Award
2009	Office of Naval Research Young Investigator Award
2007	Technology Review TR35: top 35 technology innovators under the age of 35
2007	Camille and Henry Dreyfus New Faculty Award
2006	Finalist in Collegiate Inventors Competition (Washington, DC) <i>for invention of a device to trap and manipulate single molecules.</i>
2003	5-year Hertz Fellowship to study at Stanford University
2001	2-year Marshall Fellowship to study at Cambridge University
2001	Phi Beta Kappa
1999	2-year Goldwater Scholarship
1998	Inductee into the National Gallery for America's Young Inventors (Akron Ohio) <i>for invention of a nanoscale patterning technique using an electrochemical STM</i>
1997	56 th Westinghouse Science Talent Search: first place <i>for invention of a nanoscale patterning technique using an electrochemical STM</i>

Other Activities

2025 -	Founder, Luminos Microscopy. Luminos manufactures high-end microscopes for optical electrophysiology and bidirectional microscopy.
2024 -	Scientific Advisory Board, Exin Therapeutics. Gene therapy for brain disorders.
2017 -	Harvard Life Lab selection committee: selecting biotech startups for incubator support
2016 -	JASON advisory group. Technical advice to the US Government.
2013 -	Co-founder, Q-State Biosciences (now Quiver Biotechnologies). Quiver develops drugs for the nervous system, using using human induced pluripotent stem cells and advanced optical imaging.
2013 -	Head Tutor, Chemical and Physical Biology undergraduate major, Harvard University
2012 – 2014	Scientific Advisory Board Quantum-Si
2008 – 2010	Scientific Advisory Board of ION Torrent Systems
2008 – 2010	Scientific Advisor to Liberian Ministry of Education and the University of Liberia. https://www2.lsddiv.harvard.edu/labs/cohen/Research/LiberianScience/LiberianScience.htm

Contributions to science

12/10/2025

1. Voltage Imaging. My lab discovered that microbial rhodopsins could function as fluorescent voltage indicators. We led the development of opsin-based voltage imaging technology via protein engineering, optical instrumentation, and algorithmic development, to create tools for high-speed imaging of electrical activity *in vivo*. Our recent focus has shifted toward studying bioelectrical dynamics *in vivo*: behavior-dependent changes in hippocampal dynamics; sensory processing in cortical Layer 1; and dendritic voltage dynamics *in vivo*.

We also discovered that bacteria produce electrical spikes, mapped action potential propagation at 100,000 frames/s, studied human cell-based models of pain, epilepsy, and ALS (leading to formation of two companies, Q-State Biosciences and QurAlis), developed tools for high-throughput studies of synaptic function, and discovered a new type of bioelectrical excitation which arises in muscle development called the bioelectric domain wall.

- a. Jia, B.Z., Qi, Y., Wong-Campos, J.D., Megason, S.G., & Cohen, A.E. (2023). "A bioelectrical phase transition patterns the first vertebrate heartbeats." **Nature** 622, 149-155.
- b. Fan, L.Z., Kheifets, S., Boehm, U.L., Wu, H., Piatkevich, K.D., Xie, M.E., Parot, V., Ha, Y., Evans, K.E., Boyden, E.S., Takesian, A.E. & Cohen, A.E. (2020). All-optical electrophysiology reveals the role of lateral inhibition in sensory processing in cortical layer 1. **Cell**, 180(3), 521-535. PMCID: PMC7259440
- c. Adam, Y., Kim, J.J., Lou, S., Zhao, Y., Xie, M.E., Brinks, D., Wu, H., Mostajo-Radji, M.A., Kheifets, S., Parot, V., Chettih, S., Williams, K.J., Gmeiner, B., Farhi, S.L., Madisen, L., Buchanan, E.K., Kinsella, I., Zhou, D., Paninski, L., Harvey, C.D., Zeng, H., Arlotta, P., Campbell, R.E. & Cohen, A.E. (2019). Voltage imaging and optogenetics reveal behaviour-dependent changes in hippocampal dynamics. **Nature**, 569(7756), 413-417. PMCID: PMC6613938
- d. Hochbaum, D.R., Zhao, Y., Farhi, S.L., Klapoetke, N., Werley, C.A., Kapoor, V., Zou, P., Kralj, J.M., Maclaurin, D., Smedemark-Margulies, N., Saulnier, J.L., Boulting, G.L., Straub, C., Cho, Y.K., Melkonian, M., Wong, G.K., Harrison, D.J., Murthy, V.N., Sabatini, B.L., Boyden, E.S., Campbell, R.E. & Cohen, A.E. (2014). All-optical electrophysiology in mammalian neurons using engineered microbial rhodopsins. **Nat Methods**, 11(8), 825-833. PMCID: PMC4117813
- e. Kralj, J.M., Hochbaum, D.R., Douglass, D. & Cohen, A.E. (2011). Electrical spiking in *Escherichia coli* probed with a fluorescent voltage-indicating protein. **Science**, 333(6040), 345-348.

2. Cell membrane mechanics. We showed that in mammalian cells, local changes in plasma membrane tension remain localized over many minutes, contrary to conventional wisdom. Despite the fluid nature of lipid bilayers, tension does not readily propagate in cells. A detailed biophysical model quantitatively explained our findings. This work overturned long-held dogma that the fluid mosaic plasma membrane could rapidly transmit tension signals across a cell.

- a. Shi, Z., Innes-Gold, S., Cohen, A.E. (2022). Membrane tension propagation couples axon growth and collateral branching. **Science Advances**, 8.35: eabo1297.
- b. Cohen, A.E., Shi, Z. (2020) Do cell membranes flow like honey or jiggle like Jello? **BioEssays**, 42, 1900142.
- c. Shi, Z., Graber, Z.T., Baumgart, T., Stone, H.A., Cohen, A.E. (2018) Cell membranes resist flow. **Cell** 175, 1-11. PMCID: PMC6541487

3. Superchiral light. I discovered a new fundamental feature of the electromagnetic field, *optical chirality*. Optical chirality governs the chiral asymmetry of light-matter interactions. I predicted theoretically, and my lab demonstrated experimentally, the existence of superchiral light, which shows 10-fold greater chiral dissymmetry than does circularly polarized light. These findings provide new insights into the fundamental symmetries of electromagnetism, and suggest routes toward improved chiral sensing and enantioselective photochemistry.

- b. Tang, Y. & Cohen, A.E. (2011). Enhanced enantioselectivity in excitation of chiral molecules by superchiral light. **Science**, 332, 333-336.
- a. Tang, Y. & Cohen, A.E. (2010). Optical chirality and its interaction with matter. **Phys. Rev. Lett.**, 104(16), 163901.

4. Trapping single molecules. I invented the Anti-Brownian Electrokinetic trap (ABEL trap), a device capable of trapping and manipulating single molecules in solution. The ABEL trap uses high speed tracking to follow the Brownian motion of a molecule, and real-time electrokinetic feedback to induce a motion counter to the Brownian motion. I trapped individual dye molecules, less than 1 nanometer in diameter, in water at room temperature, and used the ABEL trap for ultrasensitive measurements in single-molecule spectroscopy.

- b. Fields, A.P. & Cohen, A.E. (2011). Electrokinetic trapping at the one nanometer limit. **Proc. Natl. Acad. Sci. USA**, 108(22), 8937-8942. PMID: PMC3107292
- a. Cohen, A.E. & Moerner, W.E. (2006). Suppressing Brownian motion of individual biomolecules in solution. **Proc. Natl. Acad. Sci USA**, 103(12), 4362-4365. PMID: PMC1450176

Book

- Let's Go 2000: Peru & Ecuador

Patents

1. A. E. Cohen, "Nanoscale photolithography," U.S. patent 5,865,978 issued February 2, 1999
2. A. E. Cohen, Charles Black, Robert Sandstrom, and Chris Murray, "Scanning probe microscopy Tips composed of nanoparticles and method to form same," U.S. patent 7,282,710 issued Oct. 16, 2007
3. A. E. Cohen and W. E. Moerner, "Sub-micron object control arrangement and approach therefor," U.S. patent 8,057,655 issued Nov. 15, 2011
4. A. E. Cohen, J. M. Kralj, A. D. Douglass, "Optogenetic probes of membrane potential," U.S. patent 9,057,734 issued June 16, 2015
5. A. E. Cohen, Joel Kralj, Adam D. Douglass, Daniel Hochbaum, "Systems methods and workflows for optogenetics analysis," U.S. patent 9,207,237 issued Dec. 8 2015.
6. A. E. Cohen, Daniel Hochbaum, Peng Zou, Samouil Farhi, Robert Campbell, Yongxin Zhao, Daniel Jed Harrison, "Optogenetic probes of membrane potential," U.S. patent 9,518,103 issued Dec. 13 2016
7. A. E. Cohen, J. Kralj, A. D. Douglass, D. Hochbaum, "Systems, methods and workflows for optogenetics analysis," U.S. patent 9,702,874 issued Jul. 11, 2017.
8. A. E. Cohen, J. Kralj, A. D. Douglass, "Optogenetic probes for measuring membrane potential," U.S. patent 9,791,455 issued Oct. 17, 2017.

9. A. E. Cohen and Sabrina Leslie, "Convex Lens-Induced Confinement (CLIC) for measuring distributions of molecular sizes," U.S. patent 10,048,193 issued Aug. 14, 2018.
10. A. E. Cohen, M. P. Chien, "Optical selection of cells," U.S. patent 10,077,463 issued Sept. 18, 2018.
11. A. E. Cohen, J. Kralj, A. D. Douglass, D. R. Hochbaum, "Systems, methods and workflows for optogenetics analysis," U.S. patent 10,161,937 issued 25 Dec. 2018.
12. A. E. Cohen, J. Kralj, A. D. Douglass, "Optogenetic probes for measuring membrane potential," U.S. patent 10,352,945 issued Jul. 16, 2019.
13. A. E. Cohen, Daniel Hochbaum, Peng Zou, Samouil Farhi, Robert Campbell, Yongxin Zhao, Daniel Jed Harrison, "Optogenetic probes of membrane potential," U.S. patent 10,457,715 issued Oct. 29, 2019.
14. A. E. Cohen, Vicente Parot, "Widefield, high-speed optical sectioning," U.S. Patent 11,237,109 issued Feb. 1, 2022

Publications

Most significant publications in [blue](#).

- 125) J. D. Wong-Campos*, P. Park, H. Davis, Y. Qi, H. Tian, D. G. Itkis, D. Kim, J. B. Grimm, S. E. Plutkis, L. Lavis, A. E. Cohen, "Voltage dynamics of dendritic integration and back-propagation *in vivo*," *Nat. Neurosci* **in press** (2025).
- 124) K. M. Xiang, H. Lampson, R. F. Hayward, A. G. York, M. Ingaramo, A. E. Cohen, "Mechanism of Giant Magnetic Field Effect in a Red Fluorescent Protein," *JACS* **147**, 21, 18088–18099 (2025).
- 123) B. Antin, P. Park, A. Pasarkar, U. Ferah, C. King, A. E. Cohen, L. Paninski, "DENDRO: Recovery and denoising of whole-tree dendritic voltage from 2D voltage movies," *bioRxiv* (2025).
- 122) R. Dalangin, B. Jia, Qi, Y., *et al.*, "Far-red fluorescent genetically encoded calcium ion indicators," *Nat. Comms.* **16**, 3318, (2025).
- 121) H. McNamara, A. Guyer, B. Jia, V. Parot, C. Dobbs, A. Schier, A. E. Cohen*, N. Lord, "Optogenetic control of Nodal signaling patterns," *Development*, **152**, dev204506 (2025).
- 120) M. Howell, A. E. Cohen, "Optical Single-Channel Recording via Diffusional Confinement in Membrane Tethers," *ACS Nano*, **19**, 26852–26861 (2025).
- 119) B. Z. Jia, X. Tang, M. P. Rossmann, L. I. Zon, F. Engert, A. E. Cohen, "Swimming motions evoke Piezo1-dependent Ca²⁺ events in vascular endothelial cells of larval zebrafish," *Current Biology*, (2025).
- 118) S. Innes-Gold, H. Cheng, L. Liu, A. E. Cohen, "Tools for intersectional optical and chemical tagging on cell surfaces," *ACS Chemical Biology* **20**, 2, 455–463 (2025).
- 117) M. Duque, A. B. Chen, E. Hsu, S. Narayan, A. Rymbek, S. Begum, G. Saher, A. E. Cohen, D. E. Olson, Y. Li, D. A. Prober, D. E. Bergles, M. C. Fishman, F. Engert, M. B. Ahrens, "Ketamine induces plasticity in a norepinephrine-astroglial circuit to promote behavioral perseverance," *Neuron* **113**, 1–15 (2025).
- 116) R. F. Hayward, A. E. Cohen, "All-optical mapping of Ca²⁺ transport and homeostasis in dendrites," *Cell Calcium* **125**, 102983, (2025).
- 115) S. Kim, J. Yoon, G. Ko, I. Kang, H. Tian, L. Z. Fan, Y. Li, G. Xiao, Q. Zhang, A. E. Cohen, J. Wu, Q. Dai, M. Choi, "Optical segmentation-based compressed readout of neuronal voltage dynamics," *Nat. Comms.* **16**, 7194, (2025).
- 114) K. M. Xiang, P. Park, S. A. Koren, R. F. Hayward, A. E. Cohen, "All-optical mapping of cAMP transport reveals rules of sub-cellular localization," *bioRxiv* (2024).

- 113) P. Park,* J.D. Wong-Campos,* D. G. Itkis, B. H. Lee, Y. Qi, H. Davis, B. Antin, A. Pasarkar, J. B. Grimm, S. E. Plutkis, K. L. Holland, L. Paninski L. D. Lavis, A. E. Cohen, "Dendritic excitations govern back-propagation via a spike-rate accelerometer," *Nat. Comms.* **16**, 1333 (2025).
- 112) D. Kim, P. Park, X. Li, J.D. Wong-Campos, H. Tian, E. M. Moulton, J. B. Grimm, L. Lavis, A. E. Cohen, EPSILON: a method for pulse-chase labeling to probe synaptic AMPAR exocytosis during memory formation, *Nat. Neuro.* **28**, 1099–1107 (2025).
- 111) F. P. Brooks III, H. C. Davis, P. Park, Y. Qi, A. E. Cohen, "Photophysics-informed two-photon voltage imaging using FRET-opsin voltage indicators," *Science Advances* **11**, eadp5763, (2025).
- 110) D. J. Combs, E. M. Moulton, S. K. England, A. E. Cohen, "Mapping uterine calcium dynamics during the ovulatory cycle in live mice," *PNAS Nexus* **3**, 10, 446 (2024).
- 109) H. C. Davis*, F. P. Brooks III*, J. D. Wong-Campos, A. E. Cohen, "Optical constraints on two-photon voltage imaging," *Neurophotonics* **11**, 3, 03500 (2024).
- 108) C. Scheibner, H. Ori, A. E. Cohen, V. Vitelli, "Spiking at the edge," *PNAS*, **121** (3) e2307996120 (2024).
- 107) P. W. Liu *et al.* "A phenotypic screening platform for chronic pain therapeutics using all-optical electrophysiology," *Pain* (2023).
- 106) A. Berndt, D. Cai, A. E. Cohen, B. Juarez, J. T. Iglesias, H. Xiong, Z. Qin, L. Tian, and P. A. Slesinger, "Current Status and Future Strategies for Advancing Functional Circuit Mapping In Vivo," *J. Neurosci.* **43** 7581-7598 (2023).
- 105) R. Frank Hayward, F. P. Brooks III, S. Yang, S. Gao, A. E. Cohen, "Diminishing neuronal acidification by channelrhodopsins with low proton conduction," *eLife* **12**:RP86833 (2023).
- 104) M. Eom, S. Han, G. Kim, E. S. Cho, J. Sim, P. Park, K. H. Lee, S. Kim, M. Rozsa, K. Svoboda, M. Choi, C. H. Kim, A. E. Cohen, J. B. Chang, Y. G. Yoon, "Statistically unbiased prediction enables accurate denoising of voltage imaging data," *Nature Methods* **20**, 1581-1592 (2023).
- 103) B. Jia, Y. Qi, J. D. Wong-Campos, S. Megason, A. E. Cohen, "A bioelectrical phase transition patterns the first beats of a vertebrate heart," *Nature* **622**, 149-155 (2023).
- 102) L. Z. Fan, D. K. Kim, J. H. Jennings, H. Tian, S. Randles, C. Ramakrishnan, Y. Sun, E. Thadhani, Y. S. Kim, P. Y. Wang, S. Quirin, L. Giocomo, A. E. Cohen, K. Deisseroth, "All-optical physiology resolves a synaptic basis for behavioral timescale plasticity," *Cell* (2023).
- 101) H. Tian, H. C. Davis, J. D. Wong-Campos, L. Z. Fan, B. Gmeiner, S. Begum, C. A. Werley, G. B. Borja, H. Upadhyay, H. Shah, J. Jacques, P. Park, Y. Qi, V. Parot, K. Deisseroth, A. E. Cohen, "Video-based pooled screening yields improved far-red genetically encoded voltage indicators," *Nature Methods* (2023). See also *bioRxiv* (2021).
- 100) D. Lin, X. Li, E. Moulton, P. Park, B. Tang, H. Shen, J. B. Grimm, N. Falco, B. Jia, D. Baker, L. D. Lavis, A. E. Cohen, "Time-tagged ticker tapes for intracellular recordings," *Nature Biotech* (2023). **Cover story.**
- 99) H. Ori, M. Duque Ramirez, C. Scheibner, V. Vitelli, A. E. Cohen, "Observation of topological action potentials in engineered tissues," *Nature Physics* (2022).
- 98) Z. Shi, S. Innes-Gold, A. E. Cohen, "Membrane tension propagation couples axon growth and collateral branching," *Science Advances* **8**, eabo1297 (2022).
- 97) M. Armbruster, S. Naska, J. P. Garcia, M. Sommer, E. Kim, Y. Adam, P. G. Hadon, E. S. Boyden, A. E. Cohen, C. G. Dulla, "Neuronal activity drives pathway-specific depolarization of peripheral astrocyte processes," *Nature Neuroscience* **25**, 607-616 (2022).
- 96) A. T. Landau, P. Park, J. D. Wong-Campos, H. Tian, A. E. Cohen, B. L. Sabatini, "Dendritic branch structure compartmentalizes voltage-dependent calcium influx in cortical layer 2/3 pyramidal cells," *eLife*, 11:e76993 (2022).

- 95) U. L. Böhm, Y. Kimura, T. Kawashima, M. B. Ahrens, S.-I. Higashijima, F. Engert, A. E. Cohen, "Voltage imaging identifies spinal circuits that modulate locomotor adaptation in zebrafish." *Neuron* **110**, 1-12 (2022).
- 94) J. D. Wong-Campos, J. V. Porto, and A. E. Cohen, "Which way does stimulated emission go?" *J. Phys. Chem. A* **125**, 107713 (2021).
- 93) W. Bloxham, D. Brinks, S. Kheifets, A. E. Cohen, "Linearly polarized excitation enhances signals from fluorescent voltage indicators" *Biophysical Journal* **120**, 1-10 (2021).
- 92) M.-P. Chien, D. Brinks, G. Testa-Silva, H. Tian, F. P. Brooks, III, Y. Adam, W. Bloxham, B. Gmeiner, S. Kheifets, A. E. Cohen, "Photoactivated voltage imaging in tissue with an archaerhodopsin-derived reporter," *Science Advances* **7**, eabe3216 (2021).
- 91) Z. Al Tanoury, J. F. Zimmerman, J. Rao, D. Sieiro, H. M. McNamara, T. Cherrier, A. Rodriguez-de la Rosa, A. Hick-Colin, F. Bousson, C. Fugier-Schmucker, F. Marchiano, B. Habermann, J. Chal, A. P. Nesmith, S. Gapon, E. Wagner, V. A. Gupta, R. Bassel-Duby, E. N. Olson, A. E. Cohen, K. K. Parker, and O. Pourquie, "Prednisolone rescues Duchenne Muscular Dystrophy phenotypes in human pluripotent stem cells-derived skeletal muscle in vitro," *PNAS* **118**, 28 (2021).
- 90) M. E. Xie, Y. Adam, L. Z. Fan, U. L. Böhm, I. Kinsella, D. Zhou, M. Rozsa, A. Sing, K. Svoboda, L. Paninski, A. E. Cohen, "High-fidelity estimates of spikes and subthreshold waveforms from 1-photon voltage imaging in vivo," *Cell Reports* **35**, 108954 (2021).
- 89) C. A. Werley, S. Boccardo, A. Rigamonti, E. M. Hansson, A. E. Cohen. "Multiplexed Optical Sensors in Arrayed Islands of Cells for multimodal recordings of cellular physiology," *Nature Communications* **11**, 1-17 (2020).
- 88) Z. Shi, A. E. Cohen, "Do cell membranes jiggle like Jello or flow like honey?" *BioEssays* **42**, 1900142 (2020).
- 87) L. Z. Fan, S. Kheifets, U. L. Böhm, H. Wu, K. D. Piatkevich, M. E. Xie, V. J. Parot, Y. Ha, K. E. Evans, E. S. Boyden, A. E. Takesian, A. E. Cohen, "Optical electrophysiology reveals the role of lateral inhibition in cortical layer 1," *Cell* **180**, 521 (2020).
- 86) H. M. McNamara, R. Salegame, Z. A. Tanoury, H. Xu, S. Begum, G. Ortiz, O. Pourquie, A. E. Cohen, "Bioelectrical signaling via domain wall migration", *Nature Physics* **16**, 357 (2020).
- 85) Y. Adam, J. J. Kim, S. Lou, Y. Zhao, D. Brinks, H. Wu, M. A. Mostajo-Radji, S. Kheifets, V. Parot, S. Chettih, K. J. Williams, S. L. Farhi, L. Madisen, C. D. Harvey, H. Zeng, P. Arlotta, R. E. Campbell, A. E. Cohen, "All-optical electrophysiology reveals brain-state dependent changes in hippocampal subthreshold dynamics and excitability," *Nature* **569**, 413-417 (2019).
- 84) S. L. Farhi*, V. J. Parot*, A. Grama, M. Yamagata, A. S. Abdelfattah, Y. Adam, S. Lou, J.J. Kim, R. E. Campbell, D. D. Cox, and A. E. Cohen, "Wide-area all-optical neurophysiology in acute brain slices," *J. Neurosci.* **39**, 4889-4908 (2019). **Cover story.**
- 83) V. J. Parot, C. Sing-Long, Y. Adam, U. L. Bohm, L. Z. Fan, S. L. Farhi, A.E. Cohen, "Compressed Hadamard microscopy for high-speed optically sectioned neuronal activity recordings," *J. Phys. D: Appl. Phys.* **52**, 144001 (2019).
- 82) Z. Shi, Z.T. Graber, T. Baumgart, H.A. Stone, A.E. Cohen, "Cell membranes resist flow," *Cell* **175**, 1-11 (2018).
- 81) H.M. McNamara, S. Dodson, Y. Huang, E.W. Miller, B. Sandstede, A.E. Cohen, "Geometry-dependent arrhythmias in electrically excitable tissues," *Cell Systems* **7**, 359-370 (2018). **Cover story.**
- 80) L.Z. Fan, R. Nehme, Y. Adam, E.S. Jung, H. Wu, K. Eggan, D.B. Arnold, A.E. Cohen, "All-optical synaptic electrophysiology probes mechanism of ketamine-induced disinhibition," *Nature Methods* **15**, 823-831 (2018).

- 79) E. Kiskinis*, J. M. Kralj*, P. Zou*, E. N. Weinstein*, H. Zhang, K. Tisoras, O. Wiskow, J. A. Ortega, K. Egan, A. E. Cohen, "All-optical electrophysiology for high-throughput functional characterization of a human iPSC-derived motor neuron model of ALS." *Stem Cell Reports* **10**, 1991-2004 (2018).
- 78) A. E. Cohen and S. L. Farhi. "Sculpting light to reveal brain function," *Nature Neuroscience* **21.6**, 776 (2018).
- 77) A. H. Squires, A. E. Cohen, W. E. Moerner, "Anti-Brownian Traps," *Encyclopedia of Biophysics*, G. C. K. Robers, A. Watts (eds.), [doi:10.1007/978-3-642-35943-9_486-1](https://doi.org/10.1007/978-3-642-35943-9_486-1) (2018).
- 76) M. P. Chien*, D. Brinks*, Y. Adam, W. Bloxham, S. Kheifets, A. E. Cohen, "Two-photon photoactivated voltage imaging in tissue with an Archaelhodopsin-derived reporter," *bioRxiv* **1710**, 10080 (2017).
- 75) C. A. Werley, M. P. Chien, A. E. Cohen, "An ultrawidefield microscope for high-speed fluorescence imaging and targeted optogenetic stimulation," *Biomedical Optics Express*, **8.12**, 5794-5813 (2017).
- 74) Y. Xu, P. Zou, and A.E. Cohen. "Voltage imaging with genetically encoded indicators." *Current Opinion in Chemical Biology*, **39**, 1-10 (2017).
- 73) H. Zhang, and A.E. Cohen. "Optogenetic Approaches to Drug Discovery in Neuroscience and Beyond," *Trends in Biotechnology*, **35.7**, 625-639 (2017).
- 72) C.A. Werley, M.P. Chien, J. Gaublomme, K. Shekhar, V. Butty, B.A. Yi, J.M. Kralj, W. Bloxham, L.A. Boyer, A. Regev, A.E. Cohen, "Geometry-dependent functional changes in iPSC-derived cardiomyocytes probed by functional imaging and RNA sequencing," *PloS One*, **12.3**, e0172671 (2017).
- 71) K. Ogden, W. Chen, S.A. Swanger, M.J. McDaniel, L.Z.Fan, C. Hu, A. Tankovic, H. Kusumoto, G.J. Kosobucki, A.J. Schulien, Z. Su, J. Pecha, S. Bhattacharya, S. Petrovski, A.E. Cohen, E. Aizenman, S.F. Traynelis, H. Yuan, "Molecular mechanism of disease-associated mutations in the pre-M1 helix of NMDA receptors and potential rescue pharmacology," *PLoS Genetics*, **13**, e1006536 (2017).
- 70) D. Brinks, Y. Adam, S. Kheifets, A.E. Cohen, "Painting with rainbows: patterning light in space, time, and wavelength for multiphoton optogenetic sensing and control," *Accounts of Chemical Research*, **49**, 2518-2526 (2016).
- 69) S. Lou, Y. Adam, E.N. Weinstein, E. Williams, K. Williams, V. Parot, N. Kavokine, S. Liberles, L. Madisen, H. Zeng, A.E. Cohen, "Genetically targeted all-optical electrophysiology with a transgenic Cre-dependent Optopatch mouse," *The Journal of Neuroscience*, **36**, 11059-11073 (2016).
- 68) Y. K. Cho, G. Zheng, G. J. Augustine, D. R. Hochbaum, A. E. Cohen, T. Knopfel, F. Pisanello, F. S. Pavone, I. M. Vellekoop, M. J. Booth, "Roadmap on neurophotronics." *Journal of Optics*, **18.9**, 93007-93032 (2016).
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