CURRICULUM VITAE (scientific work)
Samuel Sheng-Hung Wang, Ph.D.

Address:	Neuroscience Institute, Princeton University, Princeton, NJ 08544	
Telephone:	(609) 258-0388	**FAX:** (609) 258-1028
E-mail:	sswang@princeton.edu	**ORCID:** 0000-0002-0490-9786
Web:	synapse.princeton.edu, election.princeton.edu, gerrymander.princeton.edu	

Research interests
1) Neuroscience of sensory learning, development, and autism
2) Data science for neuroscience, public policy, and election law

Education

1986	B.S. with honor, Physics, California Institute of Technology
1994	Ph.D., Neurosciences, Stanford University (advisor: Stuart H. Thompson)

Professional positions (current titles and affiliations in **boldface**)

1994-1995, 1996-1997	Postdoctoral fellow, Duke University (with George J. Augustine)
1995-1996	Congressional Science Fellow, Senate Committee on Labor and Human Resources (with Senator Edward M. Kennedy)
1997-1999	Postdoctoral Member of Technical Staff, Biological Computation Res. Dept., Bell Labs Lucent Technologies (with David W. Tank and Winfried Denk)
2000-2006	Assistant Professor, Department of Molecular Biology, Princeton University
2006-2015	Associate Professor, Dept. Molecular Biology and Neuroscience Institute
2015-	Professor, Neuroscience and Molecular Biology, Princeton University
	Associate, Program in Law and Public Affairs
	Associate, Center for Information Technology Policy
	Affiliate, Program in Cognitive Science
	Affiliate, Program in Quantitative and Computational Biology
2019-	**Professor, Neuroscience, Princeton University**
	Affiliate, Department of Molecular Biology
2020-	**Director, Electoral Innovation Lab**

Honors and awards

1986	Tau Beta Pi, national engineering honor fraternity
1993	Grass Fellow, Marine Biological Laboratory, Woods Hole, Massachusetts
2000-2002	Alfred P. Sloan Research Fellowship
2000-2002	Rita Allen Foundation Scholar
2004-2009	W.M. Keck Distinguished Young Scholar in Medical Research
2004-2009	National Science Foundation Career Development Award
2006	Fellow in Residence, Rockefeller Foundation, Bellagio, Italy
2009	AAAS/Subaru SB&F Prize for Excellence in Science Books
2012	Eden Autism Services – Emily Cavaliere Puzio and Frank Mauro Puzio Fellow
2016	Common Cause Gerrymandering Standard Writing Contest (*second prize*)
2018	Common Cause Gerrymandering Standard Writing Contest (*first prize*)

Professional society memberships

1986-	Society for Neuroscience, member
2000-	American Association for the Advancement of Science, member

Policy, Data, and Legal Scholarship
(for Scientific Work, go to page 7)

U.S. Supreme Court and Federal Amicus Briefs

Brief of Samuel S. Wang, Ph.D., in re Wesley W. Harris, et al., Appellants v. Arizona Independent Redistricting Commission, et al. in Support of Appellees, 2015-16 term, No. 14-232.

Brief of Heather K. Gerken, Jonathan N. Katz, Gary King, Larry J. Sabato, and Samuel S.-H. Wang as amici curiae in support of appellees, Beverly R. Gill, et al., Appellants, v. William Whitford et al., 2017-18 term, No. 16-1161. **(cited in decision)**

Brief of Wesley Pegden, Jonathan Rodden, and Samuel S.-H. Wang as amici curiae in support of appellees, Robert A. Rucho, et al., Appellants, v. Common Cause et al., 2018-19 term, No. 18-422. **(cited in decision)**

Brief of the Princeton Electoral Innovation Laboratory as amicus curiae in support of defendants, 1:20-cv-00257-Lew Hagopian et al v. Dunlap et al. regarding ranked-choice voting elections in Maine. August 5, 2020. **(cited in decision)**

Election and Legal Scholarhsip (see also Scientific Work)

S.S.-H. Wang (2015) Origins of Presidential poll aggregation: A perspective from 2004 to 2012. ***International Journal of Forecasting*** 31:898-909.

S.S.-H. Wang (2016) Three tests for practical evaluation of partisan gerrymandering. 68 ***Stanford Law Review*** 1263-1321.

S.S.-H. Wang (2016) Three practical tests for gerrymandering: application to Maryland and Wisconsin. ***Election Law Journal***, 15:367-384.

S. Wang (2016) Q&A on neuroscience, elections, and statistics. ***Neuron***, 92:290-293.

S.S.-H. Wang (2018) An antidote for gobbledygook: organizing the judge's partisan gerrymandering toolkit into a two-part framework. ***Harvard Law Review Blog***, April 11, 2018.

S.S.-H. Wang, B.A. Remlinger, and B. Williams (2018) An antidote for gobbledygook: organizing the judge's partisan gerrymandering toolkit into a two-part framework. ***Election Law Journal***, 17:302-314.

W.T. Adler and S.S.-H. Wang (2018) Response to Cho and Liu, "Sampling from complicated and unknown distributions: Monte Carlo and Markov chain Monte Carlo methods for redistricting." ***Physica A***, 516:591-593.

S.S.-H. Wang, R.F. Ober Jr., and B. Williams. Laboratories of democracy reform: state constitutions and partisan gerrymandering (2019) ***University of Pennsylvania Journal of Constitutional Law***, 22(1)203-289.

S.S.-H. Wang and J.S. Canter (2020) The best laid plans: unintended consequences of the American Presidential selection system. ***Harvard Law and Policy Review***, 15:401-428.

R.F. Ober Jr., S.S.-H. Wang, and A. Barden (2021) Up by their bootstraps: will a new Supreme Court let legislatures bypass governors over redistricting? ***Albany Law Review: State Constitutional Commentary***, forthcoming.

S.S.-H. Wang, J.R. Cervas, B. Grofman, and K. Lipsitz (2021) A systems framework for remedying dysfunction in U.S. democracy. ***Proceedings of the National Academy of Sciences USA***, 118(50), e2102154118 (cover article).

S.J. Chen. S.S.-H. Wang, B. Grofman, R.F. Ober, Jr., K.T. Barnes, and J.R. Cervas (2022) Turning communities of interest into a rigorous standard for fair districting, ***Stanford Journal of Civil Rights and Civil Liberties***, Volume XIII, Issue 1, forthcoming.

Working papers from conferences

Samuel S.-H. Wang (2019) A Bug in Democracy: Mythical and True Flaws in the Electoral College. Panel on the Electoral College organized by Rick Hasen and Bruce Cain. American Political Science Association meeting, Washington, D.C.

Advisory Roles

1995-1996	Legislative assistant, Rep. Lloyd Doggett (TX). Advised on matters coming before the House Science Committee; energy; and environment issues.
1996	Legislative fellow, Senator Edward M. Kennedy (MA). Advised Senate Committee on Labor and Human Resources on higher education, research policy, and K-12 education technology issues. Reauthorization of the National Science Foundation and coordination of NetDay96, a day of wiring Massachusetts schools to the Internet.
2010-	Rita Allen Foundation, Board of Directors
2015-	New Jersey Governor's Council for Medical Research and Treatment of Autism. Appointed by Governor Chris Christie (NJ).
2017	Contributing editor, *The American Prospect*
2021	Vice-chair (with Alanna Watt), Gordon Research Conference on Cerebellum (chair in 2023)
2021	Advisory Board, Unite America
2021	Technical advisor to chair of New Jersey Redistricting Ccommission
2022	Technical advisor to tiebreaking commissioner, New Jersey Apportionment Commission

Grant and fellowship support

Current support:

2017-2019	Educational Ventures, Inc.: New Horizons for Gerrymandering Prevention ($375,000)
2018, 2019	Anonymous: New Horizons for Redistricting Reform ($240,000)
2018-2019	The Eric and Wendy Schmidt Fund for Strategic Innovation: Seeding the Gerrymandering DataHub ($250,000)
2019	Marilyn J. Simons Foundation, support for research and analysis to support redistricting reform ($250,000)

2020-2021 The Eric and Wendy Schmidt Fund for Strategic Innovation: Using Data and Tools to Democratize the 2021 Redistricting Process ($750,000)

2020-2022 Arnold Ventures: An Electoral Innovation Initiative at Princeton University and Open Primaries ($1,500,000)

Past support:

1995-1996 Congressional Science and Engineering Fellow, American Association for the Advancement of Science (AAAS)

General-interest writings and outreach

Podcast

6/2016-present Princeton School of Public and International Affairs (formerly the Woodrow Wilson School) weekly podcast Politics And Polls. Co-hosted with Julian Zelizer. On iTunes, regularly rated in Top 20 (News & Politics). Peak position, #8 News & Politics and Top 100 overall out of all ~250,000 podcasts.

Public projects

Founder, Princeton Election Consortium, http://election.princeton.edu. 2004-2019. Over 19 million visits total. During election season, this site has accounted for approximately one-fourth of web traffic to Princeton University.

Founder, Princeton Gerrymandering Project, http://gerrymander.princeton.edu. 2017-2019. Providing data and information resources on partisan gerrymandering.

Founder, OpenPrecincts, http://openprecincts.org. 2019. A crowdsourced database of precinct and election data for public participation in redistricting in all fifty states, the District of Columbia, and Puerto Rico. A product of the Princeton Gerrymandering Project.

Faculty founder, Representable, http://representable.org. 2019. A student-initiated software tool to give anyone the ability to report their communities of interest to a validated map database, for giving direct feedback to redistricting authorities. A product of the Representable team and the Princeton Gerrymandering Project.

Co-founder, Electoral Innovation Lab. 2020. This umbrella organization encompasses previous democracy reform activities under a broader mission of understanding democracy reforms and their optimization using math, science, and theory.

Articles

Contributions on data science and elections to *Washington Post, New York Daily News, Los Angeles Times, Politico, The New Yorker.com, The New Republic, The American Prospect, The Atlantic,* and *the Columbia Journalism Review*. 2008-2020.

Fixing Bugs In Democracy, an online interview series, Spring-Summer 2020.

The great gerrymander of 2012. *New York Times*, February 3, 2013, page SR1.

Sam Wang and Benjamin C. Campbell: Mr. Bayes goes to Washington: a review of *The Signal and The Noise* by Nate Silver. *Science*, February 15, 2013, 339:758-759.

Let math save our democracy. *New York Times,* December 6, 2015, page SR6.

GOP nomination rules tilt the playing field toward Donald Trump. *The American Prospect*, January 14, 2016.

The hardened divide in American politics. *The American Prospect,* Fall 2016, 12-13.

Why Trump stays afloat. *New York Times*, October 30, 2016.

Can math stop partisan gerrymandering? *Los Angeles Times,* May 5, 2017 (with Brian Remlinger).

A manageable federalist approach to partisan gerrymandering. *Election Law Blog*, September 4, 2017. http://electionlawblog.org/?p=94580

Slaying the partisan gerrymander. *The American Prospect*, Fall 2017 (with Brian Remlinger).

Can open data save gerrymandering reform? *The American Prospect*, June 25, 2018 (with Ben Williams and John O'Neill).

The states are now the best route to gerrymandering reform. *The American Prospect*, July 16, 2018 (with Ben Williams and Rick Ober).

Lawmakers should fix inequitable district lines (concerning open data in Bethune-Hill Virginia districts). *The Virginian-Pilot*, August 30, 2018 (with Ben Williams and Will Adler).

Why North Carolina Democrats should fight gerrymandering using state law. *Washington Post*, September 4, 2018 (with Rick Ober).

The long-term solution to voter suppression. *The Atlantic,* October 31, 2018.

Partisan gerrymandering, still going strong (letter). *The Economist,* January 19, 2019.

Gerrymandering, not geography. *The Atlantic*, March 26, 2019.

If the Supreme Court won't prevent gerrymandering, who will? *New York Times,* July 14, 2019.

In redistricting, algorithms can't replace communities. *Raleigh News and Observer,* December 2, 2019 (with Jason Rhode and Hope Johnson).

Unchecked, COVID-19 could kill more than 50,000 in New Jersey. *NJ.com*, *Newark Star-Ledger* and *Trenton Times*, March 25, 2020. (with Sebastian Seung and Shirley Tilghman; co-signed by Martin Blaser, Bryan Grenfell, Jim Kim, Simon Levin, Jessica Metcalf, Olga Troyanskaya, and Roy Vagelos)

Bernie Sanders's parting gift to Wisconsin voters may last for a decade. *The Hill*, April 11, 2020.

Our polling trauma. *Columbia Journalism Review* magazine, Summer 2020, 16-18.

Virginia should lead the way on redistricting reform. *Virginia Mercury*, September 16, 2020. https://www.virginiamercury.com/2020/09/16/virginia-should-lead-the-way-on-redistricting-reform/ (with Aaron Barden and Jason Rhode).

Electoral math and the new Gilded Age. Symposium on Jack M. Balkin, The Cycles of Constitutional Time (Oxford University Press, 2020). Balkinization blog, balkin.blogspot.com, September 24, 2020..

Constitutional rot: a total eclipse, or a mistuned clockwork? Symposium on Jack M. Balkin, The Cycles of Constitutional Time (Oxford University Press, 2020). Balkinization blog, balkin.blogspot.com, September 25, 2020.

The filibuster and the zone of legislative death. *The Atlantic,* April 20, 2021 https://www.theatlantic.com/ideas/archive/2021/04/zone-legislative-death/618754/ (with Ari Goldbloom-Helzner).

Reapportionment's hidden surprises for 2022. *The Hill,* May 1, 2021 https://thehill.com/opinion/campaign/551306-reapportionments-hidden-surprises-for-2022 (with Zachariah Sippy).

The GOP scared Latinos from the census. Now that may cost the party red seats. *Washington Post,* May 1, 2021 https://www.washingtonpost.com/outlook/2021/05/01/hispanics-census-undercount-house-seats/ (with Jonathan Cervas).

Remaining unvaccinated in public should be considered as bad as drunken driving. *Washington Post,* September 14, 2021 https://www.washingtonpost.com/opinions/2021/09/15/remaining-unvaccinated-public-should-be-considered-bad-drunken-driving (with Leana Wen).

Opinion: Virginia has some of the fairest district maps in the country. Here's why. *Washington Post,* January 13, 2022 https://www.washingtonpost.com/opinions/2022/01/13/virginia-has-some-fairest-district-maps-country-heres-why/

Independent reports

A commissioner's guide to redistricting in Michigan (ed.). By graduate students of the Woodrow Wilson School of Public and International Affairs (now the Princeton School of Public and International Affairs). February 2019.

Improving New Jersey's legislative apportionment process: recommendations to increase transparency, accountability, and representation. Special report by Samuel Wang, Yurij Rudensky, Patrick Murray, Brigid Callahan Harrison, Ronald Chen, and Ben Williams. July 2019.

INVITED SEMINARS

2013 National Academy of Sciences, 150th Annual Meeting, break-out session on The New Science Of Elections, Washington, DC (chair: Douglas Massey).

2013 Opening symposium, Quantitative Collaborative program, College of Arts and Sciences, University of Virginia, Charlottesville, VA.

2013 Roundtable on elections and public opinion, CENTRA Technology, Arlington, VA.

2014 Tracking national elections with high time resolution. American Politics Research Seminar, Princeton University, Princeton, NJ.

2016 Stanford Law Review symposium on the Law of Democracy and the 2016 Election, Stanford Law School, Stanford, CA.

2016 Partisan gerrymandering convening, Brennan Center for Justice, NYU, New York, NY.

2016 Detecting and remedying partisan gerrymandering. American Politics Research Seminar, Princeton University, Princeton, NJ.

2016 Workshop on automatic voter registration, Brennan Center for Justice, New York, NY.

2016 D.E. Shaw Company, New York, NY.

2017 Symposium on partisan gerrymandering, Duke University Law School, Durham, NC.

2017 Quantitative Theory and Methods Institute (social sciences), Emory University, Atlanta, GA.

2018 Seminar on partisan gerrymandering, Columbia University Medical Center, New York, NY.

2012-2017 Annual presentation to fellows, Program in Law and Public Affairs, Princeton University, Princeton, NJ.

2018 Partisan gerrymandering convening, Brennan Center for Justice, NYU, New York, NY.

2018 Hot topics in election law - redistricting and recent Supreme Court decisions, New Jersey Institute for Continuing Legal Education, New Brunswick, NJ

2018 Caltech, Founders' Night, keynote lecture, Pasadena, CA.

2018 Science on Saturdays lecture, Princeton Plasma Physics Laboratory, Princeton, NJ.

2018 Paul D. Bartlett Lecture, Linda Hall Science and Technology Library, Kansas City, MO.

2019 Panel on the Electoral College: Open Questions, Paths Forward. Harvard Law School, Cambridge, MA.

2021 Statistics, redistricting, and gerrymandering. Berkeley Judicial Center, Berkeley, CA.

INVITED PUBLIC TALKS

2016 The November election. SciCafe, American Museum of Natural History, New York, NY.

2016 (keynote) Lecture on election analysis, Strata/Hadoop conference, New York, NY.

2016 Public lecture associated with the 2016 U.S. Vice-Presidential debate, Longwood University, Farmville, VA.

2016 The November election (with Landon Jones). Princeton Public Library, Princeton, NJ.

2017 Yale CEO Summit, New York, NY.

2017 Public lecture on statistics and elections, Lafayette College, Easton, PA.

2017 Statistical inequities of the Electoral College. Stanford Law School, Stanford, CA.

2017 (keynote) Presentation on statistical inequities of the Electoral College. Making Every Vote Count, National Press Club, Washington, DC.

2018 Nassau Club, Princeton, NJ.

2018 Present Day Club, Princeton, NJ.

2018 Princeton Bar Association, Princeton, NJ.

2019 Panel on redistricting policy organized by League of Women Voters, Maeder Hall, Princeton University, Princeton, NJ.

2019 Reason, Reform, and Redistricting conference at Center for Political Leadership, Innovation and Service, Duke University, Durham, NC.

2019 Unrig Summit, Nashville, TN.

2019 (keynote) Harvard CGA conference: The Geography of Redistricting. Cambridge, MA.

2020 Insight Lecture Series, Rockefeller University, New York, NY.

2020 Workshop on political polarization (co-organized by Simon Levin), Arizona State University, Tempe, AZ.

2020 Workshop on political polarization (co-organized by Simon Levin), Princeton University, Princeton, NJ.

2020 John G. Tower Center for Public Policy and International Affairs, Southern Methodist University, Dallas, TX.

2021 Panel on California Redistricting, California Constitution Center of UC Berkeley and Jack Citrin Center for Public Opinion Research, Berkeley, CA.

2021 Census Quality Review discussion on differential privacy protections in Census redistricting data, MALDEF/Asian Americans Advancing Justice.

Teaching at Princeton

S2017 FRS178 - Statistics, Journalism, and the Public Interest

F2018 WWS 591b - Graduate policy workshop on election law and gerrymandering

This workshop led to the publication of A Commissioner's Guide to Redistricting in Michigan. http://gerrymander.princeton.edu/michigan

S2021 AMS403 - Fixing A Bug in Democracy: Math and Practice of Fair Redistricting

Scientific Work
(for Policy and Legislative Work, see previous 8 pages)

GRANT AND FELLOWSHIP SUPPORT

Current support:

2002-2025 NIH R01 NS045193: Synaptic learning rules in the mammalian cerebellum (total: $1,958,688 over most recent 5-year renewal, 2020-2025)
2017-2022 NIH U19 NS104648: Mechanisms of neural circuit dynamics in working memory and decision-making (total: $15,346,730 over five years; shared among seven investigators)
2017-2022 NIH R01 MH115750: Cerebellar determinants of flexible and social behavior on rapid time scales in autism model mice. (S.W. is lead PI; co-investigators Joshua Shaevitz and Jonathan Pillow; total: $4,727,710 over 5 years)
2021-2024 NIH R01MH128776: A web-based framework for multi-modal visualization and annotation of neuroanatomical data. (S.W. and David Kleinfeld, co-investigators; $1,194,702 over 3 years)

Past support:

1990 Lerner-Gray Grant in Marine Zoology
1989, 1991 Earl and Ethel Myers Fellowship in Marine Biology
1991-1993 NIH predoctoral National Research Service Award
1994-1997 NIH postdoctoral National Research Service Award
2001-2004 Whitehall Foundation grant
2006 Writing residency at Rockefeller Foundation Study Center, Bellagio, Italy
2005-2007 New Jersey Governor's Council on Autism Pilot Grant
2004-2008 Human Frontier Science Project grant (Principal Investigator)
2004-2009 National Science Foundation Career Development Award
2010 NIH shared instrumentation grant for multiphoton microscope (PI)
2009-2011 NIH Challenge Grant (Co-investigator; PI Lynn Enquist)
2009-2011 NIH Challenge Grant (Co-investigator; PI David Tank)
2011-2012 Simons Foundation Autism Research Initiative (SFARI) Explorer grant
2012-2013 David A. Gardner '69 Magic Project, Princeton Council of the Humanities
2012-2015 McKnight Technological Innovations in Neuroscience award
2014-2017 NIH U01 NS090541 BRAIN Initiative grant (Co-investigator; PI Carlos Brody)
2015-2017 NIH R21 NS092320: Transcending dynamic and kinetic limits for neuronal calcium sensing
2012-2018 Nancy Lurie Marks Family Foundation grant for autism research (Co-investigator with Mustafa Sahin and Wade Regehr)
2015-2018 NIH R21 EY026434: Use of calcium indicator proteins in spike counting mode (Co-investigator David DiGregorio)

Non-University Committees, Community Outreach, and Service

2023* Gordon Research Conference on the Cerebellum, vice-chair (with Alanna Watt; will co-chair conference in 2025*). *Delayed by pandemic; the 2021 conference was cancelled.

NIH standing study section membership
2010-2014 Molecular Neurogenetics (MNG) 2010-2014

NIH ad hoc review, 2007-2021
2007 NIMH (Centers for Intervention Development and Applied Research, ZMH1 ERB-L)
2009 NIMH, National Institutes on Drug Abuse (CEBRA)
2013 Special Emphasis Panel for Brain Disorders and Clinical Neuroscience (BDCN) (ZRG1 BDCN-W (02))
2014 BRAIN Initiative: Transformative Approaches for Cell-Type Classification (ZMH1 ERB-M (06))
2014 BRAIN Initiative: Technologies for Large-scale Recording (ZNS1 SRB-G (77))
2015 Learning and Memory (LAM) study section, ad hoc
2015 Neuropharmacology (ZRG1 MDCN-R 94 S), ad hoc
2016 Special Emphasis Panel, ad hoc
2017/05 Special Emphasis Panel/Scientific Review Group ZNS1 SRB-G (13)
2018 BRAIN Initiative: Development and Validation of Novel Tools to Analyze Cell-Specific and Circuit-Specific Processes in the Brain (RFA MH-17-220)
2018 Transformative Research Award (TRA) Initiative panel
2019 BRAIN Initiative Novel Tools review
2020 BRAIN Initiative Novel Tools review (chair)
2020/08 BRAIN Initiative Cell Census Network (BICCN) review ZMH1 ERB-M (06) S
2021 BRAIN Initiative Novel Tools review (chair) 2021/05 ZMH1 ERB-M (06) R
2021 BRAIN Initiative Novel Tools review (chair) 2021/05 ZMH1 ERB-M (07) R
2021 BRAIN Initiative Pilot resources for brain cell type-specific access and manipulation across vertebrate species review (chair) 2021/08 ZMH1 ERB-Q (06) R

Other reviewing
2021 NSF Major Research Instrumentation review panel

Journal peer reviewing: *Annals of the American Association of Geographers, Biological Psychiatry, Biophysical Journal, Brain Behavior and Evolution, Brain Research, Cell Reports, The Cerebellum, Cerebral Cortex, Chemical Biology, Current Biology, Election Law Journal, eLife, Frontiers in Neuroscience, J. Cell Biology, J. Comparative Neurology, J. Neurophysiology, J. Neuroscience, J. Neuroscience Methods, J. Physiology, Molecular and Cellular Neuroscience, Molecular Psychiatry, Nature, Nature Biotechnology, Nature Communications, Nature Methods, Nature Neuroscience, Nature Reviews Neuroscience, NeuroImage, Neuron, PLoS ONE, PNAS, Phil. Trans. Roy. Soc. B,* and *Science*

U.S. Patent

Double-caged GABA: a novel light-activated probe as a neuroscience research tool. Application number 14/664,445, publication date September 14, 2015. Issued April 18, 2017 as U.S. Patent 9,625,448. D.D. Shi, M.F. Semmelhack, and S.S.-H. Wang.

Eyeblink conditioning using a mobile phone device. U.S. patent application pending. H.-J. Boele, S.S.-H. Wang.

RESEARCH PUBLICATIONS (>90 IN TOTAL; *h*-INDEX=43, *i*10-INDEX=80. SEE ALSO POLICY AND LEGISLATIVE WORK)

*The first two authors contributed equally to these works.

S.S. Wang, G.A. Ricaurte, and S.J. Peroutka (1987) ^{3}H-3,4-methylenedioxymethamphetamine (MDMA; "Ecstasy") interactions with brain membranes and glass fiber filter paper. ***European Journal of Pharmacology*** 138:439-443.

S.S.-H. Wang, C.A. Mathis, and S.J. Peroutka (1988) R-2,5-Dimethoxy-4-^{77}bromoamphetamine (^{77}Br-R(–)-DOB), a novel radioligand [that] labels a 5-HT binding site subtype. ***Psychopharmacology (Berlin)*** 94:431-432.

S.J. Peroutka, A. Hamik, M.A. Harrington, C.A. Mathis, P.A. Pierce, and S.S.-H. Wang (1988) R-2,5-dimethoxy-4-^{77}bromoamphetamine [^{77}Br-R(–)DOB] labels a novel 5-hydroxytryptamine binding site in brain membranes. ***Molecular Pharmacology*** 34:537-542.

S.S. Wang and S.J. Peroutka (1989) Historical perspectives. In *The Serotonin Receptors*. (Ed. E. Sanders-Bush). Humana Press, pp. 3-20.

S.S.-H. Wang and S. Thompson (1992) A-type potassium channel clusters revealed using a new statistical analysis of loose patch data. ***Biophysical Journal***, 63:1018-1025.

C.A. Mathes, S.S.-H. Wang, H.M. Vargas, and S.H. Thompson (1992) Intracellular calcium release in N1E-115 neuroblastoma cells is mediated by the M1 muscarinic receptor subtype and is antagonized by McN-A-343. ***Brain Research*** 585:307-310.

S.S.-H. Wang, C.A. Mathes, and S.H. Thompson (1993) Membrane toxicity of the protein kinase C inhibitor calphostin A by a free-radical mechanism. ***Neuroscience Letters***, 157:25-28. (published in error a second time as 156:145-148)

S.S.-H. Wang (1993) Modeling the apparent diffusion constant of calcium ions emanating from a channel: implications for calcium wave propagation. ***Biological Bulletin,*** 185:297-298.

S.S.-H. Wang and S.H. Thompson (1994) Measurement of changes in muscarinic and histaminergic receptor density in single neuroblastoma cells using calcium release desensitization. ***Cell Calcium***, 15:483-496.

S.S.-H. Wang, A.A. Alousi, and S.H. Thompson (1995) The lifetime of inositol 1,4,5-trisphosphate in single cells. ***Journal of General Physiology***, 105:149-171.

S.S.-H. Wang and S.H. Thompson (1995) Local positive feedback by calcium in the propagation of intracellular calcium waves. ***Biophysical Journal***, 69:1683-1697.

DeBello, W.M., V. O'Connor, T. Dresbach, S.W. Whiteheart, S.S.-H. Wang, F.E. Schweizer, H. Betz, J.E. Rothman, and G.J. Augustine (1995) SNAP-mediated protein-protein interactions essential for neurotransmitter release. ***Nature***, 373:626-630.

S.S.-H. Wang and G.J. Augustine (1995) Confocal imaging and local photolysis of caged compounds: dual probes of synaptic function. ***Neuron***, 15:755-760.

M.E. Burns, S.A. Beushausen, G.J. Chin, D. Tang, W.M. DeBello, T. Dresbach, V. O'Connor, F.E. Schweizer, S.S.-H. Wang, S.W. Whiteheart, H. Betz, J.E. Rothman, and G.J. Augustine (1995) Proteins involved in synaptic vesicle docking and fusion. ***Cold Spring Harb. Symp. Quant. Biol.*** 60:337-348.

G.J. Augustine, H. Betz, K. Bommert, M.P. Charlton, W.M. DeBello, T. Dresbach, J.M. Hunt, V. O'Connor, F.E. Schweizer, S.S.-H. Wang, and S.W. Whiteheart (1996) Molecular mechanisms of neurotransmitter secretion: functional stuides at the squid giant synapse. In *Basic neuroscience in invertebrates*. (Ed. H. Koike, Y. Kidokoro, K. Takahashi, T. Kanaseki) Japan Scientific Societies Press.

R. Kupferman, P.P. Mitra, P.C. Hohenberg, and S.S.-H. Wang (1997) Analytical calculation of intracellular calcium wave characteristics. ***Biophysical Journal***, 72:2430-2444.

A.E. Schivell, S.S.-H. Wang, and S.H. Thompson (1997) Behavioral modes arise from a random process in the nudibranch *Melibe*. ***Biological Bulletin***, 192:418-425.

D.L. Pettit*, S.S.-H. Wang*, K.R. Gee, and G.J. Augustine (1997) Chemical two-photon uncaging: a novel approach to mapping glutamate receptors. ***Neuron***, 19:465-471.

G.J. Augustine, E.A. Finch, and S.S.-H. Wang (1998) The spatial range of dendritic signals for cerebellar long-term depression: studies with local photolysis of caged compounds. In *Integrative aspects of calcium signalling*. (Ed. A. Verkhratsky and E.C. Toescu). Plenum Press.

T. Furuta, S.S.-H. Wang, J.L. Dantzker, T.M. Dore, W.J. Bybee, E.M. Callaway, W. Denk, and R.Y. Tsien (1999) Brominated 7-hydroxycoumarin-4-ylmethyls: novel photolabile protecting groups with biologically useful cross-sections for two photon photolysis. ***Proc. Natl. Acad. Sci. USA***, 96:1193-1200.

S.S.-H. Wang and G.J. Augustine (1999) Calcium signaling in neurons: a case study in cellular compartmentalization. In *Calcium as a cellular regulator*. (Ed. E. Carafoli and C.B. Klee) Oxford University Press, pp. 545-566.

G.J. Augustine, D.L. Pettit, and S.S.-H. Wang (1999) Spatially resolved flash photolysis via chemical two-photon uncaging. In *Imaging: a laboratory manual*. (Eds. R. Yuste, F. Lanni, A. Konnerth) Cold Spring Harbor Press.

S.S.-H. Wang, L. Khiroug, and G.J. Augustine (2000) Quantification of spread of cerebellar long-term depression with chemical two-photon uncaging of glutamate. ***Proc. Natl. Acad. Sci. USA,*** 97:8635-8640.

S.S.-H. Wang, W. Denk, and M. Häusser (2000) Coincidence detection in single dendritic spines mediated by calcium release. ***Nature Neuroscience***, 3:1266-1273.

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S.S.-H. Wang, P.P. Mitra, and D.A. Clark (2002) How did brains evolve? ***Nature***, 415:135 (also see Communications Arising by Sultan and Barton, 415:133-135).

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A.D. Kloth, B.C. Campbell, R.D. Jones, and S.S.-H. Wang. Bayesian learning in a cerebellar conditioning task. In preparation.

S.S.-H. Wang, K.N. Vodrahalli, Y. Shulgina, Y.L. Kim, and T. Kuhn. Machine learning-based classification of intellectual phenotypes. In preparation.

General-interest writings and outreach

Books

Sandra Aamodt and Sam Wang: *Welcome To Your Brain: Why You Lose Your Car Keys but Never Forget How to Drive and Other Puzzles of Everyday Life.* Bloomsbury USA. In US English (March 2008), paperback, and 24 international translations.

Sandra Aamodt and Sam Wang: *Welcome To Your Child's Brain: How The Mind Grows From Conception To College.* Bloomsbury USA. In US English (September 2011), paperback, and 15 international translations.

Articles

Sole author or with Sandra Aamodt or Joshua Gold: contributions on neuroscience, *New York Times (15 articles)*, *London Times*, *Washington Post*, *USA Today, Bloomberg View*, *New York Post*, *Cerebrum,* and *Physics World*. 2007-2012.

How to think about the risk of autism. *New York Times*, March 30, 2014, page SR6-SR7.

From birth onward, our experience of the world is dominated by the brain's continual conversation with itself. From *Think tank: forty neuroscientists explore the biological roots of human experience.* Ed. David J. Linden. Yale University Press (April 2018).

University and departmental service

Molecular Biology:
2000-2011 Department of Molecular Biology Seminar Committee
2001 Symposium planner, Dynamics in Biological Networks (with S. Tilghman and S. Tavazoie)
2008-2011 Graduate Committee, Department of Molecular Biology
2010 Departmental grant for rapid-scanning Prairie multiphoton microscopy (S10 RR026665)
Spring 2017 Oversight of Statistics and Machine Learning 201 (SML 201)

Neuroscience:
2003-present Executive Committee, Program in Neuroscience (term expires 6/2016)
2008-2012 Curriculum Committee, Neuroscience Institute
2008-2012 Graduate Admissions Committee, Neuroscience Ph.D. Program
2010-present C.V. Starr Fellowship Committee, Neuroscience Institute
2013-2014 Neuroscience Institute, junior faculty search committee
2013-2018 Graduate Admissions Committee, Neuroscience Ph.D. Program
2017-2018 Search committee, faculty recruitment in molecular/cellular neuroscience
2017-2019 Reorganization and course directorship, NEU501A (core graduate course)

University:
2001-2002 Fellow, Rockefeller College

2003-2007 Adviser, Forbes College
2005-2008 University Committee on Committees
2006-2010 University Committee on Public Lectures, chair (two terms)
2006-2008 Curriculum Committee, Undergraduate Certificate in Neuroscience program
2007-present Fellow, Forbes College
2010 Freshman address speaker, Class of 2014
2008-2011 Institutional Animal Care and Use Committee, chair
2009-2011 Fellow, Old Dominion
2013, Fall University Committee on Committees (one term only, vacancy substitution)
2014 Animal Research Communications Working Group, Office of Dean for Research
2014, Fall University Committee on Committees (one term only, vacancy substitution)
2015-2017 University Institutional Biosafety Committee
2016-2017 University Committee on Student Life
2017-2018 Faculty Advisory Committee on Appointments and Advancements (C/3)
2019 Freshman Pre-read Assembly, Class of 2023 (with James Williams and Prof. Jennifer Rexford)
2018- University Institutional Biosafety Committee (term expires 6/30/2024)
2019- University Committee on Public Lectures (term expires 6/30/2021)
2019- New Jersey Alliance for Clinical and Translational Science (NJ ACTS), Pilot Grants Program co-lead with Arnold Rabson, Rutgers and Guiling (Grace) Wang, NJIT. NIH UL1 TR003017, KL2 TR003018, TL1 TR00301.
2021 Panelist, "In the Public Eye: Communicating Outside the Academy" with Catherine Zandonella, Ben Chang, Keeanga-Yamahtta Taylor. For junior faculty.

Advisees, Trainees, and Selected Staff

Undergraduate students:
(37 students: 25 MOL, 11 NEU, 3 PHY, 3 PSY, 3 COS, 3 independent concentrators, 1 EEB, 1 CHM)

Damon Clark '01 (Physics) As his junior independent work, defined the cerebrotype as a measure of brain scaling. This work was published in *Nature*. Ph.D. Harvard Univ.; now faculty, Yale MCDB.

Jennifer Shultz '01 (Molecular Biology) Shultz's senior year work investigated axon scaling across brain evolution. Her project received a departmental best thesis award and launched a major project published in the *Journal of Neuroscience*. M.D. Univ. of Iowa, now attending dermatologist, Austin, TX.

Mark Burish '02 (Molecular Biology) Burish's senior thesis on bird brain evolution was published in *Brain, Behavior and Evolution*. M.D./Ph.D. Vanderbilt Univ.; now fellowship in neurology at UCSF.

Hao Yuan Kueh '02 (Physics) Kueh and Burish collaborated on the bird project. Ph.D. Harvard Univ.; now at Caltech.

Matthew Wagers '03 (Molecular Biology) Wagers contributed to the Shultz axon scaling project. Ph.D. Univ. of Maryland; now faculty in linguistics, UC Santa Cruz.

Samuel Hall ’03 (Molecular Biology) Hall’s senior thesis on neural prosthetics received a departmental best thesis award and was published in *Slate*. Wall Street; Ph.D. U. Cambridge.

Lily Johnston ’05 (Psychology) Johnston worked on scaling of cerebellar neurons. M.D. UCSD, now Department of Surgery and School of Public Health, Johns Hopkins University.

Varun Phadke ’05 (Molecular Biology) Worked on scaling of bird brains and cerebellar neurons. Phadke was the Class of 2005 valedictorian. M.D. Harvard Medical School (M.D.)

David Matthews ’05 (Molecular Biology) Worked on cerebellar synaptic learning rules. Consultant, Boston Consulting Group.

Chelsea Meskunas ’06 (Molecular Biology) Reviewed overuse of headache medication. Senior thesis was published in *Headache*. M.D. Mount Sinai, now a resident in neurology.

Natalia Balko ’07 (Molecular Biology) M.B.A. Stanford, now at IMS Consulting.

Jonathan Charlesworth ’07 (Molecular Biology) Worked on in vivo cerebellar imaging. Ph.D. UCSF, now senior scientist,at Neurotrek/thync.

Justin Huynh ’07 (Molecular Biology) Worked on cerebellar synaptic learning rules. Now director at Liquidware.

Hyunyoung Megan Lee ’08 (Independent Concentration, Computational Biology) Developed clustering algorithms for analyzing in vivo imaging. M.D. University of Maryland.

Andrew Bluher ’09 (Molecular Biology) Worked on canine brain scaling. M.D. University of Maryland.

Shihab Ali ’11 (Molecular Biology) Worked on canine brain scaling. M.D. Brown University.

Charlotte Arlt ’11 (University of Cologne) Developed in vivo imaging methods. Ph.D. University College London, now postdoc at Harvard.

David Tsao ’11 (Physics) Developed in vivo imaging methods.

Diya Das ’12 (Molecular Biology) Worked on canine brain scaling. Das’s senior thesis received a Neuroscience Institute best thesis award. Ph.D. study at UC Berkeley.

Daniel Chang ’13 (Molecular Biology) Worked on calcium sensor design. Post-baccalaureate.

Sara Connolly ’13 (Ecology & Evolutionary Biology) Eyeblink conditioning in autism model mice. Ph.D. study at Stanford University.

Tierney Kuhn ’13 (Computer Science) Developed methods for genomic and phenotypic analysis of intellectual interests. Now at Microsoft Research.

Diana Shi ’13 (Psychology) Developed a new caged GABA compound for emulating inhibition in intact brain tissue. Shi received a best thesis award and published her work in *Journal of the American Chemical Society*. M.D. Harvard, now in fellowship.

Richard D. Jones ’13 (Psychology) Discovered backward blocking, a form of Bayesian learning, in cerebellar learning. Post-baccalaureate.

Amy Li ’14 (Molecular Biology) Investigated eyeblink conditioning in autism model mice. M.D. Stanford, now resident at Georgetown.

Adriana Cherskov ’14 (Molecular Biology) Investigated eyeblink conditioning in autism model mice. Gates Scholar at Cambridge University. Planning M.D./Ph.D. study at Columbia University.

Yekaterina Shulgina ’15 (Molecular Biology) Genomic analysis of normal-range traits in relatives of persons with autism. Shulgina received the John Brinster '43 prize for best neuroscience thesis, and the Sigma Xi book prize for best molecular biology thesis. Now studying for a Ph.D. at Harvard University.

Thaddeus Weigel ’15 (Molecular Biology) Tracing of synaptic pathways from cerebellum to forebrain. NIH, Ph.D. study at University of Virginia.

Kiran Vodrahalli ’16 (Computer Science) Clustering analysis of intellectual phenotypes.

Julia Metzger ’16 (Molecular Biology) Cerebellar roles in development of nonmotor functions. Metzger received the the best thesis award in Quantitative and Computational Biology and an outstanding thesis award in Molecular Biology.

Shruthi Deivasigamani '16 (Molecular Biology) Tracing of synaptic pathways from cerebellum to forebrain.

Christine Hildreth '16 (Independent Concentration, Neuroscience) Cerebellar roles in development of nonmotor functions.

Marissa Applegate '16 (Chemistry) Acceleration of Fast-GCaMP responses for tracking neuronal activity. Ph.D. study, Columbia University.

Alice J. Tao '17 (Neuroscience) Contributions of cerebellar activity to cognitive and social behavior in mice. Tao received the John Brinster '43 Senior Thesis Prize in Neuroscience.

Joyce C. Lee '17 (Neuroscience). Going to Boston University School of Medicine.

Rob Aguilar '17 (Computer Science). Convolutional neural networks for recognizing neurons in fluorescence images.

B.C. Cho ’18 (Electrical Engineering)

Alicia Lai ’18 (Neuroscience) Going to University of Pennsylvania Law School.

Patricia Aguiar ’19 (Neuroscience)

Christina Matl ’19 (Molecular Biology)

Tiffany Chen ’20 (Molecular Biology)

Tiffany Pham ’20 (Molecular Biology)

Xiaoting Sun ’20 (Neuroscience)

Ali Munson ’21 (Neuroscience)

Angela Li ’21 (Neuroscience)

Kara Steele ’21 (Neuroscience)

Katherine Kaplan ‘22 (Neuroscience)

MIna Musthafa ‘22 (Neuroscience)

Tim Jia ‘22 (Neuroscience)

Samuel Frank ‘22 (Molecular Biology)

Eliyana Abraham ‘23 (Neuroscience)

Dafna Yavetz '23 (Molecular Biology)

Postdoctoral research associates (fellowships <u>underlined</u>):

Shy Shoham (2001-2005) Dr. Shoham arrived at Princeton as a Lewis Thomas Fellow. He designed and constructed a system for uncaging neurotransmitters to activate brain tissue in defined patterns. Professor at NYU.

Bernd Kuhn (2004-2010) Dr. Kuhn developed methods for cell-type-specific expression of calcium indicator proteins, and imaging them in vivo. Group Leader at Okinawa Institute of Science and Technology

Ilker Ozden (2004-2010) Dr. Ozden pioneered the use of calcium-sensitive indicator proteins for imaging cerebellar circuitry. He was an Autism Speaks postdoctoral fellow, and is now on the faculty at University of Missouri Columbia.

Tycho Hoogland (2005-2009) Dr. Hoogland discovered waves of activity encompassing hundreds of glial cells in cerebellum. He is now a group leader at the Netherlands Institute for Neuroscience.

Eugene Civillico (2006-2009) Dr. Civillico was a Patterson Trust postdoctoral fellow. He used patterned uncaging methods to discover rules for local signal summation in cerebellar Purkinje cell dendrites. Now a research program official at the US Food and Drug Administration.

Stephen Lin (2010-2011) Dr. Lin is a former research group leader from Wyeth Labs. At Princeton he investigated signaling properties of calcium signaling proteins. Retired.

P. Alexander Argüello (2010-2012) Dr. Argüello traced synaptic pathways between frontal cortex and cerebellum. He is now a program officer at NIMH.

Andrea Giovannucci (2010-2017) Dr. Giovannucci discovered how the cerebellum encodes learned stimuli during eyeblink conditioning, a form of cerebellar learning. He was a New Jersey Commission on Brain Injury Research postdoctoral scholar. Now faculty at University of North Carolina.

Aleksandra Badura (2012-2018) Dr. Badura tested the hypothesis that the cerebellum acts during developing as a teacher of higher cognitive processes. She also helped develop and test fast-responding fluorescent calcium sensor proteins. She recently received a Veni career development fellowship from the Netherlands Organization for Scientific Research (NWO).

Jessica Verpeut (2015-2020) Dr. Verpeut is testing the hypothesis that the cerebellum acts during developing as a teacher of higher cognitive processes. She was awarded a New Jersey Commission on Brain Injury Research postdoctoral scholarship.

Mikhail Kislin (August 2015-present) Dr. Kislin is using the monitoring of freely-moving mice to test the hypothesis that the cerebellum carries information specific to the performance of cognitive tasks.

Kelly Seagraves (2016-2020) Dr. Seagraves was a C.V. Starr Fellow hosted by the Wang laboratory. She is interested in neural mechanisms of social learning in freely behaving rodents, and in whole-brain mapping of neural activity at cellular scale. She was awarded a 2020-2021 Executive Branch AAAS Fellowship to work on cyberintrusions for the U.S. State Department.

Will Adler (2018-2019) worked on the Princeton Gerrymandering Project developing quantitative approaches to analytics and communication. His Ph.D. was in computational

neuroscience. He has a 2019-2020 Congressional AAAS Fellowship to work on oversight for Senator Elizabeth Warren.

Marlies Oostland (2018-2021). Dr. Oostland is a Marie Curie Fellow and is now at University College London.

Junuk Lee (September 2017-present).

Henk-Jan Boele (August 2018-present). Dr. Boele was awarded a postdoctoral grant from the New Jersey Commission on Medical Treatment and Research on Autism.

G. Joseph Broussard (September 2018-present). F32 BRAIN Initiative postdoctoral fellowship to investigate parallel fiber population coding using fast-GCaMP sensors during learning.

Graduate students (fellowships underlined):

Dmitry Sarkisov (2000-2007, Ph.D. Physics) Sarkisov studied coincidence detection by IP_3 single dendritic spines of cerebellar Purkinkje neurons. Now in financial industry.

Gayle Wittenberg (2001-2003, Ph.D. Molecular Biology, 2003-2006 Council on Science and Technology teaching fellow) Wittenberg studied spike timing dependent plasticity in hippocampus. Now a group leader at Janssen Research.

Kim Hatch Harrison (2002-Spring 2003; M.A. in Molecular Biology) Harrison studied evolutionary scaling principles of axons.

Daniel O'Connor (2002-2006; M.A. Psychology, Ph.D. Molecular Biology) O'Connor held a National Science Foundation Graduate Fellowship. He studied learning rules at single hippocampal synapses, and developed patterned uncaging methods. Now an associate professor at Johns Hopkins University.

Megan Sullivan (2002-2006; Ph.D. Molecular Biology) Sullivan held a National Alliance for Autism Research graduate fellowship. Sullivan pioneered in vivo imaging of cerebellar circuitry.

Eve Schneider (2007-2012; Ph.D. Psychology) Schneider discovered dendritic excitability in the deep cerebellar nuclei. Now an assistant professor at University of Kentucky Lexington. Alfred P. Sloan Fellow.

Xiaonan Richard Sun (2007-2012; Ph.D. Molecular Biology, M.D. at UMDNJ) Sun developed Fast-GCaMP sensors for rapid sensing of neuronal calcium. Now in neurosurgery fellowship at North Shore Long Island Jewish Hospital.

Alexander Kloth (2009-2014; Ph.D. Molecular Biology and Neuroscience) Kloth discovered cerebellar circuit defects in a wide variety of autism models. He received an F31 NRSA predoctoral fellowship and is now an assistant professor at Augustana University.

Matthew J. Howard (2012-2014; M.A. Molecular Biology) Howard investigated synaptic pathways between cerebellum and nonmotor regions of forebrain. Now in financial services.

Benjamin Campbell (2011-2014; Rockefeller University) Campbell formulated theories of nonmotor function for cerebellum. Now working in Silicon Valley.

Thomas J. Pisano (2014-2019; M.D.-Ph.D. program, Rutgers/Princeton) Pisano traced long-distance pathways linking the cerebellum with cognitive- and reward-related centers in the forebrain and basal ganglia. Funded by an F30 NRSA M.D.-Ph.D. fellowship award. Going to neurology residency at the University of Pennsylvania.

Ben Deverett (2014-2019; M.D.-Ph.D. program, Rutgers/Princeton) Deverett developed head-fixed approaches to a working memory task in collaboration with the Tank laboratory. The preparation was used to probe cerebellar contributions to working memory and sensory evidence accumulation. Funded by an F31 NRSA M.D.-Ph.D. fellowship award. Going to anesthesiology residency at Stanford University.

Yuhang Chen (2020; Ph.D. program, Quantitative and Computational Biology).

Fred Uquillas (2020; Ph.D. program i, Neuroscience). Co-advised by Prof. Jesse Gomez. Recipient of NSF Graduate Fellowship.

Invited seminars

Invited scientific meetings

1997 Southern California Optical Biology Users Group, University of California, Irvine, CA.
2000 Neural Information and Coding Meeting, Grindelwald, *Switzerland*.
2001 Gordon Research Conference on Calcium Signaling, Oxford University, Oxford, *England*.
2002 Workshop on Single Cell Computation, University College London, London, *England*.
2003 Workshop on Constraints in Neural Systems Design, Computational Neuroscience (CNS 2003) Meeting, Alicante, *Spain*.
2003 Banbury Workshop, Optimization and Constraints in the Evolution of Brain Design, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY.
2003 Keck Foundation/National Academy of Sciences Futures Initiative, Decisions, Signals and Meaning in Biology, Chemistry, Physics and Engineering, Beckman Center, Irvine, CA. (no talk)
2004 Monte Verità Workshop on Spike-Timing Dependent Plasticity (STDP), Monte Verità, Ascona, *Switzerland*.
2004 Third Astrobiology Science Conference, NASA Ames Research Center, Moffett Field, CA.
2004 Symposium on Optical Methods in Neuroscience, Microscopy and Microanalysis meeting, Savannah, GA.
2004 Workshop on Optimization and Neural Coding, Institute for Theoretical Physics, Santa Barbara, CA.
2004 Meeting on Brain Development, National Alliance for Autism Research, Fort Lauderdale, FL. (no talk)
2005 Keck Foundation Annual Meeting, Los Angeles, CA. (also 2007, 2008, 2009, 2010)
2005 Invited retreat speaker, Department of Neurobiology, University of California, Los Angeles, CA.
2005 Mini-symposium on controlling neural function with light. Chair, Scott M. Thompson. Society for Neuroscience meeting, Washington, DC.
2005 Session moderator, Gordon Research Conference on Neuroethology. Chairs, Nicholas Strausfeld and Catherine Carr. Magdalen College, Oxford University, Oxford, *England*.

2005 US National Academy of Sciences Frontier of Science Symposium. Principles of Brain Design. Beckman Center, University of California, Irvine, CA.
2006 Rita Allen Foundation 30th Anniversary Symposium, Institute for Advanced Study, Princeton NJ.
2006 Human Frontier Science Project Awardees Annual Meeting, Institut Pasteur, Paris, *France*. (poster)
2007 Karger Workshop on brain evolution, Society for Neuroscience meeting, San Diego, CA.
2008 Mini-School and Workshop on Multiple Time Scales in the Dynamics of the Nervous System, Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, *Italy*.
2008 Conference on Perceptual Learning, Motor Learning, and Automaticity, Netherlands Institute for Neuroscience, Amsterdam, *Netherlands*. (commemoration of the 200th anniversary of the Royal Netherlands Academy of Sciences)
2009 Banbury meeting on Searching for Principles Underlying Memory in Biological Systems, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY.
2009 Meeting on Computational Cell Biology, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY.
2009 Psi Chi Invited Speaker, Midwestern Psychological Association meeting, Chicago, IL.
2009 Society for Research on the Cerebellum, second annual meeting, Chicago, IL.
2010 McGovern Institute for Brain Research Symposium: Cells, circuits & behavior, MIT, Cambridge, MA.
2010 Symposium on Photons and Neurons, University of Rochester, Rochester, NY.
2010 Symposium on in vivo cerebellar imaging, Federation of European Neuroscience Societies, Amsterdam, *Netherlands*.
2010 Barcelona Cognition, Brain and Technology summer school, Barcelona, *Spain*.
2011 W.M. Keck Foundation Scholars Program final meeting, Beckman Center, Irvine, CA (co-organizer).
2011 Gordon Research Conference on Dendrites, Ventura Marriott, Ventura, CA.
2011 First Gordon Research Conference on the Cerebellum, Colby-Sawyer College, New London, NH.
2011 Boston Club meeting on cerebellum and autism, Nancy Lurie Marks Fdn., Wellesley, MA.
2012 Conference, Dendrites: Substrates for Information Processing, Janelia Conference, Ashburn, VA.
2012 Eden Foundation 18th Annual Princeton Lecture Series (keynote address), Princeton, NJ.
2012 Conference, Fluorescent Proteins and Biological Sensors III, Janelia Conference, Ashburn, VA (attendance cancelled due to Hurricane Sandy).
2013 McKnight Foundation Annual Meeting, Aspen, CO.
2013 Annual research symposium (keynote speaker), Delaware chapter, Society for Neuroscience, Newark, DE.
2014 McKnight Foundation Annual Meeting, Aspen, CO.
2014 Conference, Fluorescent Proteins and Biological Sensors IV, Janelia Conference, Ashburn, VA.

2014 Society for Neuroscience nanosymposium on cerebellum and autism (speaker and chair), Washington, DC.
2015 Keystone Conference on Pathways of Neurodevelopmental Disorders, Tahoe City, CA.
2015 BRAIN Initiative Investigator meeting, Bethesda, MD.
2016 McKnight Foundation Annual Meeting, Minneapolis, MN.
2016 Course on mouse methods in neuroscience, Jackson Laboratory, Bar Harbor, ME.
2017 Conference on cognition and psychiatric diseases, Brain and Spine Institute, Paris, *France.*
2017 Conference on procedural learning, Amsterdam, *Netherlands*.
2017 Gordon Research Conference on the Cerebellum, Bates College, Lewiston, ME.
2018 FENS Forum on the cognitive cerebellum, organized by M.E. Goldberg. Berlin, *Germany*.
2019 McKnight Foundation Neuroscience Conference, Aspen, CO.
2019 NIMH premeeting on New Perspectives on Cerebellar Function: Implications for Mental Health. Society for Neuroscience meeting, Chicago, IL.
2019 Minisymposium on the cognitive cerebellum, Society for Neuroscience meeting, Chicago, IL.

Invited talks (Research departments)
1994 Department of Physiology, University of Colorado Health Sciences Center, Denver, CO.
1995 Department of Theoretical Physics, AT&T Bell Laboratories, Murray Hill, NJ.
1995 Laboratory of Theoretical and Physical Biology, National Institutes of Health, Bethesda, MD.
1999 Department of Neurobiology, Duke University Medical Center, Durham, NC.
1999 Department of Biomedical Engineering, Boston University, Boston, MA.
1999 Department of Developmental and Cell Biology, University of California, Irvine, CA.
1999 Department of Molecular Biology, Princeton University, Princeton, NJ.
1999 Department of Neurobiology and Behavior, University of California, Irvine, CA.
2000 Department of Neurology, Stanford University Medical Center, Stanford, CA.
2000 Department of Physiology, University College, London, *England*.
2000 Division of Neurophysiology, National Institute for Medical Research, London, *England*.
2000 Department of Biology, Morehouse College, Atlanta, GA.
2000 Max Planck Institute for Medical Research, Dept. Biomedical Optics, Heidelberg, *Germany*.
2000 Karolinska Institutet, Stockholm, *Sweden*.
2001 Sloan Center for Theoretical Neurobiology, Caltech, Pasadena, CA.
2001 Program in Neuroscience, Columbia University, New York, NY.
2001 Wyeth-Ayerst Research Laboratories, Princeton, NJ.
2002 Center for Neurobiology, Mount Sinai School of Medicine, New York, NY.
2002 Systems neuroscience seminar, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY.
2002 Department of Physiology, New York Medical College, Albany, NY.
2003 Department of Physiology and Biophysics, University of Washington, Seattle, WA.
2003 Center for Cognitive Neuroscience, Duke University, Durham, NC.

2004 Baylor Medical College, Houston, TX. (Distinguished Neuroscientist Lecture Series)
2004 Max Planck Institute for Medical Research, Dept. Cell Physiology, Heidelberg, *Germany*.
2004 University of California, San Diego, CA.
2004 Salk Institute for Biological Studies, La Jolla, CA.
2004 Mathematical Biosciences Institute, Ohio State University, Columbus, OH.
2004 Neuroscience Program, University of Michigan, Ann Arbor, MI.
2004 Rowland Institute for Physics, Harvard University, Cambridge, MA.
2004 Department of Molecular and Cell Biology, Harvard University, Cambridge, MA.
2005 Center for Statistics in the Social Sciences, University of Washington, Seattle, WA.
2005 Department of Physiology and Biophysics, University of Washington, Seattle, WA.
2005 Department of Brain and Cognitive Sciences, MIT, Cambridge, MA.
2005 Learning and Memory Seminar, Dept. Neurobiology, University of California, Los Angeles, CA.
2005 Redwood Neuroscience Institute, Menlo Park, CA.
2005 Department of Neurobiology, Stanford University School of Medicine, Stanford, CA.
2005 Hopkins Marine Station, Stanford University, Pacific Grove, CA.
2005 Neuroscience Colloquium, Brown University, Providence, RI.
2005 CIMA, University of Navarra, Pamplona, *Spain*.
2006 Biological Chemistry Seminar Series, University of Pennsylvania, Philadelphia, PA.
2006 Vollum Institute, Oregon Health Sciences University, Portland, OR.
2006 Interdepartmental science seminar series, Delaware State University, Dover, DE.
2006 Department of Physiology, Anatomy and Genetics, Oxford University, Oxford, *England*.
2006 Instituto de Neurociencias de Alicante, Universidad Miguel Hernandez, Alicante, *Spain*.
2006 Max Planck Institute for Medical Research, Dept. Cell Physiology, Heidelberg, *Germany*.
2006 Mahoney Institute of Neurological Sciences colloquium, Univ. Pennsylvania, Philadelphia, PA.
2006 Translational Neuroscience Seminar Series, Mount Sinai School of Medicine, New York, NY.
2007 Neuroscience program, University of California San Diego, San Diego, CA.
2007 Biophysics seminar series, Rockefeller University, New York, NY.
2007 Keynote speaker, Robert Wood Johnson MD/PhD program retreat, UMDNJ, Piscataway, NJ.
2007 Seminars in Neuroscience series, West Virginia University, Morgantown, WV.
2008 Janelia Farm, Howard Hughes Medical Institute, Ashburn, VA.
2008 Department of Physiology, University College, London, *England*.
2009 Origins Institute, McMaster University, Toronto, *Canada*.
2009 Neuroscience Graduate Program seminar, McMaster University, Toronto, *Canada*.
2009 SUNY Downstate Medical Center, Brookly n, NY.
2009 Department of Neuroscience, Johns Hopkins University School of Medicine, Baltimore, MD.
2010 Department of Neurobiology, University of Chicago, Chicago, IL.

2011 University of Paris Descartes, Paris, *France*.
2011 Department of Neurology, University of Texas Southwestern Medical Center, Dallas, TX.
2011 University of Southern California, Los Angeles, CA.
2012 Google Research, Mountain View, CA.
2012 Hopkins Marine Station, Stanford University, Pacific Grove, CA.
2012 Seaver Autism Research Center, Mount Sinai School of Medicine, New York, NY.
2013 Dept. Neuroscience, Robert Wood Johnson Medical School, UMDNJ, Piscataway, NJ.
2013 Physics colloquium, Rutgers University, New Brunswick, NJ.
2014 Department of Neurology, University of California Los Angeles, Los Angeles, CA.
2014 Dept. Biochemistry and Molecular Medicine, George Washington University, Washington, DC.
2014 Neuroscience seminar series, Indiana University, Bloomington, IN.
2014 Progress in Neuroscience series, Brain and Mind Research Institute, Weill Cornell Medical College, New York, NY.
2015 Neuroscience and Medicine series, Department of Neuroscience, Pasteur Institute, Paris, *France*.
2015 Department of Biology, University of South Carolina, Columbia, SC.
2015 Okinawa Institute of Science and Technology, Okinawa, *Japan*. (visit postponed)
2016 Department of Neuroscience, Thomas Jefferson University, Philadelphia, PA.
2016 Symposium on the cerebellum and autism, Sick Kids Hospital, Toronto, *Canada* (keynote).
2017 Max Planck Institute, Jupiter, FL.
2017 Center for Computational Cognitive Neuropsychiatry, Rutgers University, New Brunswick, NJ.
2017 Department of Neurobiology, Duke University, Durham, NC.
2017 Brain Talk, Roche Pharmaceutical, Basel, Switzerland.
2017 Kavli Brain Forum, Emory University, Atlanta, GA.
2017 Biophysics Colloquium, Cornell University, Ithaca, NY.
2017 Rockefeller University, New York, NY.
2018 Children's National Hospital, Washington, DC.
2019 Neurology Grand Rounds, UCLA, Los Angeles, CA.
2021 McGill University, Montreal, Canada.
2021 Gatsby Computational Neuroscience Unit, University College London, London, *UK*.
2021 University of Minnesota Political Science, Methods colloquium, Minneapolis, MN.

Invited public talks

1997 National Association of Graduate-Professional Students, 12th annual meeting, New Orleans, LA.
2001 World Congress of Science Producers, Washington, DC.
2002 Policy Fellows' retreat, American Association for the Advancement of Science, Washington DC.
2002 Science on Saturdays lecture, Princeton Plasma Physics Laboratory, Princeton, NJ.
2004 Phi Beta Kappa induction dinner, Princeton University.

2005 Nassau Club, Princeton, NJ.
2005 Discussion panelist. Blurry vision: bridging the gap between science and the public. Princeton Dept. Molecular Biology and New York Academy of Sciences meeting. November 8, 2005.
2006 Princeton Alumni Council outreach trip, Seattle, WA.
2006 Princeton Tiger Talk for high school students, Princeton, NJ.
2007 Discussant, panel on career development, Society for Neuroscience, San Diego, CA.
2007 Princeton Alumni Council outreach trip, Los Angeles, CA.
2008 Smithsonian Associates, Washington, DC.
2008 Princeton Alumni Council outreach trip, Hong Kong, China.
2008 Brainwave series, discussion of creativity and the brain with Sandra Aamodt and director Julie Taymor, Rubin Museum of Art, New York, NY.
2008 authors@google, Mountain View, CA.
2008 Panel discussion on science writing: "Crystals, Quarks, Biomes and Genomes: How to Make Complex Science Compelling." Princeton University, Princeton, NJ.
2008 Conference on Learning and the Brain, MIT, Cambridge, MA.
2008 Panel discussion on the Challenges of the Brain, sponsored by *Discover* magazine/NSF/Franklin Institute. Philadelphia, PA.
2008 Renaissance Weekend, Charleston, SC.
2009 Princeton Regional Chamber of Commerce, Princeton, NJ.
2009 Brainwave series, discussion of science and Buddhism with Donald S. Lopez Jr., Rubin Museum of Art, New York, NY.
2009 Adventures of the Mind mentoring summit, Institute for Advanced Study, Princeton, NJ.
2009 TEDxSF talk, San Francisco, CA. www.tedxsf.org.
2010 Speaker, freshman address, Princeton University.
2011 Annual David Wilkinson Lecture, Harold R. Medina Seminar for State and Federal Judges, Princeton, NJ.
2011 Adventures of the Mind mentoring summit, Missoula, MT.
2012 Conference on Learning and the Brain (keynote address), Columbia University, New York, NY.
2012 Annual David Wilkinson Lecture, Harold R. Medina Seminar for State and Federal Judges, Princeton, NJ.
2012 Common Ground (local K-12 schools consortium), Princeton, NJ.
2013 Parents and Science lecture series, Rockefeller University, New York, NY.
2013 Riverside Elementary School, Princeton, NJ.
2013 Annual David Wilkinson Lecture, Harold R. Medina Seminar for State and Federal Judges, Princeton, NJ.
2013 AAAS Science and Technology Fellowship Year-End Summit, Silver Spring, MD.
2013 Conference on Active, Engaged Minds (Learning And the Brain), Boston, MA.
2014 The Science Behind The Science Behind The News, discussion of neuroscience with Joe Palca, Smithsonian Institution, Washington, DC.
2014 Understanding Autism, SciCafe, American Museum of Natural History, New York, NY.
2014 Invited panelist, Society for Neuroscience Professional Development Workshop on Teaching Neuroscience.

2016 Annual David Wilkinson Lecture, Harold R. Medina Seminar for State and Federal Judges, Princeton, NJ.
2016 Partnership for Maternal and Child Health of Northern New Jersey - annual meeting, Newark, NJ.
2017 Grand Rounds, Princeton House, Princeton, NJ.
2018 Science on Saturdays lecture, Princeton Plasma Physics Laboratory, Princeton, NJ.
2018 Paul D. Bartlett Lecture at the Linda Hall Science and Technology Library, Kansas City, MO.
2019 Old Guard of Princeton, Princeton, NJ.

Teaching at Princeton (* = new course; see also Policy and Legislative Work)
F2000-01 *MOL 508 - Neurobiology (with Berry, Tsien in different years)
F2001-06, 2008 *MOL 408 - Neurobiology (with Berry, Gould, Eggenschwiler, Haxby in different years)
S2002 *MOL 549 - Laboratory in Neurophysiology (with Gelperin/Tank)
F2006 *MOL 90 - Advanced Seminar in Cellular and Systems Neuroscience
S2009-10 MOL 214 - Introduction to Cellular and Molecular Biology (co-instructor)
F2009-16 *NEU501 - Neuroscience Ph.D. core course (co-instructor)
S2010-14 *NEU101 - Neuroscience and Everyday Life (with Gelperin)
S2012-13, 2015 *MOL451 - Genes, Brain, and the Human Mind (with Rosenberg 2012-13)
F2017, 2018, 2019, 2021 NEU501A-MOL501A – Neuroscience Ph.D. core course (course organizer)

External teaching activities
Mar.-Apr. 2008 *Workshop co-organizer, Kavli Institute for Theoretical Physics.* Program on Anatomy, Development, and Evolution of the Brain.
Summer 2012-13 *Invited lecturer,* summer course, Biophysics and Computation in Neurons and Networks. Organized by Alan Gelperin, David Tank, and Michael Berry.
Summer 2015-17 *Invited lecturer,* summer course, Neurotechnologies for Analysis of Network Dynamics (NAND). Organized by Gelperin, Tank, and Berry.
Summer 2018-19 *Invited lecturer,* summer course, Cellular, Cognitive, and Computational Neuroscience (C3N). Organized by Gelperin, Tank, and Berry.