



Gabriel A. Silva, MSc, PhD

Professor

Shu Chien-Gene Ley Department of Bioengineering
Department of Neurosciences
J. Robert Beyster Endowed Chair in Engineering
Founding Director, Center for Engineered Natural Intelligence
Associate Director, Kavli Institute for Brain and Mind

University of California San Diego

Mailing address

Franklin Antonio Hall
University of California San Diego
9500 Gilman Drive, Mail Code 0433
La Jolla, California 92093-0433

Mathematical Neuroscience Lab @ UCSD | silva.ucsd.edu
Center for Engineered Natural Intelligence | ceni.ucsd.edu
Kavli Institute for Brain and Mind | kibm.ucsd.edu

Email - gsilva@ucsd.edu
Telephone - 858.822.4591

Academic Appointments

All listed academic faculty appointments are at the University of California San Diego.

J. Robert Beyster Endowed Chair in Engineering (2022 to present)

Associate Director, Kavli Institute for Brain and Mind (2020 to present)

Full Professor (with Tenure)

Department of Neurosciences, School of Medicine (2017 to present)

Founding Director, Center for Engineered Natural Intelligence (2016 to present)

Consulting Researcher, Microsoft (2022 to 2023)

Microsoft Research Fellow (sabbatical; 2018-2019)

Jacobs Family Scholar in Engineering Endowed Chair (2017 to 2022)

Vice Chair, Department of Bioengineering (2014 to 2018)

Full Professor (with Tenure)

Department of Bioengineering, Jacobs School of Engineering (2014 to present)

Full Professor (with Tenure)

Department of Ophthalmology, School of Medicine (2014 to 2016)

Jacobs Faculty Fellows Professor of Bioengineering (2009 to 2014)

Associate Professor (with Tenure)

Department of Bioengineering, Jacobs School of Engineering (2009 to 2014)

Associate Professor (with Tenure)

Department of Ophthalmology, School of Medicine (2009 to 2014)

Co-Director, Retinal Engineering Center

Institute for Engineering in Medicine (IEM) (2009 to 2011)

Affiliated faculty member, Department of NanoEngineering (2008 to present)

Assistant Professor

Department of Bioengineering, Jacobs School of Engineering (2003 to 2009)

Assistant Professor

Department of Ophthalmology, School of Medicine (2004 to 2009)

Faculty member in the following programs, centers and institutes:

Kavli Institute for Brain and Mind (2020 to present)

Center for Large-Scale Data Systems Research,

San Diego Super Computer Center (2018 to present)

Center for Engineered Natural Intelligence (2016 to present)

Center for Multi-scale Imaging of Brain Function (2016 to present)

Contextual Robotics Institute (2015 to present)

Center for Multiscale Imaging of Living Systems (2011 to present)

Institute for Neural Computation (2009 to present)

Biocircuits Institute (2009 to present)

Retinal Engineering Center (2008 to present)

Institute of Engineering in Medicine (2008 to present)

Neurosciences Graduate Program (2004 to present)

Computational Neurobiology Specialization (2004 to present)

Stein Institute for Research on Aging (2004 to present)

Materials Science and Engineering Graduate Program (2004 to present)

Whitaker Institute for Biomedical Engineering (2004-2008)

Academic Training

Postdoctoral Fellowship (2001-2003)

Institute for BioNanotechnology in Medicine (IBNAM) and Department of Neurology
Northwestern University, Chicago

Advisors: Dr. Samuel I. Stupp (IBNAM) and Dr. John A. Kessler (Neurology)

Doctorate (Ph.D., 1998-2001)

Department of Bioengineering and Department of Ophthalmology
University of Illinois at Chicago

Title: Experimental and theoretical study of mouse rod photoreceptors in vivo

Advisor: Dr. David R. Pepperberg (Ophthalmology)

Master of Science (M.Sc., 1996-1998)

Department of Physiology and Graduate Program in Neuroscience
University of Toronto

Title: Metabotropic glutamate receptor expression in rat spinal cord astrocytes
Advisors: Dr. Elizabeth Theriault (Neurosurgery) and Dr. Linda Mills (Physiology)

Honors Bachelors of Science (Hon. B.Sc., 1992-1996) Human physiology, University of Toronto
Bachelors of Science (B.Sc., 1992-1996) Biophysics, University of Toronto

Professional Training, Licenses, and Certifications

Emergency Medical Technician

(National Registry No. E3611408, County of San Diego No. E166276)

Tactical Emergency Casualty Care (TECC)

Basic Life Support (BLS; American Heart Association No. 05180680985)

EMSTA College Emergency Medical Technician Program, Santee, California

San Diego County Sheriff Search and Rescue Academy

Type I and II mountain rescue specialist

Rope Rescue Technician I

Urban Search and Rescue (USAR) Level 4 (Federal Emergency Management Agency, FEMA)

FEMA certifications: ICS-100 'Introduction to the Incident Command System'; IS-00200.c 'Basic Incident Command System for Initial Response'; IS-00700.b 'Introduction to the National Incident Management System'; 'WMD/Terrorism Awareness for Emergency Responders'; IS-00907 'Active Shooter'; IS-00005.a 'Introduction to Hazardous Materials'

Active Member: San Diego County Sheriff's Department Search and Rescue - Medical Unit
San Diego County Sheriff's Department Search and Rescue - Technical Rescue Unit
San Diego County Sheriff's Department Search and Rescue - Mountain Rescue Team

Awards and Honors

J. Robert Beyster Endowed Chair in Engineering (2022 to present)

Microsoft Research Fellow (2018)

Jacobs Family Scholar in Engineering Endowed Chair (2017-2022))

College of Fellows of the American Institute of Medical and Biological Engineering (2016)

'Faculty of the Year' award for education, Tau Beta Pi Engineering Honors Society (2015)

Career Milestone Award, University of California, San Diego (2014)
 Biocom Cell Art Exhibit winning entry: "SEM of neurons on optoelectronics nanowires" (2014)
 Society for Neuroscience (SFN) 2013 annual meeting 'Hot Topic' abstract (2013)
 'Faculty of the Year' award for education, Tau Beta Pi Engineering Honors Society (2012)
 Beverley and Clarence Chandran Distinguished Lecture, Duke University (2010)
 Jacobs Faculty Fellows Chair in Bioengineering (2009 to 2014)
 Selection to "Nanoscience: The best of NATURE publications" (2009)
 National Academy of Engineering (NAE) Frontiers Conference selection (2009)
 American Society of Mechanical Engineers (ASME) Y.C. Fung Young Investigator Medal (2008)
 Wallace Coulter Foundation Early Career Award (2007)
 National Science Foundation/Science Magazine Visualization Challenge semi-finalist (2007)
 Associated Students of UCSD Faculty Award for undergraduate education (2005)
 IEEE/EMBS Excellence in Neural Engineering Award (2005)
 UCSD Faculty Career Development Award (2005)
 Ray Thomas Edwards Medical Foundation Young Investigator Recognition Award (2004)
 UCSD Academic Senate Faculty Award (2004)
 Stein Institute for Research on Aging (SIRA) Faculty Award (2004)
 Whitaker Foundation-University of California, San Diego Leadership Award (2003-2005)
 Retina Research Foundation Travel Fellowship (2002)
 Natural Sciences and Engineering Research Council (NSERC) Graduate Fellowship (1999-2001)
 American Society for Artificial Internal Organs Biomedical Engineering Fellowship (1999)
 College of Engineering Dean's Fellowship, University of Illinois at Chicago (1998)
 University of Toronto Open Fellowship (1998, declined)
 Institute of Medical Science Research Studentship, University of Toronto (1998, declined)

Publications

GA Silva (2024) Using quantum computing to infer dynamic behaviors of biological and artificial neural networks. *arXiv* <https://arxiv.org/abs/2403.18963>.

JJ Li, S Pardo Guerra, K Basu and GA Silva (2023) A categorical framework for quantifying emergent effects in network topology. *arXiv* <https://arxiv.org/abs/2311.17403>.

V Kurien George, A Gupta, and GA Silva (2023) Identifying steady state in the network dynamics of spiking neural networks. *Heliyon* <https://doi.org/10.1016/j.heliyon.2023.e13913>.

T Chen, Y Park, A Saad-Eldin, Z Lubberts, A Athreya, BD Pedigo, JT Vogelstein, F Puppò, GA Silva, AR Muotri, W Yang, GM White, and CE Priebe (2023) Discovering a change point and piecewise linear structure in a time series of organoid networks via the iso-mirror *Applied Network Science* <https://doi.org/10.1007/s41109-023-00564-5>

S Pardo G and GA Silva (2021) Information entropy re-defined in a category theory context using preradicals. arXiv 2112.06064.

VK George, V Morar, W Yang, J Larson, B Tower, S Mahajan, A Gupta, C White, and GA Silva (2021) Learning without gradient descent encoded by the dynamics of a neurobiological model. arXiv <https://arxiv.org/abs/2103.08878>.

F Puppo, D Pre, A Bang, and GA Silva (2020) Super-selective reconstruction of causal and direct connectivity with application to in-vitro iPSC neuronal networks. *Frontiers in Neuroscience* doi.org/10.3389/fnins.2021.647877 [bioRxiv version:<https://doi.org/10.1101/2020.05.08.085191>.]

F Puppo, S Sadegh, CA Trujillo, M Thunemann, E Campbell, M Vandenberghe, X Shan, I Akkouh, Evan Miller, BL Bloodgood, GS Silva, AM Dale, GT Einevoll, S Djurovic, OA Andreassen, AR Muotri, and A Devor (2021) All-optical electrophysiology in hiPSC-derived neurons with synthetic voltage sensors. *Frontiers in Cellular Neuroscience*. 15:671549. doi: 10.3389/fncel.2021.671549 [bioRxiv:<https://www.biorxiv.org/content/10.1101/2021.01.18.427081v1>]

PW Wang, S Sapra, VK George, GA Silva (2021) Generalizable machine learning in neuroscience using graph neural networks. *Frontiers in Artificial Intelligence* 4:618372. doi: 10.3389/frai.2021.618372 [arXiv 2020.08569]

VK George, F Puppo, and GA Silva (2021) Computing temporal sequences associated with dynamic patterns on the C. elegans connectome. *Frontiers in Systems Neuroscience*. doi.org/10.3389/fnsys.2021.564124 [bioRxiv:<https://doi.org/10.1101/2020.04.28.067124>.]

S Pardo G and GA Silva (2020) Information flows as a path least resistance: A category theory approach using preradicals. arXiv:2012.02886

N Bhattacharya and GA Silva (2020) Stability and complexity analysis of finite difference algorithms for the time fractional diffusion equation. arXiv:2007.08660.

GA Silva, AR Muotri, and C White (2020) Understanding the human brain using brain organoids and a structure-function theory. bioRxiv:<https://doi.org/10.1101/2020.07.28.225631>.

JM Roldan, S Pardo G, VK George, and GA Silva (2020) Construction of edge-ordered multidirected graphlets for comparing dynamics of spatial temporal neural networks. arXiv:2006.15971.

GA Silva (2019) The effect of signaling latencies and refractory node states on the dynamics of networks. *Neural Computation*. 31:2492-2522. [arXiv:arXiv:1804.07609]

GA Silva (2019) Neuroscience and artificial intelligence can help improve each other. The Conversation. <https://theconversation.com/neuroscience-and-artificial-intelligence-can-help-improve-each-other-110869>.

F Puppo, V George, and GA Silva (2018) An optimized structure-function design principle underlies efficient signaling dynamics in neurons. *Nature Scientific Reports*. 8:10460.

GA Silva (2018) A New Frontier: The Convergence of Nanotechnology, Brain Machine Interfaces, and Artificial Intelligence. *Frontiers in Neuroscience*. 2:843. doi:10.3389/fnins.2018.00843.

S Ha, M Khraiche, A Akinin, Y Jin, WR Freeman, GA Silva, and G Cauwenberghs (2016) Towards high-resolution retinal prostheses with direct optical addressing and inductive telemetry. *Journal of Neural Engineering*. 13:056008.

H Uhlirova, K Kılıç, P Tian, S Sakadžić, L Gagnon, M Thunemann, M Desjardins, PA. Saisan, K Nizar, MA Yasseen, DJ Hagler Jr, M Vandenberghe, S Djurovic, OA. Andreassen, GA Silva, E Masliah, D Kleinfeld, S Vinogradov, RB. Buxton, GT. Einevoll, DA Boas, AM Dale, and A Devor (2016) The roadmap for estimation of cell-type-specific neuronal activity from non-invasive measurements. *Philosophical Transactions B*. 371:20150356.

H Uhlirova, K Kılıç, P Tian, PA Saisan, Q Cheng, KL Weldy2 S Sakadžić, F Razoux, M Vandenberghe, K Nizar, VB Sridhar, TC Steed, M Abashin, Y Fainman, E Masliah, S Djurovic, OA Andreassen, GT Einevoll, GA Silva, DA Boas, RB Buxton, AM Dale, A Devor (2016) Cell type specificity of neurovascular coupling in cerebral cortex. *eLife* 2016;10.7554/eLife.14315

S-Y Eun, K Nguyen-Ta, GA Silva, and S-J Kim (2016) Assembly and calcium binding properties of quantum dot-calmodulin calcium sensor. *Journal Nanoscience and Nanotechnology*. 16:2065-2068.

CL MacDonald, N Bhattacharya, BP Sprouse, and GA Silva (2015) Efficient computation of the Grunwald-Letnikov fractional diffusion derivative using adaptive time step memory. *Journal of Computational Physics*. 297:231-236. [arXiv:1505.03967]

J Blumling III and GA Silva (2015) Sulforhodamine B-loaded polyethyleneimine/silica hybrid nanoparticles. *Journal of Nanoneuroscience*. 6:73-77.

M Buibas and GA Silva (2015) Algebraic identification of the effective connectivity of constrained geometric network models of neural signaling. arXiv:1505.03964.

B Maranhao, P Biswas, JL Duncan, KE Branham, GA Silva, MA Naeem, SN Khan, S Riazuddin, JF Hejtmančik, JR Heckenlively, SA Riazuddin, PL Lee, and R Ayyagari (2014) exomeSuite: Whole exome sequence variant filtering tool for rapid identification of putative disease causing SNVs/indels. *Genomics* 103:169-176.

CL MacDonald and GA Silva (2013) A positive feedback cell signaling nucleation model of astrocyte dynamics. *Frontiers in Neuroengineering* 6:4. doi: 10.3389/fneng.2013.00004.

K Nizar, P Tian, Q Cheng, PA Saisan, H Uhlrova, L reznichenko, K Weldy, TY Steed, VB Sridhar, CL MacDonald, J Cui, S Sakadzic, DA Boas, TI Beka, GT Einevoll, J Chen, E Masliah, AM Dale, GA Silva, and A Devor (2013) In vivo stimulus-induced vasodilation precedes astrocytic calcium increase. *Journal of Neuroscience* 33:8411-8422.

GA Silva and ML Khraiche (2013) Nanotechnologies for recording and stimulating from excitable cells. *Discovery Medicine* 15:357-365.

A Devor, PA Bandettini, DA Boas, JM Bower, RB. Buxton, M Carandini, LB. Cohen, AM. Dale, GT Einevoll, P Fox, MA Franchescini, K Friston, JG Fujimoto, MA Geyer, JH Greenberg, E Halgren, MS. Hämäläinen, KD Harris, M Häusser, F Helmchen, BT Hyman, A Jasanoff, TL Jernigan, LL Judd, S-G Kim, D Kleinfeld, NJ Kopell, M Kutas, KK Kwong, ME Larkum, EH. Lo, PJ Magistretti, JB Mandeville, E Masliah, PP Mitra, WC Mobley, CI Moore, MA Moskowitz, A Nimmerjahn, JH Reynolds, BR Rosen, BM Salzberg, CB Schaffer, GA Silva, PTC. So, NC Spitzer, RB Tootell, DC Van Essen, W Vanduffel, SA Vinogradov, LL Wald, LV Wang, B Weber, AG. Yodh (2013) The challenge of connecting the dots in B.R.A.I.N. *Neuron* 80:270-274.

S-J Kim, J Blumling, MC Davidson, H Saad, S-Y Eun, and GA Silva (2012) Calcium and EDTA induced folding and unfolding of calmodulin on functionalized quantum dot surfaces. *Journal of Nanoneuroscience* 2:75-81.

V Parpura GA Silva, PA Tass, KE Bennet, M Meyyappan, J Koehne, KH Lee, and RJ Andrews (2012) Neuromodulation: selected approaches and challenges. *Journal of Neurochemistry* 10.1111/jnc.12105

J Blumling and GA Silva (2012) Targeting the brain: Advances in drug delivery. *Journal of Current Pharmaceutical Biotechnology* 13:2417-2426.

C Evans, M Fitzgerald, T Clemons, M House, B Padman, J Shaw, M Saunders, A Harvey, B Zdyrko, I Luzinov, GA Silva, S Dunlop, KS Iyer (2011) Multimodal analysis of PEI-mediated endocytosis of nanoparticles in neural cells. *ACS Nano* 5:8640-8648.

GA Silva (2011) The need for the emergence of mathematical neuroscience: Beyond computation and simulation. *Frontiers in Computational Neuroscience* 5:51. doi: 10.3389/fncom.2011.0005.

M Buibas and GA Silva (2011) A framework for simulating and estimating the state and functional topology of complex dynamic geometric networks. *Neural Computation* 23:183-214. [arXiv:0908.3934]

M Buibas, D Yu, K Nizar, and GA Silva (2010) Mapping the spatiotemporal dynamics of calcium signaling in cellular neural networks using optical flow. *Annals of Biomedical Engineering* 38:2520-2531. [arXiv:0912.0265]

SK Chow, D Yu, CL MacDonald, M Buibas, and GA Silva (2010) Amyloid- β -peptide directly induces spontaneous calcium oscillations, intercellular calcium waves, and gliosis in rat cortical astrocytes. *ASN Neuro* 2(1):art:e00026.doi:10.1042/AN20090035.

GA Silva (2010). Nanotechnology applications and approaches for neuroregeneration and drug delivery to the CNS. *Annals of the New York Academy of Sciences* 1199:221-230.

D Yu, M Buibas, Z Singer, I Lee, and GA Silva (2009) Characterization of calcium mediated intracellular and intercellular signaling in the rMC-1 glial cell line. *Cellular and Molecular Bioengineering* 2:144-155.

S Pathak, R Tolentino, K Nguyen, L DAmico, E Barron, L Cheng, WR Freeman, and GA Silva (2009) Quantum dot labeling and imaging of GFAP intermediate filaments and gliosis in the rat neural retina and dissociated astrocytes. *Journal of Nanoscience and Nanotechnology* 9:5047-5054.

GA Silva (2009) Shorting neurons with carbon nanotubes. *Nature Nanotechnology*. 4:82-83.

GA Silva (2009). Quantum dot nanotechnologies for neuroimaging. *Progress in Brain Research* 180:17-32.

JM Provenzale and GA Silva (2009) Use of nanoparticles to central nervous system imaging and therapy. *American Journal of Neuroradiology* 10.3174/ajnr.A1590:1-9.

NA Kotov*, JO Winter*, I Clements, E Jan, BP Timko, S Campiedelli, S Pathak, A Mazzatenta, CM Lieber*, M Prato*, RV Bellamkonda*, GA Silva*, NWS Kam, F Patolsky, and L Ballerini (2009) Nanomaterials for neural interfaces. *Advanced Materials* 21:1-35. (*corresponding authors)

F Mojana, L Cheng, D-WG Bartsch, GA Silva, I Kozak, N Nigam, and WR Freeman (2008) The role of abnormal vitreomacular adhesion in age-related macular degeneration: Spectral OCT and surgical results. *American Journal of Ophthalmology* 146:218-227.

C MacDonald, D Yu, M Buibas, and GA Silva (2008) Diffusion modeling of ATP signaling suggests a partially regenerative mechanism underlies astrocyte intercellular calcium waves. *Frontiers in Neuroengineering* 1:1-13.

I Falkenstein, L Cheng, F Wong-Staal, A Tammewar, E Barron, GA Silva, Q-X Li, D Yu, G Liu, N Ke, J MacDonald, and WR Freeman (2008) Toxicity and intraocular properties of a novel long acting anti-proliferative and anti-angiogenic compound IMS2186. *Current Eye Research* 33:599-609.

M Hashemi, M Buibas, and GA Silva (2008) Automated detection of intercellular signaling in astrocyte networks using the converging squares algorithm. *Journal of Neuroscience Methods* 170:294-299.

GA Silva (2008) The central nervous system. *Drug Discovery Today: Disease Models* 5:1-3.

GA Silva (2008) Nanotechnology approaches for crossing the blood brain barrier and drug delivery to the CNS. *BMC Neuroscience* 9(Suppl 3):S4, 1-4.

D Yu and GA Silva (2008) Stem cell sources and therapeutic approaches for central nervous system and neural retinal disorders. *Neurosurgical Focus* 24:E10, 1-14.

S Pathak, MC Davidson, and GA Silva (2007) Characterization of the functional binding properties of antibody conjugated quantum dots. *NanoLetters* 7:1839-1845.

GA Silva (2007) Nanotechnology approaches for drug and small molecule delivery across the blood brain barrier. *Surgical Neurology* 67:113-116.

GA Silva (2007) What impact will nanotechnology have on neurology? *Nature Clinical Practice Neurology*. 1:92-94.

I Kozak, L Cheng, GA Silva, and RF Freeman (2007) Testing of intraocular drugs for clinical use. *Investigative Ophthalmology and Visual Sciences* 48:4861-4863.

GA Silva (2007) Nanotechnology approaches for drug and small molecule deliver across the blood brain barrier. *Surgical Neurology* 67:113-116

I Kozak, OR Kayikcioglul, Cheng, I Falkenstein, GA Silva, D Yu, and WR Freeman (2006) The effect of recombinant human hyaluronidase on dexamethasone penetration into the posterior segment of the eye after sub-Tenon's injection. *Journal of Ocular Pharmacology and Therapeutics* 22:362-369.

M Ho, D Yu, MC Davidson, and GA Silva (2006) Comparison of standard surface chemistries for culturing mesenchymal stem cells prior to neural differentiation. *Biomaterials* 27:4333-4339.

S Pathak, E Cao, MC Davidson, S Jin, and GA Silva (2006) Quantum dot applications in neuroscience: New tools for probing neurons and glia. *Journal of Neuroscience* 26:1893-1895.

GA Silva (2006) Neuroscience nanotechnology: Progress, challenges, and opportunities. *Nature Reviews Neuroscience* 7:65-74.

GA Silva (2006) Nanomedicine: Seeing the benefits of ceria. *Nature Nanotechnology* 1:92-94.

GA Silva (2005) Small Neuroscience: The nanostructure of the central nervous system and emerging nanotechnology applications. *Current Nanoscience* 1:225-236.

GA Silva (2005) Nanotechnology approaches for the regeneration and neuroprotection of the central nervous system. *Surgical Neurology* 63:301-306.

GA Silva, C Czeisler, KL Niece, E Beniash, D Harrington, JA Kessler, and SI Stupp (2004) Selective differentiation of neural progenitor cells by high-density epitope nanofibers. *Science* 303:1352-1355.

GA Silva and DR Pepperberg (2004) Step response of mouse rod photoreceptors modeled in terms of elemental photic signals. *IEEE Transactions on Biomedical Engineering* 51:3-12.

GA Silva (2004) Introduction to nanotechnology and its applications to medicine. *Surgical Neurology* 61:216-220.

GA Silva, JR Hetling, and DR Pepperberg (2001) Dynamic and steady-state light adaptation of mouse rod photoreceptors in vivo. *Journal of Physiology* 534:203-216.

GA Silva, E Theriault, LR Mills, PS Pennefather, and CJ Feeney (1999) Group I and II metabotropic glutamate receptor expression in cultured rat spinal cord astrocytes. *Neuroscience Letters* 263:117-120.

GA Silva, CJ Feeney, LR Mills, and E Theriault (1998) A novel and rapid method for culturing pure rat spinal cord astrocytes on untreated glass. *Journal of Neuroscience Methods* 80: 75-79.

Media articles and publications

Regular contributor to Forbes (full list of articles published in Forbes [here](#)) and Medium (full list of articles published in Medium and its various publications [here](#)).

Books, book chapters, collections, and multimedia

Editor-in-Chief, World Scientific Press upcoming four volume set on brain research.

GA Silva. Editor (2016) The role of mathematics and theory in understanding the brain. 'Frontiers in Computational Neuroscience' Research Topic.

GA Silva and V Parpura. Editors. (2011) Nanotechnology for Biology and Medicine: At the Building Block Level. Springer Life Sciences, New York, New York. ISBN 978-0-387-31282-8.

GA Silva (2011) Quantum dots for cellular neural imaging. In: Nanotechnology for Biology and Medicine: At the Building Block Level. Springer Life Sciences, New York, New York. ISBN 978-0-387-31282-8.

GA Silva (2008) The structure of the nervous system and nanoengineering approaches to studying it and repairing it. In: Introduction to Bioengineering pp. 327-351. S Chien and P Chang, Editors. World Scientific Press, Hackensack, New Jersey. ISBN 978-981-270-793-2.

GA Silva (2007) The nanostructure of the nervous system and the impact of nanotechnology on neuro- science. In: United Nations Educational, Scientific, and Cultural Organization (UNESCO) Encyclopedia of Life Support Systems (EOLSS). H Doelle, Editor, Biotechnology Theme. UNESCO Publishing-EOLSS Publishers, Oxford, UK.

GA Silva (2005) Bionanotechnology applications to the central nervous system. In: Exploring Nanotechnology multimedia CD ROM. Nanopolis Distributed Knowledge Network in Science and Engineering.

Patents

GA Silva, ML Khraiche, G Cauwenberghs, Y Lo, WR Freeman, S Ha, Y Jing, and EJ Chichilnisky (2013) Integrated nanowire array devices for detecting and/or applying electrical signals to tissue. EP2880430A1, US20150209586, WO 2014022828 A1.

[This application claims priority to 5 provisional applications of varying subject matter: Direct inductive stimulation for energy-efficient wireless neural interfaces (Provisional application No. 61/679,054); Integrated optoelectronic nanowire array and method of use (Provisional application No. 61/681,656); Integrated nanowire arrays for spectral detection and methods of use (Provisional application No. 61/779,550); Self-regulating nanowire arrays and methods of

use (Provisional application No. 61/779,680); Self-powering arrays and methods of use (Provisional application No. 61/780,515)

ML Khraiche, GA Silva, D Wang, Y Lo, G Cauwenberghs, WR Freeman (2010) Ultra-high photosensitivity vertical nanowire arrays for retinal prosthesis. CA2803319A1, EP2582324A2, EP2582324A4, US20140128972, WO2011163262A2, WO2011163262A3

SI Stupp, JJJM Donners, GA Silva, HA Behanna, and SG Anthony (2005) Self-assembling peptide amphiphiles and related methods for growth factor delivery. CA2549164A1, CN1905892A, CN102225964A, EP1696945A1, EP1696945A4, EP1696945B1, EP2314305A2, EP2314305A3, US7544661, US8138140, US8580923, US20050209145, US20090269847, US20120264912, WO2005056039A1

GA Silva, M Buibas, and HS Khanna (2006) Complex network mapping. CA2674361A1, EP2087654A2, EP2087654A4, US20090248376, WO2008058263A2, WO2008058263A3

Invited Talks and Lectures

Note: All invited talks are listed. Talks with a title associated with them were accepted invitations. Entries without a title indicate invitations that were declined due to scheduling conflicts or other prior commitments.

"Bringing into context the significance of AI" Longley Capital. La Jolla, California. June 6, 2023.

"Towards true zero-shot learning: Data embeddings encoded by network dynamics". Lockheed Martin AI Summit. September 21st, 2022

"Exploring categorical models of generative neural properties from computable local dynamics". Department of Mathematics, University of California San Diego. May 26, 2022.

"The refraction ratio in brain dynamics". Science of Consciousness. Tucson, Arizona. April 19, 2022. (Co-presented with Prof. Erik Vierre.)

"How does creativity emerge from the brain". University of California Foundation. Washington D.C. March 23, 2022.

"What network geometry and temporal latencies can teach us about the brain". Department of Bioengineering, University of California San Diego. February 18, 2022.

"Nanotechnology and the brain: Opportunities over the next decade." Health Taneja College of Pharmacy Graduate Programs Seminar Series, University of South Florida, Tampa, Florida. November 11, 2021.

"Generalizable latent neural dynamic models discovered using graph neural networks". Emerging Topics in Artificial Intelligence, The International Society for Optics and Photonics (SPIE). August 1-5, 2021.

"Why we need engineering and math to understand how the brain works". UC San Diego Board of Trustees. June 8, 2021.

"Machine learning in neuroscience: Graph neural network based discovery of generalizable models". IEEE EMBS Grand Challenges in Brain and Neural Systems. February 13, 2021.

"Statistical and machine learning analyses of human-derived brain organoids". Kavli Neurosciences Discovery Institute, Johns Hopkins University, Baltimore, Maryland. February 12, 2021.

"A fundamental geometric structure-function constraint and the search for the brain's algorithms". Unconventional Computing Workshop, IBM. July 20, 2020.

"Understanding the brain as an engineered system". TJ Watson Research Center, IBM, Yorktown Heights, New York. May 14, 2020.

"The brain and AI as engineered systems". Microsoft Innovation Center, Washington DC. February 26, 2020.

"The brain and AI as engineered systems". Ingleside Investors, New York City. February 25, 2020.

"Towards engineered intelligence." IEEE EMBS Brain, Mind, and Body workshop, La Jolla, California. December 19, 2019.

"Neuroscience derived algorithms for machine inference and problem solving: The state of the field." DataWest, La Jolla, California. December 10, 2019.

"McLaren F1. Engineering speed." McLaren Technology Center. Woking, United Kingdom. December 5 and 6, 2019.

"The possible in machine learning and data analytics" Naval Special Warfare, La Jolla, California, September 25, 2019,

"No training required: Theory and algorithms for one-shot machine learning and inference" Brain Corporation. San Diego, California. August 22, 2019.

"Where neuroscience meets machine learning" Philanthropic Educational Organization (PEO). La Jolla, California. May 21, 2019.

Society for Brain Mapping and Therapeutics. Los Angeles, California. March 17, 2019

"From brain to data and back again". DataWest. La Jolla, California. December 6, 2018.

"From brain to to machine: Leveraging our understanding of neuroscience to develop next generation machine intelligence" Center for Engineered Natural Intelligence Symposium, University of California San Diego. La Jolla, California. December 4, 2018.

Panel discussion: "The role of neuroscience, cognitive sciences, and bioengineering in media and entertainment" Entertainment Technology Leaders symposium, Entertainment Technology Center (ETC), University of Southern California (USC). Los Angeles, California. June 27, 2018.

"The future of artificial intelligence is natural intelligence: Discovering the brain's internal algorithms" Osher Life Long Learning Center, UCSD. La Jolla, California. May 30, 2018.

"From neuroscience to engineering and back: Algorithms for machine natural intelligence and new perspectives on neural structure-function dynamics". Department of Bioengineering, University of California Riverside., California. June 6, 2018. Riverside

Panel discussion: "Content genomics: neuroscience and machine learning practices to hack audience segmentation" National Association of Broadcaster (NAB) 2018 meeting. Las Vegas, Nevada. April 10, 2018.

"How the brain and neuroscience will inform the next generation of artificial intelligence". La Jolla Villagers. La Jolla, California. March 28, 2018.

"From neuroscience to engineering and back: Algorithms for machine natural intelligence and new perspectives on neural structure-function dynamics". Lawrence Livermore National Lab, Department of Energy. Livermore, California. March 6, 2018.

"Natural intelligence for machines: Deriving neurobiological algorithms for machine learning". Microsoft Research. Redmond, Washington. February 1st, 2018.

"Inference of actualized subsets of geometric association graphs based on context and a neural derive dynamic competition model". 'Differential Equations and Their Applications to Neuroscience' session, Mathematical Association of America (MAA). January 10, 2018. San Diego, California.

"Natural intelligence for machines: Deriving neurobiological algorithms for machine learning". George Mason University. Fairfax, Virginia. November 16, 2017.

"Natural intelligence for machines: Deriving neurobiological algorithms for machine learning". Lawrence Livermore National Laboratory-University of California San Diego. La Jolla, California, November 14, 2017.

"Natural intelligence for machines: Deriving neurobiological algorithms for machine learning". Google. Mountain View, California. September 14, 2017.

"Discovering the brain's internal algorithms: The future of artificial intelligence is *natural* intelligence". California State Summer School for Math and Science (COSMOS) Discovery Lecture. La Jolla, California. July 18, 2017.

"Discovering the brain's internal algorithms: The future of artificial intelligence is *natural* intelligence ". Global AI Hackathon San Diego, California, June 24, 2017.

"Discovering the brain's internal algorithms: The future of artificial intelligence is *natural* intelligence ". Department of Biomedical Engineering. University of California, Irvine. June 9, 2017.

"Discovering the brain's internal algorithms: The future of artificial intelligence is *natural* intelligence". Gordon Center, University of California, San Diego. June 1 2017.

"How mathematics and engineering allow us to understand how the brain functions". 1230 Club, La Jolla, California. March 31, 2017.

"Discovering the brain's internal algorithms: The future of artificial intelligence is *natural* intelligence ". Qualcomm, San Diego, California. February 8, 2017.

"The future of artificial intelligence is natural intelligence: Our quest to engineer the brain's internal algorithms". Chancellor's Associates, University of California, San Diego. January 25, 2017.

"An engineering quest to understanding the brain as a system". Marquette University and Medical College of Wisconsin, Department of Biomedical Engineering. Milwaukee, Wisconsin. November 30, 2016.

"Dynamic functional connectomics: Deriving causal information flow from the structural connectome". Center for Brain Activity Mapping, University of California, San Diego. June 22, 2016.

"Dynamic information flow in the brain: How structure determines function". Google/Verily. MIT, Cambridge Massachusetts. April 24, 2016.

"The development of novel information processing algorithms derived from biological neural computation" Jacobs School of Engineering, UCSD Research Expo. April 14, 2016.

UST-UCSD-IRICE Symposium. National Yang-Ming University, Taipei City, Taiwan. November 17, 2015.

Institute of Engineering and Technology, Ahmedabad University. Ahmedabad, Gujarat, India.

"A storm is coming: The challenges of analyzing, modeling, and using huge volumes of data from nanoscale electrophysiological recordings." Society for Neuroscience (SFN). Chicago, Illinois. October 19, 2015.

"The brain as a dynamical system: An engineering perspective on neuroscience". Department of Bioengineering, University of Illinois at Chicago. September 21, 2015

"The brain as a dynamical system: An engineering perspective on neuroscience". Department of Biomedical Engineering, Georgia Tech. and Emory University, Atlanta, Georgia. August 7, 2015

"Algorithms and nanoscale neural stimulation: Physiologic inspired light adaptation of optoelectronic nanowire stimulation of the neural retina". Society for Neuroscience. Washington D.C. November 19, 2014.

"Neuromimetic algorithms derived from neural dynamics and signaling in the brain". Hughes Research Laboratories. July 10, 2014. Malibu, California.

"Integrating computational neuroscience, algorithms, and neurotechnologies for restoring neural function". American Society of Experimental Neurotherapeutics (ASENT): Science nonfiction in neurotherapeutics. February 20, 2014. Bethesda, Maryland.

"Graph theoretic methods for descriptive and predictive analyses of cellular neural network dynamics" Winter School on Neuromorphic Engineering: dynamics of Multifunction Brain Networks. January 7, 2014. La Jolla, California.

"High density optoelectronic nanowire array selective stimulation of the neural retina: Comparison with other neural stimulation technologies" Society for Neuroscience, San Diego, California. November 10, 2013.

"A roadmap for translational nanomaterials and technologies aimed at restoring neurological function" BioCom 2013, Perth, Australia. October 3, 2013. (Invited plenary lecture.)

"Nanotechnology approaches for neurostimulation and restoring function". Graduate Program in Neurosciences, University of Minnesota. April 12, 2013. (Invited speaker as chosen by the graduate students in the program.)

"The business of nanotechnology" symposium, Materials Research Society (MRS) annual meeting, Boston, Massachusetts, November 26-30, 2012.

"Nanotechnology approaches to manipulating and monitoring neural properties symposium", Society for Neuroscience (SFN) annual meeting, New Orleans, Louisiana, October 13-17, 2012.

"Theoretical, computational, and experimental considerations for mapping dynamic neural network connectivity". q-Bio Summer School, Biocircuits Institute, University of California, San Diego. July 30, 2012. NanoScience and Technology 2012 Annual Meeting. June 18-21, Santa Clara, California.

"Cell signaling in neural networks: Mapping dynamic activity and a nanophotonic interface". 6th edition of the European school on Neuroengineering, Genova, Italy. June 11-16, 2012. (Invited plenary lecture.)

"Where engineering meets ophthalmology: Designing an artificial retina". Department of Ophthalmology, University of California, San Diego. La Jolla, California. March 19, 2012

"Phototransduction and retinal neural stimulation with an ultra-high resolution nanoengineered prosthesis". Engineering Research Center on Sensorimotor Neural Engineering, San Diego State University. March 12, 2012.

"Predicting function from structure in cellular neural networks". Computational Neuroscience Program seminar, University of Chicago. February 21, 2012. (Invited speaker as chosen by the graduate students in the program.)

"Restoring vision with an ultra-high resolution nanoengineered retinal prosthesis". Circle of Sight lecture, Department of Ophthalmology, University of California, San Diego. La Jolla, California. February 8, 2012. Society for Neuroscience, Washington DC, November 12-16 2011.

"Geometric considerations for mapping the dynamic connectivity of cellular neural networks". California Institute of Technology Neuromorphic Engineering Student Society retreat, Laguna Niguel, California. October 22, 2011. (Invited speaker as chosen by the graduate students in the program.)

"Neurobiological challenges facing the use of nanotechnologies and how to overcome them". Nanodrug Delivery: From the Bench to the Patient. Instituto Superiore Di Sanita, Rome, Italy. October 10-13, 2011.

4th Joint Symposium between National Yang Ming University (NYMU) and the University of California, San Diego. August 10-12, 2011.

IEEE International Symposium on Information Theory: Special session on neuroscience and information theory. St Petersburg, Russia. August 2, 2011.

"Mapping functional cellular neural network dynamics and connectivity using GPU's". Computational Neuroscience (CNS) 2011 (CNS2011) workshop: Enabling Super-Computational Neuroscience: Low- Cost GPU-Parallel Analyses And Simulations. Stockholm, Sweden. July 27, 2011.

"Nanotechnological approaches to neurodegenerative disorders". CIC NanoGune and InBioMed Foundation First Nanobiomedicine Seminar. San Sebastian, Guipuzcoa, Spain. April 15, 2011. (Invited plenary lecture.)

"Imaging cellular calcium neural signaling using FRET nanoprobess". ImagineNano 2011. Bilbao, Biscay, Spain. April 14, 2011. (Invited plenary lecture.)

"Mathematical and engineering methods for understanding the dynamics of cellular neural networks". Department of Neuroscience and Brain Technologies, Italian Institute of Technology, Genova, Italy. March 11, 2011.

"Mathematical and engineering methods for understanding the dynamics of cellular neural networks". Department of Physiology, University of Trieste, Italy. March 9, 2011.

"Engineering methods for making sense of the function of neural circuits and networks from cell signaling". Department of Bioengineering, University of Pennsylvania. March 3, 2011.

"Engineering methods for mapping the functional connectivity of cellular neural networks". Department of Bioengineering, University of California, San Diego. February 11, 2011.

"From neural signaling and networks to a theory of brain function". Defense Advanced Research Projects Agency (DARPA) Department of Defense Neural Tools workshop. Arlington, Virginia. November 4, 2010.

"Engineering methods for making sense of the function of neural circuits and networks from cell signaling". Department of Bioengineering, University of Illinois at Chicago. October 8, 2010.

"Mapping the topology of functional neural networks with single cell resolution". The Monte Verita' Workshop: Frontiers in Neuroengineering. Centro Stefano Franscini of the Swiss Federal Institute of Technology (ETH), Zurich, Ascona, Switzerland. September 5-7, 2010.

"Nanotechnology based biosensors for imaging neural cells". Molecular Neuroimaging Symposium. Society for Nuclear Medicine Imaging Center of Excellence and National Institutes of Health, Bethesda, Maryland. May 6, 2010.

"Simulating and mapping the functional topology of cellular neural networks from experimental data". Biocircuits Institute, University of California, San Diego. April 24, 2010. World Conference on Nanomedicine and Drug Delivery. Kottayam, Kerala, India. April 16-18, 2010.

"Where Engineering Meets Neurobiology: Imaging and Mapping the Functional Activity of Neurons, Astrocytes, and Neural Networks". Beverley A. and Clarence J. Chandran Distinguished Lecture, Pratt School of Engineering, Duke University, Raleigh, North Carolina. April 8, 2010. (Invited plenary lecture.)

Symposium for Nanotechnology to the Biological Sciences. University of North Texas, Denton, Texas. April 9, 2010.

"The electroretinogram and electrophysiology of the retina: Theory and practice". Institute for Neural Computation, University of California, San Diego. April 1st, 2010.

International Congress of Antibodies. Beijing, China. March 24-26, 2010.

Global College of Neuroprotection and Neuroregeneration, Uppsala, Sweden. February 28-March 3, 2010.

"Novel nano-agents for drug delivery and in vivo imaging". American Heart Association International Stroke Conference. San Antonio, Texas. February 24-26, 2010.

Entretiens Jacques Cartier colloquium, Building the Nanoworld. Grenoble, France. December 1-4, 2009. BIT Life Science's Annual Congress, Foshan, China. December 1-7, 2009.

"Functionalized quantum dot systems for probing cellular neural function". Biomolecular Science and Engineering, University of California, Santa Barbara. November 18, 2009.

"At the interface between systems and nano scales: Mapping and modeling functional neural network activity at cellular resolution". Sandia National Laboratories, Albuquerque, New Mexico. November 12, 2009.

National Yang Ming University Symposium, Taipei, Taiwan. October 16-17, 2009.

Iberian-American Congress on Chemistry, Biochemistry and Chemical Engineering. Havana, Cuba. October 12-16, 2009.

Nanotechnology in Neuroscience symposium, Electroencephalograph and Clinical Neuroscience Society Meeting, September, Atlanta, Georgia. September 10-12, 2009.

17th Annual Conference on Composites and NanoEngineering, International Community on Composites Engineering. Honolulu, Hawaii. July 26-31, 2009.

2009 Rozman Symposium, West Chester, Pennsylvania. June 10, 2009.

"The need for nanotechnology methods to probe function in biological neural circuits and networks". NanoScience and Technology NanoTech 2009, Houston, Texas. May 5, 2009.

BIT Life Sciences 2nd Annual World Congress of Industrial Biotechnology-2009, Seoul, Korea. April 5, 2009.

"Imaging neural cells with functionalized quantum dots: From structure to function". Global College of Neuroprotection and Neuroregeneration, Vienna, Austria. March 4, 2009. (Invited plenary lecture.)

"An introduction to nanotechnology and its applications to the central nervous system: Implications for neuro-ophthalmology". North American Neuro-Ophthalmology Society, Lake Tahoe, Nevada. February 25, 2009. (Invited plenary lecture.)

"The potential of stem cells in the retina and optic nerve for restoring vision". North American Neuro-Ophthalmology Society, Lake Tahoe, Nevada. February 25, 2009. (Invited plenary lecture.)

"Nanoengineering and computational approaches for investigating the cellular structure and physiology of neural cells". Jacobs School of Engineering Research Expo, University of California, San Diego. February 19, 2009.

"Imaging and deriving the structure and function of neural networks from cells to circuits". University of Alabama, Birmingham. November 7, 2008.

"Functional signaling in neural networks from cells to circuits". Department of Radiology, Emory University and Department of Biomedical Engineering, Georgia Institute of Technology, Atlanta, Georgia. October 29, 2008.

"Discovering and validating drug effects at the physiological level using computational methods". 4th Annual Modern Drug Discovery and Development Summit, San Diego, California. October 15-17, 2008.

6th Annual Congress of International Drug Discovery Science and Technology. Beijing, China. October 18-22, 2008.

100th Year Nobel Award Anniversary of Paul Ehrlich for the Discovery of the Blood Brain Barrier. Nurnberg, Germany. October 3-5, 2008.

"Imaging and deriving the structure and function of neural networks from cells to circuits". Department of Bioengineering, Yale University, New Haven, Connecticut. September 25, 2008.

"Imaging neural cellular anatomy and pathology with chemically functionalized quantum dot nanocrystals". 9th International Conference on Neuroprotective Agents, Marine Biological Laboratories, Woods Hole, Massachusetts. September 10, 2008. (Invited plenary lecture.)

"Imaging the structure and deriving the function of neural networks from cells to circuits". Department of Bioengineering, University of Illinois at Champaign-Urbana. September 4, 2008.

Materials Science Workshop, Korea University, Seoul, Korea. August 29, 2008.

"Mapping the functional connectivity of cellular neural networks in order to investigate how networks represent and store information". Department of Biomedical Engineering, Columbia University, New York City, June 9, 2008.

"Deriving functional signaling structures in cellular neural networks: Implications for both health and disease". Division of Physiology, University of California, San Diego, June 6, 2008.

"Imaging structure and function in cellular neural networks". Yang Ming University-University of California, San Diego symposium, La Jolla, California. April 9, 2008.

"New tools for imaging and quantitatively mapping function in neuronal and glial networks". Department of Bioengineering, University of Southern California, Los Angeles, California. March 31, 2008.

"Imaging astrocytes using functionalized quantum dot nanocrystals". American Society for Neurochemistry, San Antonio, Texas. March 5, 2008.

Royan International Twin Congress: 9th congress on Reproductive Biomedicine and 4th congress on Stem Cell Biology and Technology. Tehran, Iran, January 27-29, 2008.

"Optimizing protocols for imaging neural cells and tissues using functionalized quantum dots". SPIE Quantum Dots for Biomedical Applications, San Jose, California, January 20, 2008.

XII Congress of the Academy of Neurosurgery of Brasil. Sao Paulo, Brazil. December 2-8, 2007.

"Mapping functional signaling in neural networks: Towards a systems neuroscience understanding of health and disease". Department of Bioengineering, University of California, San Diego. October 12, 2007.

"Neural regeneration: A systematic approach". Biomedical Engineering Society (BMES) annual meeting. Los Angeles, California, September 26-29, 2007.

"Imaging vascular and neural retinal pathology using functionalized quantum dots". 10th International Congress on Amino Acids. Chalkidiki, Greece. August 22, 2007.

"Nanotechnology and neuroscience: Opportunities for novel research and therapies". Society of Biological Psychiatry, San Diego, California. May 17, 2007.

"Using nanoengineering and nanotechnology to treat neurological and neurosurgical disorders". Society of Neurological Surgeons, San Francisco, California. May 6, 2007.

"Nanotechnology approaches for investigating and treating the central nervous system". NanoBioNexus, NanoTumor Centers seminar series. March 23, 2007.

International Conference on Neuroplasticity and Neuroregeneration, Bucharest, Romania. March 22-25, 2007.

"Quantitatively mapping the spatial and temporal propagation of functional signaling in glial networks". Gordon Research Conference on Glial Physiology, Ventura, California. March 13, 2007.

"Nanotechnology approaches for neuroprotection and regeneration of the CNS". Association for Ocular Pharmacology and Therapeutics (AOPT), San Diego, California. February 9, 2007.

"Engineering approaches for drug delivery across the blood brain barrier". Drug Discovery, Development, and Delivery for Neurodegenerative Diseases, Alzheimers Drug Discovery Foundation and Institute for the Study of Aging, New York, New York. February 5, 2007.

"Nanoengineering approaches for investigating cellular neurobiology across scales: From individual cells to systems of neural networks". Winter Conference on Brain Research, Snowmass Colorado. January 27, 2007.

Colloidal Quantum Dots for Biomedical Applications II Conference, San Jose, California. January 20-24, 2007.

"Nanotechnology approaches for repairing the central nervous system". 2006 International Conference on Bio and Pharmaceutical Science and Technology. San Diego, California. December 18, 2006.

"Imaging and mapping the dynamic structure of functional glial neural networks". University of Texas at Austin, Texas. November 10, 2006.

"Imaging and mapping the topology of functional neural glial networks". Center for Theoretical Biological Physics, University of California, San Diego and Salk Institute for Biological Sciences. October 20, 2006.

Nanomaterials for Application in Medicine and Biology, NATO Advanced Research Workshop, Bonn, Germany. October 4-10, 2006.

Cognitive Systems Workshop, Sandia National Laboratory and the University of New Mexico, Santa Fe, New Mexico. June 27-29, 2006.

7th Annual University of California System Wide Bioengineering Symposium, University of California, Los Angeles. June 24-26.

"Selective differentiation and imaging of neural progenitor cells using high density epitope nanofibers and quantum dots". Regenerative medicine: Isolation and induction of neural progenitor cells, University of Rostock, Rostock, Germany. June 25, 2006.

"The future of neurotechnology: Cell signaling across spatial scales". The Potomac Institute for Policy Studies workshop on neurotechnology, La Jolla, California. June 19, 2006.

"Nanotechnology contributions to neuroscience and neurology". NanoScience and Technology Institute, Boston, Massachusetts. May 7, 2006.

"Nanotechnology approaches for differentiating stem cells into neural lineages". Society of University Neurosurgeons, Salk Institute for Biological Sciences, La Jolla, California. March 30, 2006.

"Functional signaling between neural cells: From cells to networks". Jacobs School of Engineering Research Expo 2006. February 23, 2006.

"Investigating central nervous system gliosis using nanotechnology". National Amyotrophic Lateral Sclerosis (ALS) Society. Long Island, New York. January 11, 2006.

"Tracking physiological molecular dynamics in neural cells". Powell Foundation Advisory Board, Jacobs School of Engineering, University of California, San Diego. November 9, 2005.

"Tracking molecular dynamics in neurons and glia with functionalized quantum dots". 40th Anniversary Symposium for Bioengineering, University of Illinois at Chicago. September 16, 2005.

"Tracking molecular dynamics in neurons and glia with functionalized quantum dots". Department of Bioengineering, University of Illinois at Urbana-Champaign. September 15, 2005.

"Characterization of previously unknown topologies in glial signaling networks identified by high through-put mapping". Northwestern University Institute for Neuroscience, Chicago, Illinois. May 13, 2005.

"Challenges and opportunities for central nervous system repair by nanotechnology based approaches", International Congress of Nanotechnology, San Francisco, California. November 10, 2004.

"Neural retinal engineering laboratory: Neural engineering through cell biology and molecular engineering", University of California, San Diego, Bioengineering Industrial Review Board. October 8, 2004.

"Neural tissue engineering strategies for regeneration of the central nervous system", Summer Training Academy for Research in the Sciences, University of California, San Diego. August 4, 2004.

"Light adaptation algorithm and neural network implementation for retinal prosthetic devices", von- Liebig Center for Entrepreneurship, University of California, San Diego. June 8, 2004.

"Nanoengineering approaches for reactive gliosis in central nervous system pathologies", Department of Bioengineering, University of California, San Diego. June 4, 2004.

"Introduction to electroretinography: Foundations and applications", Department of Ophthalmology, University of California, San Diego. April 14, 2004.

"Nanotechnology and engineering approaches towards reconstructing the retina", Retina: A vision for the future symposium, dedication of the Jacobs Retina Center, Department of Ophthalmology, University of California, San Diego, November 13, 2003.

"Applying nanoengineering for neuroscience: New approaches for the regeneration of the central nervous system", Department of Bioengineering, University of Wisconsin at Madison. May 11, 2003.

"The use of nanoengineering to replace diseased retinal elements", Department of Ophthalmology, University of California, San Diego. April 15, 2003.

"Applying nanoengineering for neuroscience: New approaches for the regeneration of the central nervous system", Department of Bioengineering, University of California, San Diego. January 11, 2003.

"Applications of nanoengineering to neuroscience", Department of Bioengineering, University of Illinois at Chicago. December 18, 2002.

"Experimental study of mouse rod photoreceptor light adaptation in vivo", Department of Electrical and Computer Engineering, University of Rhode Island. April 26, 2002.

Conference Proceedings and Abstracts

E Vierre and GA Silva (2022) The refraction ratio: Means of binding neuronal activity at scales from cell assemblies to the entire human brain. Science of Consciousness 2022.

V Kurien George, V Morar, A Gupta, W Wang, J Larson, B Tower, S Mahajan, C White, and GA Silva (2021) Learning without gradient descent encoded by the dynamics of a neurobiological model. International Conference on Machine Learning (ICLR) Brain2AI 2021.

P Wang, S Sapna, V Kurien George, and GA Silva (2021) Generalizable latent neural dynamic models discovered using graph neural networks. International Society for Optics and Photonics (SPIE).

JM Roldan and GA Silva (2018) Topology of dynamic perceptrons. Center for Engineered Natural Intelligence (CENI) 2018 Research Review Symposium.

J Kavner, F Puppo, C Trujillo, AR Muorti, and GA Silva (2018) In vitro modeling of autism using the refraction ratio. Center for Engineered Natural Intelligence (CENI) 2018 Research Review Symposium.

A Gupta, V George, and GA Silva (2018) Cracking open the black box of neural networks. Center for Engineered Natural Intelligence (CENI) 2018 Research Review Symposium.

J Ngo and GA Silva (2018) Prismatic tree algorithm. Center for Engineered Natural Intelligence (CENI) 2018 Research Review Symposium.

V George, A Gupta and GA Silva (2018) Ascertaining steady-state statistics of a deterministic neuronal ensemble. Center for Engineered Natural Intelligence (CENI) 2018 Research Review Symposium.

A Gupta, V George, and GA Silva (2018) Cracking open the black box of neural networks. Division of Biology Symposium, University of California San Diego.

V George, F Puppo and GA Silva (2017) Analysis of Network Dynamics an Application to *C. elegans*. Society for Neuroscience (SFN).

F Puppo, V George, and GA Silva (2017) Emergent spatio-temporal tradeoff in axon arbors defines signaling efficiency neurons. Society for Neuroscience (SFN).

N Grayson, V George, F Puppo, and GA Silva (2017) A model of geometric dynamic perceptrons. Society for Neuroscience (SFN).

V George, F Puppo and GA Silva (2017) Analysis of Network Dynamics an Application to C. Elegans. 24th Symposium on Neural Computation, Institute for Neural Computation.

F Puppo, V George, and GA Silva (2017) Emergent spatio-temporal tradeoff in axon arbors defines signaling efficiency neurons. 24th Symposium on Neural Computation, Institute for Neural Computation.

N Grayson, V George, F Puppo, and GA Silva (2017) A model of geometric dynamic perceptrons. 24th Symposium on Neural Computation, Institute for Neural Computation.

K Kilic, H Uhlirova, P Tian, M Thunemann, M Desjardins, P Saisan, S Sakadzic, V Ness, C Mateo, Q Cheng, KL Weldy, F Razoux, M Vandenberghe, JA Cremonesi, CG Ferri, K Nizar, VB Sridhar, TC Steeds, M Abashin, Y Fainman, E Masliah, S Djurovic, OA Andreassen, GA Silva, DA Boas, D Kleinfeld, RB Buxton, GT Einevoll, AM Dale, A Devor (2016) The selective role of cortical inhibitory interneurons in functional hyperemia. Society for Neuroscience.

C Zane, J Lim, S Brown, M Keller, J Bugbee, FD Broccard, M Khraiche, GA Silva, and G Cauwenberghs (2015) Bidirectional neural interface: Closed loop feedback control for hybrid neural systems. IEEE Engineering in Medicine and Biology Society (EMBC), Milano, Italy.

M Khraiche, L Cheng, GA Silva and WR Freeman (2014) A nano-engineered light sensitive retinal prosthesis. American Society of Retinal Surgeons (ASRS).

M Khraiche, L Cheng, WR Freeman and GA Silva (2014) Evaluation of high efficiency optoelectronic nanowires in rabbits. BioMedical Engineering Society (BMES).

M Khraiche, GA Silva, and WR Freeman (2014) Evaluation of a high density photovoltaic nanowire based retinal prosthesis in rabbits. Association for Research in Vision and Ophthalmology (ARVO).

M Khraiche, L Cheng, Y Jing, GA Silva, and WR Freeman (2014) Functional and histological evaluation of a high-density optoelectronic nanowires in rabbits. University of California System Wide Bioengineering Symposium.

N Bhattacharya and GA Silva (2013) An efficient finite difference approach to solving the time-fractional diffusion equation. Society for Neuroscience.

M Khraiche, SE Emam, A Akinin, G Cauwenberghs, WR Freeman, GA Silva (2013) Visual evoked potential characterization of a rabbit animal model for retinal prosthesis research. IEEE Engineering in Medicine and Biology Society 2013:3539-3542.

H Uhlirova, S Sakadzic, K Nizar, MA Yaseen, PA Saisan, Q Cheng, K Weldy, L Reznichenko, MA Yupei, GA Silva, Y Yanagawa, KA Kasischke, SA Vinogradov, AM Dale, E Masliah, DA Boas, and A Devor (2013) Regulation of cellular metabolism by variation in O₂ availability: 2-photon imaging of NADH in cerebral cortex in vivo. Society for Neuroscience.

B Maranhao, P Biswas, GA Silva, JRHeckenlively, SARiazuddin, PL Lee, R. Ayyagari. (2013) exome-Suite: A whole exome variant filtering software for identification of disease causing variants. Association for Research in Vision and Ophthalmology (ARVO).

ML Khraiche, D Wang, G Cauwenberghs, D Wang, Y Lo, WR Freeman, and GA Silva (2012) Ultrahigh photosensitivity silicon nanophotonics for retinal prosthesis. Association for Research in Vision and Ophthalmology (ARVO).

ML Khraiche, Y Jing, S HA, Y Lo, WR Freeman, EJ Chichilnisky, D Wang, G Cauwenberghs, GA Silva (2012) Silicon nanophotonics for the replacement of the damaged photoreceptors in diseased retinas. Society for Neuroscience.

S. Damle, ML Kraiche, P Nguyen, JP Blumling, S Reiss, S Tandon, G Cauwenbergh, and GA Silva (2012) Optimization of surface roughness of flexible neural implants. Society for Neuroscience.
HG Saad and GA Silva (2012) Modeling heterogeneous dynamics and plasticity in cortical pyramidal cells. Society for Neuroscience.

S Ha, ML Khraiche, GA Silva, and G Cauwenberghs (2012) Direct inductive stimulation for energy efficient wireless neural interfaces. IEEE Engineering in Medicine and Biology Society 2012:883-886.

P Tian, H Uhlirova, Q Cheng, K Weldy, P Saisan, K Nizar, TC Steed, VB Sridhar, GA Silva, AM Dale, A Devor (2012) Spatial gradient of vasodilation kinetics in the mouse somatosensory cortex. Society for Neuroscience.

H Sadd and GA Silva (2012) At the interface of detail and abstraction: Modeling heterogeneous dynamics and plasticity in cortical pyramidal cells. Jacobs School of Engineering Research Expo.

ML Khraiche, D Wang, G Cauwenberghs, Y Lo, WR Freeman, and GA Silva (2011) Ultrahigh photosensitivity silicon nanophotonics for retinal prosthesis: Electrical characteristics. IEEE Engineering in Medicine and Biology Society 2011:2933-2936.

ML Khraiche, Y Lo, D Wang, G Cauwenberghs, WR Freeman, and GA Silva (2011) Ultra high photosensitivity vertical nanowire arrays for retinal prosthesis. Biomedical Engineering Society (BMES 2011)

S Ha, ML Khraiche, GA Silva, and G Cauwenberghs (2011) Wireless inductive link for nanoengineered retinal prosthesis. Biomedical Circuits and Systems Conference (BIOCAS 2011)

H Saad and GA Silva (2011) The emergence of functional connectivity patterns bound by an underlying structural connectivity substrate. Society for Neuroscience.

ML Khraiche, D Wang, G Cauwenberghs, Y Lo, WR Freeman, and GA Silva (2011) Ultrahigh photosensitivity silicon nanophotonics for retinal prosthesis. Society for Neuroscience.

M Buibas, J Cui, J Quinn, HDI Abarbanel, A Devor, and GA Silva (2011) Nonparametric estimation of neuronal time series: current from voltage and spikes from calcium. Society for Neuroscience.

B Maranhao and GA Silva (2011) Assessing predictive capability of neuronal network models by computing Lyapunov exponents. Computational Neurosciences (CNS) 2011.

H Saad and GA Silva (2011) The emergence of functional connectivity patterns bound by an underlying structural connectivity substrate. Computational Neurosciences (CNS) 2011.

T Hong, T Dai, M Khraiche, and GA Silva (2011) The effect of carbon nanotubes on the biocompatibility and electrical activity in the growth and development of neurons. American Society of Mechanical Engineers (ASME) Dayton Engineering Sciences Symposium (DESS) Symposium.

M Buibas and GA Silva (2010) Mapping functional connectivity of neural networks from calcium data: A unified simulation and estimation framework with parallel CPU/GPU implementation. Society for Neuroscience.

CL MacDonald and GA Silva (2010) The biophysical basis of glutamate and amyloid-beta mediated spontaneous intercellular calcium waves in astrocytes. Society for Neuroscience.

H Saad and GA Silva (2010) Multimodal information encoding in astrocytes. Society for Neuroscience.

BP Sprouse, CL MacDonald and GA Silva (2010) Computationally efficient simulation of fractional order ATP diffusion in glial networks. Society for Neuroscience.

J Cui, M Buibas, CL MacDonald, HDI Abarbanel, and GA Silva (2010) Estimation of spiking rates from intracellular calcium signals using balanced synchronization. Society for Neuroscience.

J Blumling and GA Silva (2010) Novel molecular tubes as membrane sensors and channels in neurons and astrocytes. Society for Neuroscience.

MC Davidson, S-J Kim, and GA Silva (2010) Site-directed mutagenesis of calmodulin for a quantum dot-FRET sub-cellular calcium sensor. Society for Neuroscience.

CL MacDonald and GA Silva (2010) Temporally delayed spontaneous calcium waves in a theoretical model of astrocyte glial signaling. Society for Neuroscience.

K Nizar, L Reznichenko, Q Cheng, S Sakadzic, DA Boas, E Masliah, AM Dale, GA Silva, and A Devor (2010) Unreliable and delayed astrocytic calcium response does not support the hypothesis of calcium dependent astrocytic regulation of blood flow. Society for Neuroscience.

J Blumling, H Saad, S-Y Eun, S-J Kim, and GA Silva (2010) Calcium and EDTA induced folding and unfolding of calmodulin on functionalized quantum dot surfaces. IEEE 10th International Conference on Nanotechnology and Nano Korea 2010.

CW Evans, M Fitzgerald, TD Clemons, BS Padman, JAS Harrison, CA Bartlett, JA Shaw, M Saunders, GA Silva, MJ House, SA Dunlop and KS Iyer (2010) Neuronal endocytosis of multifunctional polymer nanospheres Australian Neuroscience Society.

ML Khraiche, GA Silva, G Cauwenberghs, WR Freeman, D Wang, and Y Lo (2010) Ultra-high photo-sensitivity vertical nanowire arrays for retinal prosthesis. Biomedical Engineering Society (BMES 2010).

ML Khraiche, GA Silva, G Cauwenberghs, WR Freeman, D Wang, and Y Lo (2010) Ultra-high photosensitivity vertical nanowire arrays for retinal prosthesis. Society for Neuroscience (SFN 2010).

ML Khraiche, GA Silva, G Cauwenberghs, WR Freeman, D Wang, and Y Lo (2010) Ultra-high photo-sensitivity vertical nanowire arrays for retinal prosthesis. Neural Interfaces 2010.

H Saad, M Buibas, and GA Silva (2009) Quantifying information in neuronal networks. Society for Neuroscience.

M Buibas, S-J Kim, Jay Blumling, K Nguyen, and GA Silva (2009) Construction and Characterization of Quantum dot-Calmodulin Calcium Sensor. Society for Neuroscience.

J Blumling, S-J Kim, K Nguyen, and GA Silva (2009) Multifunctionalized quantum dot-based sensors for neural network interrogation. Society for Neuroscience.

K Nguyen, J Blumling, S-J Kim, and GA Silva (2009) Intracellular delivery of quantum dots using cell penetrating peptides and antimicrobial peptides. Society for Neuroscience.

K Nguyen, I Kozak, MC Davidson, WR Freeman, and GA Silva (2009) Distribution of anti-VEGF molecules in ARPE-19 cells using quantum dot labeling. Association for Research in Vision and Ophthalmology.

H Saad, C MacDonald, K Chiao, and GA Silva (2009) Continuous Real-Time Image and Electrophysiological Recording and Processing. Jacobs School of Engineering Research Expo.

CL MacDonald, KW Chaio, D Creveling, HDI Abarbanel, and GA Silva (2009) Nonlinear estimation of neuronal spike rates calcium measurements. Jacobs School of Engineering Research Expo.

M Buibas and GA Silva (2009) Advances in a spatial filtering model for mapping biological neural networks. Jacobs School of Engineering Research Expo.

GA Silva and J Blumling (2008) A nano/micro drug delivery device for non-invasive controlled and tunable drug delivery to the retina. Early Career Awardee Meeting, Coulter Foundation for Biomedical Research.

CL MacDonald, KW Chaio, D Creveling, HDI Abarbanel, and GA Silva (2008) Nonlinear estimation of spike rates from neuronal intracellular calcium signals. Society for Neuroscience.

KW Chaio and GA Silva (2008) Geometric and physiological properties spontaneously forming neuron networks. Society for Neuroscience.

S Pathak and GA Silva (2008) High resolution labeling of proteins implicated in central nervous system injury and disease using quantum dot nanocrystals. NanoScience and Technology Institute.

J Nissimov, MC Davidson, M Li, and GA Silva (2008) IL-6 and related cytokines induce gliosis in glial cell culture. 2008 Annual Scientific Meeting of the American Geriatrics Society.

GA Silva and S Pathak (2008) Optimizing protocols for imaging neural cells and tissues using functionalized quantum dots. SPIE Quantum Dots for Biomedical Applications.

F. Mojana, L. Cheng, D.-U.G. Bartsch, GA Silva, I. Kozak, N. Nigam, W.R. Freeman (2008) Abnormal vitreoretinal Interface in age-related macular degeneration: A spectral OCT study and preliminary surgical outcomes. Association for Research in Vision and Ophthalmology.

S Pathak, MC Davidson, and GA Silva (2007) Choroidal neovascularization lesion labeling and quantification using quantum dots. Society for Neuroscience.

D Yu, M Buibas, Z Singer, and GA Silva (2007) Characterization of perturbed intercellular Ca²⁺ transient propagation in spinal cord astrocyte networks. Society for Neuroscience.

D Yu, M Buibas, Z Singer, S Chow, I Lee, and GA Silva (2007) Quantitative characterization of perturbations to intercellular Ca²⁺ transient propagations in glial networks in vitro. Society for Neuroscience.

D Yu, M Buibas, Z Singer, S Chow, I Lee, and GA Silva (2007) Characterization of pharmacological perturbations to intercellular calcium transient propagations in glial networks in vitro. University of California System Wide Bioengineering Symposium.

M Buibas and GA Silva (2007) Mapping and characterization of functional networks with single cell resolution. Society for Neuroscience.

MC Davidson, Z Singer, E Ai, and GA Silva (2007) IL-6 induces gliosis in rMC-1 cell cultures. Society for Neuroscience.

K Chaio and GA Silva (2007) The role of glial network calcium dynamics in neurological disorders. Society for Neuroscience.

GA Silva (2007) Nerve innervations: A systematic approach. Biomedical Engineering Society.

C MacDonald, D Yu, M Buibas, and GA Silva (2007) Dynamic model of glial signaling. Biomedical Engineering Society.

S Pathak, MC Davidson, and GA Silva (2007) Functional binding properties of antibody conjugated quantum dots and applications to the neural retina. Biomedical Engineering Society.

GA Silva (2007) Imaging vascular and neural retinal pathology using functionalized quantum dots. 10th International Congress on Amino Acids.

C Sharp, S Pathak, MC Davidson, and GA Silva (2007) Quantum dot labeling of retinal tissue sections. NanoScience and Technology Institute.

D Yu, M Buibas, SK Chow, GA Silva (2007) An in vitro model of spontaneously forming glial networks for studying intercellular signaling properties. University of California, San Diego, Jacobs School of Engineering Research Expo.

S Pathak, MC Davidson, C Sharp, and GA Silva (2007) Functionalized quantum dot characterization and applications in neuroscience. NanoScience and Technology Institute Nanotech 2007.

M Buibas, H Khanna, D Yu, SD Larson, and GA Silva (2006) Mapping the structure of dynamic networks and applications to biological neural networks. 2006 Biomedical Engineering Society Annual Meeting.

S Pathak, MC Davidson, C Sharp, and GA Silva (2006) Functionalized Quantum Dot Characterization, Quantification, and Applications in Neurosciences. 2006 Biomedical Engineering Society Annual Meeting.

D Yu, M Buibas, and GA Silva (2006) An in vitro model for quantitative analysis of calcium transients in glial networks. 2006 Biomedical Engineering Society Annual Meeting.

S Pathak and GA Silva (2006) High resolution optical imaging of neural cells using functionalized quantum dots. 28th Annual Symposium at the Burnham Institute for Medical Research.

MO Buibas and GA Silva (2006) Mapping the structure of neuronal and glial networks. University of California, San Diego, Jacobs School of Engineering Research Expo.

S Pathak and GA Silva (2006) Quantum dot nanocrystals in neuroscience. University of California, San Diego, Jacobs School of Engineering Research Expo.

D Yu and GA Silva (2006) Calcium signaling of neuronal and glial networks on a microfluidic device. University of California, San Diego, Jacobs School of Engineering Research Expo.

GA Silva (2006) Nanotechnology contributions to neuroscience and neurology. NanoScience and Technology Institute Nanotech 2006 Conference Proceedings.

S Pathak, E Cao, MC Davidson, S Jin, GA Silva (2006) Quantum dot nanocrystals in neuroscience. NanoScience and Technology Institute Nanotech 2006 Conference Proceedings.

BG Cordero, MC Davidson, J Schallhorn, GA Silva (2005) Modulation of reactive gliosis by siRNA. Society for Neuroscience Abstracts.

GA Silva and B Culp (2005) High throughput algorithms for mapping the topology of neuronal and glial networks. IEEE/EMBS Neural Engineering Conference.

J Schallhorn, Y Valenzuela, M Davidson, GA Silva (2005) Development and characterization of a novel reactive gliosis cell culture model. International Congress of Physiological Sciences.

Diana Yu, Mai Ho, M Davidson, GA Silva (2005) Surface chemistry effects on the morphology of mesenchymal stem cells. International Congress of Physiological Sciences.

B Culp, GA Silva (2005) Development of high throughput algorithms to map the network structure of biological neural networks. University of California, San Diego, Jacobs School of Engineering Research Review.

S Pathak, GA Silva (2005) Application of functionalized quantum dots to macroglial neural cells. University of California, San Diego, Jacobs School of Engineering Research Review.

D. Yu, GA Silva (2005) Engineered transplantation approaches of adult stem cells for degenerative retinal disorders. University of California, San Diego, Jacobs School of Engineering Research Review.

M Ho, GA Silva (2005) Development of differentiation strategies and characterization of adult stem cells for degenerative retinal disorders. University of California, San Diego, Jacobs School of Engineering Research Review.

J Schallhorn, GA Silva (2005) Development of a novel quantitative cell culture model of central nervous system reactive gliosis. University of California, San Diego, Jacobs School of Engineering Research Review.

Y Valenzuela, J Schallhorn, GA Silva (2004) A novel cell culture model of reactive gliosis. Society for Advancement of Chicanos and Native Americans in Science.

KL Niece, C Czeisler, GA Silva, JD Hartgerink, JJJM Donners, JA Kessler, and SI Stupp (2004) Presentation of two neurobiological epitopes in self-assembling peptide amphiphile gels. Gordon Research Conference, Signal Transduction by Engineered Extracellular Matrices.

GA Silva and B Culp (2004) Neural encoding of the rod photoreceptor response. Association for Research in Vision and Ophthalmology Abstracts.

JJJM Donners, SG Anthony, HA Behanna, GA Silva, and SI Stupp (2004) Growth factor binding self- assembling nanofiber networks for tissue regeneration. American Chemical Society Abstracts.

C Czeisler, VM Tysseling-Mattiace, GA Silva, SI Stupp, and JA Kessler (2003) Behavioral improvement and increased survival rate after treatment with a self-assembling gel in a rat model of spinal cord. Society for Neuroscience Abstracts.

GA Silva, KL Kehl, KL Niece, and SI Stupp (2003) Nanoengineered peptide amphiphile network for photoreceptor replacement in degenerative retinal disorders. Association for Research in Vision and Ophthalmology Abstracts.

GA Silva, C Czeisler, KL Niece, E Beniash, JD Hartgerink, JA Kessler, and SI Stupp (2002) Development of neural progenitor cells encapsulated in a peptide amphiphile substrate that is induced to self-assemble under physiological conditions. Society for Neuroscience Abstracts.

GA Silva, JC Stendahl, C Czeisler, TA Neideen, RC Claussen, JA Kessler, and SI Stupp (2002) Semi- dissociated mixed retinal cultures grown on a fibrous scaffold modified by self- assembling molecules containing L-lysine. Association for Research in Vision and Ophthalmology Abstracts.

GA Silva, and DR Pepperberg, D.R. (2001) Model of light adaptation of mouse rod photoreceptors based on paired-flash and step-plus-probe ERG data. Association for Research in Vision and Ophthalmology Abstracts 42: S368.

GA Silva, JR Hetling, and DR Pepperberg (2000) Electoretinographic determination of the response of mouse rods in vivo to a step of light. Association for Research in Vision and Ophthalmology Abstracts 41: S493.

JR Hetling, GA Silva, and DR Pepperberg (2000) Temporal properties of a gain parameter describing the rod flash response in the presence and absence of a background light. Association for Research in Vision and Ophthalmology Abstracts 41:S493.

GA Silva, E Theriault, and C Feeney (1997) Expression of group I and II metabotropic glutamate receptors in rat spinal cord astrocytes in vitro. Society for Neuroscience Abstracts 23:1489.

E Theriault, S Mortin-Toth, C Feeney, and GA Silva, (1997) Developmental expression and glial localization of group I and II metabotropic glutamate receptors in the rat spinal cord. Society for Neuroscience Abstracts 23:1489.

GA Silva, LR Mills, and E Theriault (1997) Developmental expression and functional assessment of Group I (mGluR1 and 5) and II (mGluR2 and 3) metabotropic glutamate receptors in rat spinal cord astrocytes in vitro and in situ. University of Toronto-McGill University Graduate Student Conference 1:12.

GA Silva, LR Mills, and E Theriault (1997) Developmental expression of group I and II metabotropic glutamate receptors in rat spinal cord astrocytes in vitro. *Frontiers in Physiology Research Symposium* 10: 25.

Industry

Start Up Companies

Level7, Co-Founder, General Partner, and Head of Asset Acquisitions (2017 to 2019)

Catapult Services Inc., Co-Founder and Chief Scientist (2017 to 2019)

Nanovision Biosciences Inc., Co-Founder and Executive Director (2011 to 2019)

Nanovision Biosciences Inc., Chief Scientific Advisor (2011-2016)

GraphTrak Inc., Founder, Executive Director and Chief Scientific Advisor (2009-2011)

BPT Pharmaceuticals Inc., Co-Founder and Scientific Advisor (2009-2011)

Advisory Boards

Scientific Advisory Board, enterBRAINment, Valletta, Malta (2020 to 2022)

Medical Advisory Board, Wholistic Research Foundation, La Jolla California (2017 to present)

Scientific Advisory Board, Exceleation Capital LLC, La Jolla California (2016 to 2018)

Scientific Advisory Board, Corto.ai, Beverley Hills, California and Hong Kong (2016 to 2018)

Scientific Advisory Board, Integrative Neural Technologies Inc., Irvine, California (2006-2008)

Scientific Advisory Board, Touch Briefing. London, England, scientific advisory board (2006)

Scientific Advisory Board, iMediaSoft, Grenoble Cedex, France (2005-2007)

Other Consulting

IntraWorks, Las Vegas, Nevada 92024 to present)

AlwaysAi, Cardiff, California (2023 to present)

Chronos AI, Los Angeles, California (2023 to present)

Neptune ASC Inc., Washington DC (2019 to present)

Otonomy Inc., San Diego, California (2008-2009)

NanoBioNexus, scientific advisory board, La Jolla, California (2007-2011)

Defined Health, Morristown, New Jersey (2006)

Cyntellect Inc. San Diego, California (2005-2009)

Excellin Life Sciences. Menlo Park, California (2005)

EyeOn Inc. Rochester, New York (2005)

Health Tech Inc. San Francisco, California (2004)

NanoMateria Inc. Chicago, Illinois (2002)

Editorial Responsibilities

Editor-in-Chief

World Scientific Press upcoming four volume set on brain research.

Associate Editor

Nature Scientific Reports (2023 to present)

Frontiers in Neuroscience, Neural Technology (2022 to present)

Frontiers in Computational Neuroscience (2020 - Guest Editor)

Section editor, IEEE EMBS Neural Engineering conference (2021)

Frontiers in Neuroengineering (2008 to present)

Journal of Biomedical Nanotechnology (2007 to present)

IEEE Transactions on Nanobioscience (2004 to present)

Editorial Board Member

Nature Scientific Reports (2023 to present)

Electronics, Bioelectronics Section (2020 to present)

Journal of Network Medicine and Targeted Therapies (2017 to present)

Journal of Bioengineering and Biomedical Sciences (2014 to present)

CNS Drug-Target (2012 to present)

Dataset Papers in Medicine, ophthalmology section (2012 to present)

Frontiers in Fractal Physiology (2011 to present)

Journal of Tissue Science and Engineering (2011 to present)

World Journal of Neurology (2011 to present)

ISRN Nanotechnology (2011 to present)

Journal of Bioengineering and Biomedical Sciences (2010 to present)

American Journal of Neuroprotection and Neuroregeneration (2009 to present)

Current Nanoscience (2009-2013)

International Journal of Nanotechnology and Molecular Computation (2008 to present)

Experimental Biology and Medicine (2006 to 2021)

Journal of Nanoneuroscience (2007 to present)

Special Issue Invited Guest Editor

'Quantum machine learning', Nature Scientific Reports (2024)

'The role of mathematics and theory in understanding the brain' Research Topic, Frontiers in Computation Neuroscience (2014)

Drug Discovery Today: Disease Models (2008)

Combinatorial Chemistry and High Throughput Screening (2006, declined)

Frontiers in Bioscience (2006, declined)

Reviewed Manuscripts

American Chemical Society (ACS) Chemical Neuroscience

Annual Review and Research in Biology

Cerebral Cortex

Chemical Society (ACS) Nano

Annals of Biomedical Engineering

Acta Biomaterialia

Applied Physics Letters Biomacromolecules

Biomaterials

Biomedical Materials

Biotechnology Progress

Bioconjugate Chemistry

Cellular and Molecular Bioengineering

ChemBioChem

Chemical Physics Letters

Clinical Medicine: Oncology

Clinical Ophthalmology

Computer Methods and Programs in Biomedicine

CRC Press

Current Drug Delivery

Current Medicinal Chemistry

Current Nanoscience

Developmental Neurobiology

Drug Discovery Today

Entropy

Experimental Biology and Medicine

Experimental Eye Research

Expert Opinion on Drug Delivery

Eye and Brain

Frontiers in Computational Neuroscience

Frontiers in Neural Engineering

Frontiers in Neuroscience

Glia

IFAC Workshop on Fractional Derivatives and Applications

IEEE Transactions on Biomedical Engineering

IEEE Transactions on Neural Systems and Rehabilitation Engineering

International Journal of Molecular Sciences

International Journal of Nanomedicine

Interface Focus

ISRN Nanotechnology

Journal of the American Chemical Society (JACS)

Journal of Biomaterials Research, Part A

Journal of Biomaterials Science, Polymer Edition

Journal of Biomedical Nanotechnology

Journal of Cell Transplantation

Journal of Controlled Release

Journal of Electronics Engineering Research

Journal of Luminescence

Journal of Histochemistry and Cytochemistry

Journal of Neurochemistry

Journal of Neural Engineering

Journal of Neurological Sciences

Journal of Neuroscience

Journal of Neuroscience Research

Mathematical Biosciences

Medical Devices: Evidence and Research

Medical Principles and Practice

Medicinal Research Reviews

Medical Science Monitor

Nanotechnology, Science, and Applications

Nano Letters

Nanomedicine

Nanotoxicology

Nature Communications

Nature Materials

Nature Methods

Nature Reviews Neuroscience

Nature Scientific Reports

Nature Nanotechnology

Nano Today

Neoplasia

Network Neuroscience

Neural Computing and Applications

Neuroimage

Neurophotonics

PLOS One

Proceedings of the National Academy of Sciences (PNAS)

Progress in Neurobiology

Recent Patents on Anti-Cancer Drug Discovery

Recent Patents on Nanomedicine

Retina

Small

Soft Matter

Surgical Neurology

Systems Biology and Medicine

Therapeutic Delivery

Tissue Engineering

Reviewed Grants**National**

National Science Research Council of Canada, Quantum Computing Alliance (NSERC, 2023)

Mathematical Biology (panel ID P200433), National Science Foundation (NSF, 2019)

Galvanizing Engineering in Medicine (GEM) program, University of California (2017)

National Institutes of Health (NIH) Special Emphasis Panel ZRG1 MDCN-G (91) (2016)

National Institutes of Health (NIH) Director's Transformative Research Award (TRA; 2016)

National Science Foundation (NSF) Robust Intelligence Program Division of Information and Intelligent Systems (2016)

National Institutes of Health (NIH), BRAIN Initiative study section: Technologies for large scale recordings (2014 and 2015)

National Institutes of Health (NIH), Bioengineering Neuroscience and Low Vision Technologies study section (2012)

National Institutes of Health (NIH), Neurotechnology study section (2004 to 2011)

Vision Research Program (VRP), Telemedicine and Advanced Technology Research Center (TATRC), United States Army Medical Research and Materiel Command (USAMRMC) (2012)

Neurosciences Collaborative, American Association for the Advancement of Science (AAAS, 2010)

Alzheimer's Association (2009)

National Institutes of Health (NIH), Nanotechnology study section (2007)

National Institutes of Health (NIH), Neurogenetics study section (2007)

Citizens United for Research in Epilepsy (CURE, 2007)

US Army Medical Research and Materiel Command (USAMRMC, 2007-2008)

National Science Foundation (NSF), Graduate Research Fellowship Program (2006)

US Department of Defense, Air Force Office of Scientific Research (AFOSR, 2006)

Nanotechnology Integrated Research, National Science Foundation (NSF, 2006)

Nanoscale Exploratory Research, National Science Foundation (NSF, 2004-2005)

International

Nazarbayev University Research Council, Astana, Kazakhstan (2021)

German Research Foundation (2021)
 New Frontiers in Research Fund, Canadian Institutes of Health Research (CIHR). Natural Sciences and Engineering Research Council of Canada (NSERC), and the Social Sciences and Humanities Research Council (SSHRC; 2020)
 Wellcome Trust, UK (2018)
 Israel Science Foundation (ISF; 2016)
 Wellcome Trust and India Alliance Fellowship (2013)
 French National Research Agency (2013)
 Medical Research Council (MRC), UK (2013)
 French National Alliance for Life and Health Sciences (AVIESAN; 2012)
 French National Cancer Institute (INCa) (2012)
 Alliance Nationale Pour les Sciences de la Vie et de la Sante, Paris, France (2012)
 Institut National de la Sante et de la Recherche Medicale (National Institute for Health and Medical Research), Paris, France (2012)
 Human Frontier Science Program, France (2010) Biomedical Research Council (BMRC), Singapore (2010)
 Fondazione Cassa di Risparmio di Pisa, Italy (2010) US-Israel Binational Science Foundation (2010)
 The National Institute for Nanotechnology, National Research Council of Canada (2009)
 Alberta Ingenuity Fund, Canada (2008)
 Grants Research Council (GRC) of Hong Kong (2008)
 Science Foundation Ireland (SFI), Investigator Program Grant, Dublin, Ireland (2006)

Service

All listed committees and service were at the University of California, San Diego, unless otherwise noted

Department of Bioengineering space committee (2023)
 Division of Biological Sciences 5-year Dean review committee (2023)
 Associate Director, Kavli Institute for Brain and Mind (2022 to present)
 Irish Research Council (IRC) Laureate Award review (2021)
 Jacob's School of Engineering Dean's Executive Faculty Committee (2021-2022)
 Expert Panelist, Fund Consciousness Science (<https://sites.google.com/uci.edu/fundconsciousness>; 2021 to present)
 Department of Bioengineering Divisional Representative Assembly, Academic Senate (2021-2022)
 Galvanizing Engineering and Medicine (GEM) review committee (2020)
 Jacobs School of Engineering Artificial intelligence engineering curriculum committee (2019)

Jacobs School of Engineering Resources and Budget/New Resource Opportunities committee (2019)

Founding Director, Medical Specialization-Bioengineering Masters of Science Program (2018 to 2019)

Chair, Department of Bioengineering communications committee (2018 to 2019)

Medical Advisory Board, Wholistic Research and Education Foundation (2018 to present)

Jacobs School of Engineering faculty advisory committee on branding (by invitation of the Dean; 2017)

Institute for Global Entrepreneurship (IGE) faculty advisor (2017)

Bioengineering Institute of California (BIC) University of California alternate faculty representative (2017 to present)

Department of Bioengineering Faculty Advisory Council (2016 to present)

Advisory Committee, Center for Multiscale Imaging of the Brain (2016 to present)

Jacobs School of Engineering Dean's space development committee (2015 to present)

School of Medicine 'Informatics and Systems Medicine' faculty search committee (appointed by the Dean; 2015)

Advisory committee, The National Chiao Tung University (NCTU), National Yang Ming University (NYMU), and Taipei Veterans General Hospital (VGHTPE) Center for Integrative and Translational BioEngineering (CITBE) (2015)

Advisory committee, Ahemedabad University biomedical engineering initiative, Ahemedabad, Gujarat, India (2015)

Department of Bioengineering faculty retreat organizer (2015)

Vice Chair for Research and Development, Department of Bioengineering (2014 to present)

Acting Chair, Department of Bioengineering (various dates throughout 2014-2015)

Kavli Institute for Brain and Mind (KIBM) Organized Research Unit (ORU) review committee (2014-2015)

Advisory board for the 10th International Conference on Medical Applications of Novel Biomaterials and Nanobitechnology. Montecatini Terme, Tuscany, Italy (2013-2014)

Society for Neuroscience (SFN) annual meeting symposium chair: "Nanotools for neuroscience" (2013)

Society for Neuroscience (SFN) annual meeting symposium chair: "Brain-machine interfaces" (2013)

Department of Bioengineering By-Laws formation committee (2012)

Session Organizer and Chair, "The need for the emergence of mathematical neuroscience", in Methods of Information Theory in Computational Neuroscience workshop, Computational NeuroScience (CNS) meeting (2012)

BioCircuits Institute ad hoc faculty review committee chair (2012)

Department of Bioengineering ad hoc faculty review committee chair (2012-2013)

Theme co-chair, IEEE Engineering in Medicine and Biology Society annual meeting (2012)

InfoBioMed advisory board, San Sebastian, Spain (2011 to present)

BioCircuits Institute, University of California, San Diego executive advisory committee (2011 to present)

Faculty promotion review committee, BioCircuits Institute, University of California, San Diego (2011)

Executive advisory board, International Conference on Neuroprotective Agents (ICNA; 2010 to present)

Executive advisory board, Institute for Engineering in Medicine (IEM), University of California, San Diego (2010 to present)

Computational neuroscience graduate program executive committee, University of California, San Diego (2010)

Department of Ophthalmology chair search committee, University of California, San Diego (2010-2011)

Institute of Engineering in Medicine (IEM) advisory board, University of California, San Diego (2010 to present)

Neuroimaging section moderator, IEEE EMBS Forum on Grand Challenges in Neuroengineering meeting (2010)

Department of Bioengineering faculty search committee, University of California, San Diego (2010-2011)

Department of Bioengineering space committee, University of California, San Diego (2010)

Department of Bioengineering faculty ad-hoc review committee, University of California, San Diego (2009)

Navy Space and Warfare Systems Command (SPAWAR)-University of California networks workshop organizer (2009)

Defense Advanced Research Program Agency (DARPA), United States Department of Defense (DOD) Neural Engineering invited workshop (2009)

Departments of Bioengineering and Mechanical Engineering joint faculty recruitment committee (2009)

Department of Bioengineering Lecturer recruitment committee (2009)

Jacobs Scholars selection committee, University of California, San Diego (2009)

University of California, San Diego and Salk Institute for Biological Sciences joint faculty recruitment committee (2008)

Symposium Chair, Quantitative Pharmacokinetics and Pharmacodynamics Analysis in Drug Development session, Drug Discovery and Development Summit, La Jolla, California (2008)

Co-director, Undergraduate Program, Department of Bioengineering, University of California, San Diego (2008 to 2010)

Defense Advanced Research Program Agency (DARPA), United States Department of Defense (DOD) Human Assisted Neural Devices (HANDS) invited workshop (2008)

Department of Bioengineering joint graduate-undergraduate curriculum revision, University of California, San Diego (2008)

Department of Bioengineering graduate curriculum revision, University of California, San Diego (2008)

MD-PhD Medical Scientist Training Program (MSTP)-Department of Bioengineering liaison, University of California, San Diego (2008)

Department of Psychiatry Resident Research Program interviewer, University of California, San Diego (2008)

National Institute for Neurological Disorders and Stroke (NINDS) Blood Brain Barrier Nanotechnology program development, National Institute of Health (NIH, 2007)

Institute for Non-Linear Science (INLS) Organized Research Unit (ORU) steering committee, University of California, San Diego (2007)

University of California, San Diego Academic Senate, Department of Bioengineering co-representative (2007 to present)

Symposium Chair, Nanotechnology to Neuroscience session, Nano Science and Technology Institute (NSTI) (2007 to present)

Bioengineering Graduate Students (BEGS) society faculty advisor, Department of Bioengineering, University of California, San Diego (2007-2008)

University of California, San Diego Office of Academic Diversity and Equal Opportunity (OADEO) Department of Bioengineering faculty representative (2007 to present)

Yang Ming University/University of California, San Diego symposium (2008)

Graduate Studies Committee, Department of Bioengineering, University of California, San Diego (2007- 2008)

Department of Defense (DOD) Defense Advanced Research Projects Agency (DARPA) Neural Engineering Invited Workshop (2007)

Academic Senate Sub-Committee on Research, University of California, San Diego (2006 to present)

Teaching assistant (TA) faculty advisor, Department of Bioengineering, University of California, San Diego (2006)

Neurosciences Graduate Program Boot Camp, University of California, San Diego (2006)

Co-organizer, 4th Annual Biomedical Imaging and Bioengineering Symposium, University of California, San Diego (2006)

The Potomac Institute for Policy Studies workshop on neurotechnology, La Jolla, California (2006)

University of Bath/University of California, San Diego SETSquared workshop on Bioengineering and Stem Cells, Bath, UK. (2006)

Symposium Chair, Nanotechnology to Neuroscience Symposium, Nano Science and Technology Institute (NSTI) Nanotech (2006 to present)

University of California, San Diego Office of Graduate Studies (OGSR) Outreach Collaboration faculty liaison (2006)

Taiwan National University/University of California, San Diego academic exchange program (2006)

Powell Foundation review of the Jacobs School of Engineering, University of California, San Diego (2005)

Organized research unit (ORU) review of the Institute for Non-linear Science (INLS), University of California, San Diego (2005)

Minor Proposition Examination Committee, Neurosciences Graduate Program, University of California, San Diego (2005 to present)

Materials Science and Engineering Graduate Program Review, University of California, San Diego (2005)

MD-PhD Medical Scientist Training Program (MSTP) Admissions Committee, University of California, San Diego (2004 to present)

Bioengineering Graduate Program admissions reviews, Department of Bioengineering, University of California, San Diego (2004 to present)

Qualifying Examination Committee, Department of Bioengineering, University of California, San Diego (2004-2006)

Neural Engineering Initiative Steering Committee, University of California, San Diego (2004)

Chair, Steering Committee application for an NIH Nanomedicine Center, University of California, San Diego (2004)

Professional Memberships

International Conference on Neuroprotective Agents (ICNA)

Materials Research Society (MRS)

Organization for Computational Neuroscience (OCNS)

Association for Research in Vision and Ophthalmology (ARVO)

Society for Neuroscience (SFN)

International Society for Clinical Electrophysiology of Vision (ISCEV)

American Association for the Advancement of Science (AAAS) Faculty for Undergraduate Neuroscience (FUN)

Wilderness Medical Society (WMS)

Society for Experimental Biology and Medicine (SEBM)

American Mathematical Society (AMS)

IEEE Engineering in Medicine and Biology Society (IEEE EMBS)

New York Academy of Sciences

College of Fellows, American Institute for Medical and Biological Engineering (AIMBE)

Teaching

All listed activities are at the University of California, San Diego unless noted.

Lecture Courses

All courses were taught as the primary instructor, unless noted. Courses listed with an asterisk indicate new developed courses. Several of the listed courses have been taught over multiple years.

BENG189 (Bioengineering) Physiological Systems Engineering*

BENG221 (Bioengineering) Mathematical Methods in Bioengineering

BENG234 (Bioengineering), Introduction to Neurophysiology: From Molecules to Systems*

BENG207 (Bioengineering), Mathematical Methods in Neuroscience*

BENG231 (Bioengineering) Foundations of Physiology for Bioengineering*

BENG207 (Bioengineering) Introduction to Neuroscience*

BENG101 (Bioengineering) Fundamentals of Medical Imaging

BENG140A (Bioengineering) Introduction to Physiology for Bioengineers I

BENG140B (Bioengineering) Introduction to Physiology for Bioengineers II

BENG 147A (Bioengineering) Design Development in Neural Engineering

BENG 147B (Bioengineering) Design Implementation in Neural Engineering

BENG 187A (Bioengineering) Senior Engineering Design

BENG260 (Bioengineering) Neurodynamics

BENG130 (Bioengineering) Thermodynamics

BENG241A (Bioengineering) Foundations of Tissue Engineering Science (guest lecturer)

BENG100 (Bioengineering) Introduction to Bioengineering (guest lecturer)

BENG166A (Bioengineering) Cell and Tissue Engineering (guest lecturer)

BENG (Bioengineering) Senior Design

MDE 231 (Advanced Masters in Medical Devices) Anatomy and Physiology*

CogSci101 (Cognitive Sciences and Psychology) Introduction to Cognitive Sciences (guest lecturer)

American Academy of Ophthalmology (AAO) Residency Home Course (guest lecturer)

Ophthalmology Basic Sciences Course (guest lecturer)

MatSci395 (Materials Science) Topics in Materials Science (guest lecturer; Northwestern University, Chicago)

Bioe475 (Bioengineering) Neural Engineering I: Neural Hybrid Systems (guest lecturer; University of Illinois, Chicago)

Participating faculty mentor in the following programs (including diversity programs)

Latin America-UC San Diego Science Connect, Center for Investigations of Health and Education Disparities (2014 to present)

Amgen Scholars Program (2012)

Howard Hughes Summer Research Program (2010)
 Academic Internship Program (2010)
 School of Medicine medical student faculty mentor (2008-2009)
 Howard Hughes Medical Institute (HHMI) Multi-Scale Biology Program (2008 to present)
 National Science Foundation (NSF), Research Experience for Undergraduates (2008-2010)
 Initiative for Maximizing Student Diversity (IMSD, 2008-2010)
 Medical Student Training in Aging Research (MSTR) program (2007 to 2011)
 Summer Training Academy for Research in the Sciences (STARS, (2007 to 2008)
 Regents Scholars Research Initiative Mentor Program (2007 to present)
 Howard Hughes Medical Institute (HHMI) Scholars Program (2007)
 Preuss School Health Partners Program (2006 to present)
 Pacific Rim Undergraduate Experience (PRIME), National Science Foundation (NSF, 2006)
 Stein Institute for Research on Aging (2005))
 Jacobs School of Engineering Teams in Engineering Service (TIES, 2005)
 Revelle College Freshman Honors Program (2005)
 McNair Academic Enrichment Program (2005)
 Leadership Excellence through Advanced Degrees (LEADS, (2004 to 2012)
 California Alliance for Minority Participation in Science, Engineering and Mathematics (2004)
 Summer Training Academy for Research in the Sciences (2004)

Research Trainees

*All University of California, San Diego students are listed by their departments or programs.
 Visiting scholars or students to our lab are listed by their home institutions.*

Research Scientists

Dhruv Grover, PhD (2023 to present)
 Francesca Puppo, PhD (2021 to present)
 Vivek George, PhD (2022-2023)
 Hiren Thacker, PhD (2018-2021), Nanovision Biosciences
 Yu-Hsin Liu, PhD (2017-2021), Nanovision Biosciences
 Brandon Boss, MS (2016-2021, Nanovision Biosciences
 Sue Murray, PhD, PE (2015 to present), Nanovision Biosciences
 Yi Jing, PhD (2012 to 2020), Nanovision Biosciences
 Cynthia Overstreet, PhD (2014-2015), Nanovision Biosciences
 Arthur Zhang, PhD (2014), Nanovision Biosciences
 Soon-Jong Kim, PhD (2009-2010; on sabbatical in our lab) Professor of Chemistry, Pohang University, South Korea
 Su-Yong Eun, MD, PhD (2009; on sabbatical in our lab) Professor of Physiology,, Jeju National University,, South Korea
 Massoud L. Khraiche, PhD (2013-2015)

Postdoctoral and clinical fellows

Sebastian Prado, PhD (Postdoctoral Fellow, 2019 to present)
Vive George, PhD (Postdoctoral Fellow, 2018-2022)
Francesca Puppo, PhD (Postdoctoral Fellow, 2016 to 2018)
Katayoun Seyedmadani, PhD (Postdoctoral Fellow, 2014)
Massoud L. Khraiche, PhD (Postdoctoral Fellow, 2009-2013)
Jianxia Cui, PhD (Postdoctoral Fellow, 2009-2012)
Diana Yu, PhD (Postdoctoral Fellow, 2008)
Korak Sarkar MD (Clinical Fellow, 2008)

Doctoral (PhD) students (thesis advisor)

Dante J. Fisher, Neurosciences Graduate Program (2023 to present)
Carlos J. Escalante-Vera Neurosciences Graduate Program (2023 to present)
Johnny Jingze Li, Mathematics (2022 to present)
Vikash Morar, Bioengineering (2021 to present)
Vivek George, Bioengineering (2015-2018)
Bruno Maranhao, Bioengineering (MD/PhD student; 2010-2015)
Pamela Bhattacharya, Bioengineering (20011-2014)
Helen Saad, Bioengineering (2008-2013)
Jay Blumling, Bioengineering (2007-2012)
Christopher MacDonald, Bioengineering (2007-2011)
Marius Buibas, Bioengineering (2006-2011)
Krystal Chaio, Neurosciences Graduate Program (MD/PhD student; 2007-2010)
Diana Yu, Bioengineering (2004-2008)
Smita Pathak, Materials Science and Engineering Program (2004-2008)

Masters (MS) students (thesis advisor)

Paul Wang, Physics (2018 to 2021)
Sandalika Sapa, Electrical Engineering and Computer Science (2020)
Vikash Morar, Bioengineering (2020 to 2021)
Jonathan Kravner, Bioengineering (2018)
Nick Grayson, Electrical and Computer Engineering (2018)
Emily Petrillo, Bioengineering (2015)
Vivek George, Bioengineering (2014-2015)
Pamela Bhattacharya, Bioengineering (2010-2011)
Kim Nguyen, Bioengineering (2008 to 2010)
Brian Sprouse, Bioengineering (2008-2010)
Siu Kei Chow, Bioengineering (2007-2008)
Christopher MacDonald, Bioengineering (2006-2007)
Nathan Shepard, Bioengineering (2006-2007)

David Kupec, Bioengineering (2006-2007)
Marius Buibas, Bioengineering (2005-2006)
Joanna Zanmiller, Materials Science Program (2004-2005)
Bradley Culp, Bioengineering (2004-2005)
Julie Schallhorn, Bioengineering (2004-2005)
Mai Ho, Bioengineering (2004-2005)

PhD rotation students

Marissa Heintschel, Bioengineering (2023)
Carlos Escalante-Vera, Neurosciences (2023)
Dante Fisher, Neurosciences (2023)
Blanca Martin, Neurosciences (2020)
Tim Tardos, Neurosciences (2018)
Cong Dinh, (MD/PhD student), Bioengineering (2015)
Jun Wang, Bioengineering (2015)
Emily Petrillo, Bioengineering (2014)
Nicole Schwartz, Physics (2014)
Cameron Evans, University of Western Australia (2010)
Tyler Steed (MD/PhD student), Bioengineering (2010)
Espoir Kyubwa (MD/PhD student), Bioengineering (2010)
Aaron Simon (MD/PhD student), Bioengineering (2009)
Ben Hu (MD/PhD student), Neurosciences Graduate Program (2008)
Alex Hui (MD/PhD student), Neurosciences Graduate Program (2008)
Carson Fuller, Bioengineering (2009)
Lorenzo D'Amico, Bioengineering (2009)
Adam Colhoun, Neurosciences Graduate Program (2007)
Vanessa Lacey, Division of Biological Sciences (2007)
Emily Gunthier, Department of Bioengineering (2007)
Siu Kei Chow, Bioengineering (2007)
Stephan Larson, Computational Neurobiology Program (2006)
Jennifer Park, Department of Bioengineering (2005)
Katherine Amhann, Department of Bioengineering (2005)
Nicolas Wall, Neurosciences Graduate Program (2005)
James Clancy, Bioengineering (2005)
MD clinical rotation students
Omar Ozgur, University of Vermont (2009)
Christopher Cheng, University of California, Riverside (2008)
Julie E. Nissimov, University of California, Irvine (2007)
Korak Sarkar, University of California, San Diego (2006)
Dustin Hayward, University of California, San Diego (2005)

Undergraduate students (research advisor)

Ido Duckler, Mathematics and Computer Science and Engineering (2022)
Dana Steinberg, Bioengineering (2021-2022)
Derek Chan, , Bioengineering (2021-2022)
Mary Nguyen, Bioengineering (2021-2022)
Pasha Sing, , Bioengineering (2021-2022)
Jason Ngo, Mathematics and Computer Science and Engineering (2018 to 2021)
Dongyoung Kim, Bioengineering (2018 to 2019)
Jiajia Guo, University of Wisconsin Madison and Shanghai Jiao Tong University, China (2018)
Joshua Roldan, Mathematics (2018)
Irina Bataeva, Bioengineering (2018)
Arkin Gupta, Mathematics and Computer Science and Engineering (2017-2019)
Gengshuo Tian, Mathematics, Beijing Normal University, China (2018)
Kevin Dam, Bioengineering (2016-2017)
Nick Grayson, Electrical and Computer Engineering (2015-2016)
William Coulter, Bioengineering (2015-2016)
Megan Freidlander, Bioengineering (2014-2015)
Elisabeth Rebboah, Bioengineering (2014-2015)
Jos Bsaibes, Bioengineering (2014-present)
Nikhar Abhas, Bioengineering (2014-2015)
Arjun Bhungal, Bioengineering (2013-2015)
Suriel Lee, University, Hangzhou, China (2014)
Alexander Jorjorian, Bioengineering (2014)
Rachel Patron, Chemical Engineering (2014)
Joe Bsaibes, Political Sciences Premed (2013)
Melissa Yunting Tang, Bioengineering (2012-2013)
Kevin Chang, Bioengineering (2012-2013)
Hema Sulkar, Bioengineering (2012-2013)
Nithya Kubendran, University of Southern California (2012)
Siu Kit Cheng, Bioengineering (2012)
Neil Gandhi, Bioengineering (2011-2013)
Samantha Reiss, Bioengineering (2011-2013)
Sarika Tandon, Bioengineering (2011-2013)
Amir Bolandpar, Bioengineering (2011)
Phuong Nguyen, Bioengineering (2011-2013)
Charlie Park, Bioengineering (2011)
Tracey Hong, Vanderbilt University (2011)
Tiffany Dai, Molecular Biology (2011)
Kim Macias, Bioengineering (2011)
Cory Steven, Bioengineering (2009 to 2011)
Samir Damle, Bioengineering (2009-2013)

Brian Wong, Departments of Chemistry/Biochemistry and Neuroscience (2007-2011)
Carlos Salcedo, Bioengineering (2010-2011)
Nishant Munugala, Bioengineering (2010-2011)
Audris Fan, Bioengineering (2010)
Diane Yi, Cell Biology (2010-2011)
Paul Hart, Vanderbilt University (2010)
Vikram Chauhan, Bioengineering (2010)
Antonio Pinto-Duarte, Bioengineering (2009)
Glendon MacDuff, Bioengineering (2009)
Nicole Medina, Bioengineering (2009)
Ryan Cloke, Gonzaga University (2009)
Piyush Goyal, Bioengineering (2009)
Kenneth Sugerman, Bioengineering (2009)
Andrew Islip, Bioengineering (2009)
Amir Taat, Bioengineering (2009)
Israel Morales, Bioengineering (2008-2009)
Matthew Adams, Bioengineering (2008)
Saisindhu Narala, Bioengineering (2008)
Venkatakaushik Voleti, Bioengineering (2008-2010)
Carson Fuller, Bioengineering (2008)
Melanie Das, Bioengineering (2008)
Sean Takal, Bioengineering (2008)
Eva Situ, Bioengineering (2008)
Nicolas Floresta, Bioengineering (2008)
Michael Olivera, Bioengineering, University of California, Merced (2008)
Ali Hadian, Bioengineering (2007-2010)
Kim Thanh Nguyen, Bioengineering (2007-2008)
Lorenzo Damico, Bioengineering (2007-2008)
Chris Ross, Bioengineering (2007-2008)
Joshua Wong, Bioengineering (2007-2008)
Matthew Li, Bioengineering (2007-2008)
Conrad Pascual, Bioengineering (2007-2008)
Peng Zhang, Bioengineering (2007-2008)
Wilbert Copeland, Bioengineering (2007-2008)
Tanya Ed, Bioengineering (2007-2008)
Thomas Nunn, Bioengineering (2007-2008)
Esmond Ai, Bioengineering (2007-2008)
Doug Cohen, Bioengineering (2007-2008)
Zak Singer, Bioengineering (2007-2008)
Amul Shah, Bioengineering (2007)
Rosa Tolentino, New Jersey Institute of Technology (2007)

Ian Lee, Bioengineering (2006-2008)
John Miller, Bioengineering (2006-2007)
Mahboubeh Hashemi, Bioengineering (2006-2007)
Andrea Chan, Bioengineering (2005-2006)
Craig Sharp, Bioengineering (2005-2007)
Harry Khanna, Bioengineering (2005-2007)
Mathew Borzage, Bioengineering (2005-2006)
Siu Kei Chow, Bioengineering (2005-2006)
Puneet Gupta, Bioengineering (2005)
Raquel Orozco, University of California, Berkeley (2005)
Albert Kao, Harvard University (2005)
Tabitha Williamson, Biology (2005)
Barry Cordero, Bioengineering (2004-2006)
Yvette Valenzuela, Bioengineering (2004-2005)
Danni Wang, Bioengineering (2004-2005)
Harsimran Sabharwal, Bioengineering (2004-2005)
Elizabeth Cao, Bioengineering (2004)
Jonathan Chiang, Bioengineering (2004)

Graduate thesis committees

Blanca Martin (PhD), Neurosciences
Advisor: Alysson Muotri, Pediatrics and Cell and Molecular Biology

Omowuyi Olajide (PhD), Bioengineering
Advisor: Gert Cauwenberghs, Bioengineering

Kai Chen, Bioengineering
Advisors: Gert Cauwenberghs, Bioengineering
Siwen Wang (MS), Bioengineering
Advisors: TP Jung, Institute for Neural Computation

Soumil Jain, Bioengineering
Advisors: Gert Cauwenberghs, Bioengineering and Terry Sejnowski, Neurobiology and Salk Institute

Kyle Marra (MD/PhD) Bioengineering
Advisor: Martin Friedlander, Scripps Health

Alice Yeperemyan (MS) Bioengineering
Advisor: Brian Wilson, Jet Propulsion Laboratory, NASA and CalTech

Oliver Ernst (PhD) Department of Physics
Advisor: Terry Sejnowski (Neurobiology and Salk Institute)

Kangbo Hao, (PhD) Department of Physics
Advisor: Henry Abarbanel, Department of Physics

Zheng Fang, (PhD) Department of Physics
Advisor: Henry Abarbanel, Department of Physics

Holly Howarth (PhD) Department of Bioengineering
Advisor: Gert Cauwenberghs, Department of Bioengineering

Sasen Cain (PhD) Department of Bioengineering
Advisor: Timothy Gentner (Psychology)

Kai Chen (PhD) Department of Bioengineering
Advisor: Timothy Gentner (Psychology)

Kangbo Hao (PhD) Department of Physics
Advisor: Henry Abarbanel

Hiteshwar Rao (MS) Department of Bioengineering
Advisors: David Kleinfeld (Physics) and Gert Cauwenberghs, Department of Bioengineering

Jun Wang (PhD) Department of Bioengineering
Advisor: Gert Cauwenberghs, Department of Bioengineering

Jason Wang (PhD) Bioengineering
Advisor: Tariq Rana, Sanford-Burnham Medical Research Institute

Bruno Pedroni (PhD) Department of Bioengineering
Advisor: Gert Cauwenberghs, Department of Bioengineering

Chunshu Wei (PhD) Department of Bioengineering
Advisor: Tzyy-Ping Jung, Department of Bioengineering and Institute for Neural Computation

Alex Perez (PhD) Department of Bioengineering
Advisor: Dr. Mark Ellisman, Department of Neurosciences

Jia Guo (PhD) Department of Bioengineering
Advisor: Eric Wong, Department of Radiology
Jason Dang (PhD) Department of Bioengineering
Advisor: Tariq Rana, Department of Pediatrics

Espoir Kyubwa (MD/PhD) Department of Bioengineering
Advisor: Edward Callaway, Salk Institute for Biological Studies
Abraham Akinin (PhD) Department of Bioengineering
Advisor: Gert Cauwenberghs, Department of Bioengineering
Sohmyung Ha (PhD) Department of Bioengineering
Advisor: Gert Cauwenberghs, Department of Bioengineering
Corey Stevens (PhD) Department of Bioengineering
Advisor: David Gough, Department of Bioengineering

Jia Guo (PhD) Department of Bioengineering
Advisor: Eric Wong, Department of Radiology

Jangir Selimkhanov (PhD) Division of Biology
Advisor: Jeff Hasty, Division of Biology and Department of Bioengineering

Hamid Ehsani-Nia (MS) Division of Biology
Advisor: Tony L. Yaksh, Department of Anesthesiology

Robert DeConde (MD/PhD) Department of Bioengineering
Advisor: Trey Idekar, Departments of Medicine and Bioengineering
Mithun Diwakar (MD/PhD) Materials Science and Engineering Graduate Program
Advisor: Tom Liu, Department of Radiology

Valerie Griffith (MD/PhD) Materials Science and Engineering Graduate Program
Advisor: Tom Liu, Department of Radiology

Karla Brenner (PhD) Department of Bioengineering
Advisor: Sungho Jin, Department of Mechanical and Aerospace Engineering and Materials Science

Garrett Smith (PhD), Department of Bioengineering
Advisor: Sungho Jin, Department of Mechanical and Aerospace Engineering and Materials Science

Lisa Fung (MS), Department of Bioengineering
Advisor: Mark Ellisman, Department of Neurosciences

Mark Kostuk (PhD), Department of Physics
Advisor: Henry Abarbanel, Department of Physics and Scripps Institution of Oceanography

Bryan Toth (PhD), Department of Physics
Advisor: Henry Abarbanel, Department of Physics and Scripps Institution of Oceanography

Daniel Nunez (PhD), Department of Bioengineering
Advisors: Gaudenz Danuser and Sandra Schmid, The Scripps Research Institute

Kevin Chung (MS), Department of Bioengineering
Advisor: Karen Christman, Department of Bioengineering

Tyler Seibert (MD/PhD), Department of Bioengineering
Advisor: Dr. James Brewer, Department of Radiology

Alex Perez (MS), Department of Bioengineering
Advisor: Mark Ellisman, Department of Neuroscience

Gene Hsiao (PhD), Department of Bioengineering
Advisor: Shankar Subramaniam, Department of Bioengineering

Anna Leigh Rack-Gomer (PhD), Department of Bioengineering
Advisor: DTom Liu, Department of Radiology

Ji Ho Park (PhD), Materials Science and Engineering
Advisor: Dr. Michael Sailor, Department of Chemistry

Sahar Soleymani (MS), Department of Bioengineering
Advisor: Wayne Giles, Department of Bioengineering

Adam Wright (PhD), Department of Bioengineering
Advisor: Andrew McCulloch, Departments of Bioengineering and Cardiology

Betty Hu (MS), Department of Bioengineering
Advisor: Wayne Giles, Department of Bioengineering

Linda Chang (PhD), Department of Bioengineering
Advisor: Nick Spitzer, Division of Biological Sciences

Loni Canepa (MS), Department of Bioengineering
Advisor: Mark Tuszynski, Department of Neuroscience

Kanika Chawla (PhD), Department of Bioengineering
Advisor: Robert Sah, Department of Bioengineering

Lee Landeen (PhD), Department of Bioengineering
Advisor: Wayne Giles, Department of Bioengineering

Justin Kinney (PhD), Department of Bioengineering
Advisor: Terrance Sejnowski, Division of Neurobiology and Salk Institute for Biological Sciences

Joseph Russo (PhD), Department of Bioengineering
Advisor: Jeff Price, Signal Transduction Research Group, Burnham Institute

Rick Guilly (MS), Department of Bioengineering
Advisor: Mark Ellisman, Department of Neurosciences

Lee Pang (PhD), Department of Bioengineering
Advisor: Jeff Hasty, Department of Bioengineering

Sachin Talati (PhD), Department of Physics
Advisor: Dr. Henry Abarbanel, Department of Physics

Joy Liao (MD/PhD), Department of Bioengineering
Advisor: Tom Liu, Department of Radiology

Tom Gros (PhD), Department of Bioengineering
Advisor: Mark Tuszynski, Department of Neuroscience

Tom Pisanic (PhD), Department of Bioengineering
Advisor: Sungho Jin, Department of Mechanical and Aerospace Engineering and Materials Science

Rita Fiones (PhD), Materials Science and Engineering Program
Advisor: Sungho Jin, Department of Mechanical and Aerospace Engineering and Materials Science

Jason Nathanson (PhD), Department of Bioengineering
Advisor: Fred Gage, Salk Institute for Biological Sciences

Sandy Klein PhD, Department of Neurosciences (CIRM Scholar advising committee)
Advisor: Binghai Zhang, Department of Neurosciences

Other academic educational responsibilities

Adjudicator, PhD thesis committee, Department of Electronics and Communications Engineering
Andhra University Engineering College, Visakhapatnam, India

Awards received by students

All listed students are or were postdocs, graduate, medical, or undergraduate students in our lab at UC San Diego at the time of their awards for research conducted in our lab.

Fullbright International Scholarship (2023)
Carlos J. Escalante-Vera, Neurosciences Graduate Program

Sampson Family/Microsoft Graduate Student Fellowship (2021)
Vikash Morar, Bioengineering and Center for Engineering Natural Intelligence

Physical Sciences Dean's Undergraduate Award (2019)
Arkin Gupta, Mathematics

Swiss National Science Foundation (SNSF) Mobility Fellowship (2016)
Francesca Puppo, PhD, BioCircuits Institute and Center for Engineering Natural Intelligence

iBoss Graduate Fellowship (2016)
Vivek George, Bioengineering and Center for Engineering Natural Intelligence

National Science Foundation (NSF) Graduate Research Fellowship (2015)
Emily Petrillo, Bioengineering

Department of Bioengineering nomination for the Chancellor's Dissertation Medal (2015)
Nirupama (Pam) Bhattacharya, Bioengineering

Seibel Scholars Award (2012)
Helen Saad, Bioengineering

Eugene Mead Memorial Best Senior Design Project Award (2012)
Samir Damle, Phuong Nguyen, Samantha Reiss, Sarika Tandon, Bioengineering

Amgen Scholarship (2012)
Nithya Kubendran, University of Southern California

Gordon Scholarship (2011)
Helen Saad, Bioengineering

Amgen Scholarship (2011)
Charlie Park, Bioengineering

Initiative for Maximizing Student Diversity (IMSD) scholarship (2011)
Kim Macias, Bioengineering

Howard Hughes Medical Institute (HHMI) Gilliam Fellowship (2010)
Espoir Kyubwa, MD/PhD Medical Scientist Training Program (MSTP) and Bioengineering

Jacobs MD/PhD Training Fellowship (2010)
Bruno Maranhao, MD/PhD Medical Scientist Training Program (MSTP) and Bioengineering,

Seibel Scholars Award (2010)
Christopher MacDonald, Bioengineering

Gordon Conference on Neural Micro-circulation Best Poster Award (2010)
Krystal Nizar, MD/PhD Medical Scientist Training Program (MSTP) and Neurosciences Graduate Program,

Beyond Brain Machine Interface Workshop travel award (2010)
Masoud Khraiche, PhD, Bioengineering

Hughes Research Scholar (2010)
Brian Wong, Bioengineering

NSF Research Experience for Undergraduates (2010)
Paul Hart, Vanderbilt University

Initiative for Maximizing Student Diversity (IMSD) Fellowship (2010)
Carlos Salcedo, Bioengineering

Interfaces Graduate Fellowship (2009)
Helen Saad, Bioengineering

Interfaces Graduate Fellowship (2009)
Christopher MacDonald, Bioengineering

Reagents Scholar Research Initiative fellowship (2009)
Glendon MacDuff, Bioengineering,

Research Experience for Undergraduates fellowship (2009)
Ryan Cloke, Gonzaga University

Fullbright International Scholarship (2008)
Helen Saad, Bioengineering

University of California, San Diego Chancellor's Interdisciplinary Collaboratories Fellowship
(2008)
Krystal Chaio, Neurosciences Graduate Program

University of California, San Diego Chancellor's Interdisciplinary Collaboratories Fellowship
(2008)
Jay Blumling, Bioengineering

National Science Foundation (NSF) East Asia and Pacific Summer Institutes for U.S. Graduate
Students (EAPSI) fellowship (2008)
Christopher MacDonald, Bioengineering

University of California Leadership Excellence through Advanced Degrees (LEADS) Program
scholarship (2008)
Michael Oliveira, University of California, Merced

Best Overall Poster Award, Undergraduate Research Day (2008)
Kim Nguyen, Bioengineering

Reagents Scholar Research Initiative fellowship (2008)
Venkatakaushik Voleti, Bioengineering

Initiative for Maximizing Student Diversity (IMSD) fellowship (2008)
Nicolas Floresta, Bioengineering

Howard Hughes scholar (2007)
Matthew Li, Bioengineering

Reagents Scholar Research Initiative fellowship (2007)
Amul Shah, Bioengineering

Medical Student Training in Aging Research fellowship (2007)
Julie E. Nissimov, University of California, Irvine

University of California Chancellors Research fellowship (2007)
Zachary Singer, Bioengineering

Biomedical Engineering Society travel fellowship (2007)
Smita Pathak, Materials Science Graduate Program

Biomedical Engineering Society travel fellowship (2007)
Diana Yu, Bioengineering,

Biomedical Engineering Society travel fellowship (2007)
Marius Buibas, Bioengineering

Summer Training Academy for Research in the Sciences (STARS) fellowship (2007)
Rosa Tolentino, New Jersey Institute of Technology

US Grants Undergraduate Scholastic Grant (2007)
Siu Kei Chow, Bioengineering

US Grants Undergraduate Scholastic Grant (2007)
Ian Lee, Bioengineering

Howard Hughes Medical Institute (HHMI) Med into Grad Fellowship (2006)
Smita Pathak, Materials Science and Engineering Program

Best Undergraduate Bioengineering Researcher Award (2006)
Siu Kei Chow, Bioengineering,

University of California Chancellors Research Scholarship (2006)
Craig Sharp, Bioengineering

Pacific Rim Undergraduate Experience (PRIME) fellowship (2006)
Mahboubeh Hashemi, Bioengineering

US Grants Undergraduate Scholastic Grant (2005)
Siu Kei Chow, Bioengineering

US Grants Undergraduate Scholastic Grant (2005)
Puneet Gupta, Bioengineering

Faculty for Neuroscience/ Society for Neuroscience Travel Award (2005)
Barry Cordero, Department of Bioengineering, University of California, San Diego

Best Undergraduate Bioengineering Researcher Award (2005)
Barry Cordero, Bioengineering

Amylin Scholarship (2005)
Barry Cordero, Bioengineering

Harvard University Herchel Smith Research Fellowship (2005)
Albert Kao, Harvard University

BIOCOM Best Poster Award, UCSD Jacobs School of Engineering Research Expo (2005)
Diana Yu, Bioengineering

Sigma Xi Scientific Research Honor Society (2005)
Barry Cordero, Bioengineering

Society of Hispanic Professional Engineers (2005)
Yvette Valenzuela, Bioengineering

Next Generation of Public Servants Award, United States Department of Energy (2004)
Yvette Valenzuela, Bioengineering

US Grants Undergraduate Scholastic Grant (2004)
Elizabeth Cao, Bioengineering

University of California Leadership Excellence through Advanced Degrees (LEADS) Program
Scholarship (2004)
Yvette Valenzuela, Bioengineering

Chancellors Award for Excellence (2004)
Elizabeth Cao, Bioengineeirng

Bridges to the Future Program Fellowship (2004)
Barry Cordero, Bioengineering