

CURRICULUM VITAE

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Employment

Research Staff Member, May 2001-present, IBM T. J. Watson Research Center, Yorktown Heights, NY.

Manager, Dept. of Multiscale Systems Biology and Modeling — Heart, Brain, and Spinal Cord, Oct. 2016-present, IBM Research.

IBM Honors

Member, IBM Academy of Technology, 2017-present

IBM Master Inventor, 2015-present

Education

Postdoctoral Fellow, January 1999-May 2001, Columbia University: Optical probing of microcircuits in visual cortex. Dr. Rafael Yuste, principal investigator.

Ph.D. in Neuroscience, 1999, University of Pennsylvania: Constructing a representation of periodicity for temporal pattern recognition in a vertebrate auditory system. Dr. John D. Crawford, advisor.

BA in Biology, 1992, University of Virginia. Dr. Russell Foster, advisor.

BA in English, 1992, University of Virginia. Dr. Barbara Nolan, advisor.

Journal Publications

Ponzi A, Barton SJ, Bunner KD, Rangel-Barajas C, Zhang ES, Miller BR, et al. (2020) Striatal network modeling in Huntington's Disease. *PLoS Comput Biol* 16(4): e1007648.

<https://doi.org/10.1371/journal.pcbi.1007648>

S. Sihag, Naze S, Taghdiri F, ... , Tartaglia MC, Kozloski JR (2020) Multimodal Dynamic Brain Connectivity Analysis Based on Graph Signal Processing for Former Athletes With History of Multiple Concussions. *IEEE Transactions on Signal and Information Processing over Networks*, vol. 6, pp. 284-299.

Di Achille P, Parikh J, Khamzin S, Solovyova O, Kozloski J, Gurev V (2020) Model order reduction for left ventricular mechanics via congruency training. *PLoS ONE* 15(1): e0219876.

<https://doi.org/10.1371/journal.pone.0219876>

Rumbell T, Kozloski J (2019) Dimensions of control for subthreshold oscillations and spontaneous firing in dopamine neurons. *PLoS Computational Biology*. PCOMPBIOL-D-19-00679R1.

Parikh J, Di Achille P, Kozloski J, Gurev V (2019) Global sensitivity analysis of ventricular myocyte model-derived metrics for proarrhythmic risk assessment, *Frontiers in Pharmacology*, doi:10.3389/fphar.2019.01054

Naze S, Caggiano V, Sun Y, Lucas MV, Etkin A, Kozloski JR (2019) Classification of TMS evoked potentials using ERP time signatures and SVM versus deep learning, *IEEE EMBC Conference*, Paper FrA02.2.

Octeau JC, Gangwani MR, Allam S, ... , Rumbell TH, Kozloski JR, Khakh BS (2019) Transient, Consequential Increases in Extracellular Potassium Ions Accompany Channelrhodopsin2 Excitation, *Cell Reports* 27, 2249–2261.

Naze S, Humble J, Zheng P, Barton S, Rangel-Barajas C, Rebec GV, Kozloski J (2019) Cortico-Striatal Cross-Frequency Coupling and Gamma Genesis Disruptions in Huntington's Disease Mouse and Computational Models, *eNeuro* 29 November 2018, 5 (6).

Webster E, Sukaviriya N, Chang HY, Kozloski J (2017) Predicting cognitive states from wearable recordings of autonomic function. *IBM Journal of Research and Development special issue on Computational Neuroscience*, 61:2/3(2:1-2:11).

Hoang Trong TM, Motley SE, Wagner J, Kerr RR, Kozloski J (2017) Explicit multi-compartment models of dendritic spines in the Neural Tissue Simulator modify action potential back-propagation. *IBM Journal of Research and Development special issue on Computational Neuroscience*, 61:2/3(11:1-11:13).

Zheng P, Kozloski J (2017) Striatal Network Models of Huntington's Disease Dysfunction Phenotypes. *Front. Comput. Neurosci. Research Topic: Cortico-striato-nigro-thalamo-cortical Modeling for Understanding Motor Function and Neurodegenerative Disease*.

Kozloski J (2016) Closed-Loop Brain Model of Neocortical Information-Based Exchange. *Frontiers in Neuroanatomy* 10:3, doi:10.3389/fnana.2016003.

Memelli H, Torben-Nielsen B, Kozloski J (2013) Self-referential forces are sufficient to explain different dendritic morphologies. *Frontiers in Neuroinformatics* 7:1, doi: 10.3389/fninf.2013001.

Kozloski J and Wagner J (2011). An ultrascaleable solution to large-scale neural tissue simulation. *Frontiers in Neuroinformatics* 5:15. doi: 10.3389/fninf.2011015.

Kozloski J (2011) Automated Reconstruction of Neural Tissue and the Role of Large-Scale Simulation. *Neuroinformatics* 9(2-3): 133-142.

Kozloski J, Cecchi GA (2010) A theory of loop formation and elimination by spike timing-dependent plasticity. *Frontiers in Neural Circuits* doi:10.3389/fncir.2010007.

Kozloski J, Sfyarakis K, Hill S, Schürmann F, Markram H (2008) Identifying, tabulating, and analyzing contacts between branched neuron morphologies, IBM Journal of Research and Development special issue on Massively Parallel Computing, 52:1/2(43-55).

Kozloski J, Hamzei-Sichani F & Yuste R (2001) Stereotyped position of local synaptic targets in neocortex. *Science*. 293: 868-872.

Kozloski J & Crawford JD (2000) Transformations of an auditory temporal code in the medulla of a sound-producing fish. *Journal of Neuroscience*. 20(6):2400-2408

Kozloski J & Crawford JD (1998) Functional neuroanatomy of auditory pathways in the sound producing fish *Pollimyrus*. *Journal of Comparative Neurology* 401:227-252.

Ellis NE, Roe AM, Kozloski J, Proytcheva M, Falk C, & German J (1994) Linkage disequilibrium between the FES, D15S127, and BLM loci in Ashkenazi jews with Bloom Syndrome. *American Journal of Human Genetics* 55:453-460.

Peterlin Z, Kozloski J, Mao BQ, Tsiola A, & Yuste R (2000) Optical probing of neuronal circuits with calcium indicators. *Proceedings of the National Academy of Science*. 97(7):3619-3624.

Suzuki A, Kozloski J & Crawford J (2002) Temporal encoding for auditory computation: physiology of primary afferent neurons in sound-producing fish. *Journal of Neuroscience*. 22(14):6290-6301.

Yuste R, Peterlin Z, Kozloski J. (2000) Optical probing: a novel technique for revealing neuronal circuits. *Journal of Physiology London*. 526:20S-20S, Suppl. S.

Conference Papers

Sihag S, Naze S, Taghdiri F, Tartaglia MC, Kozloski JR (2019) GSP Analysis of Brain Imaging Data from Athletes with History of Multiple Concussions, IEEE GlobalSIP Conference, Paper 341117.

Kozloski J (2017) Synaptic integrators implement inhibitory plasticity, eliminate loops and create a 'winnerless' Network, IEEE International Symposium on Circuits and Systems (ISCAS), Baltimore, MD

Peck CC, Kozloski J (2011) The computational basis of emotions and implications for cognitive architectures, 2nd International Conference on Biologically Inspired Cognitive Architectures (BICA).

Kozloski J, Cecchi GA, Peck CC, Rao AR (2007) Topographic Infomax in a neural multigrid, International Symposium on Neural Networks (ISNN).

Rao AR, Cecchi GA, Peck CC, Kozloski JR (2007) Emergence of topographic cortical maps in a parameterless local competition. *Advances in Neural Networks Proceedings 4th International Symposium on Neural Networks (ISNN)*.

Rao AR, Cecchi GA, Peck CC, & Kozloski JR (2006) An optimization approach to achieve unsupervised segmentation and binding in a dynamical network. *International Joint Conference on Neural Networks (IJCNN)*.

Peck C, Kozloski, J, Cecchi G, Rao R (2005) A biologically motivated classifier that preserves implicit relationship information in layered networks. *Proceeding of the International Conference on Adaptive and Natural Computing Algorithms (ICANNGA)*.

Peck C, Kozloski J, Rao R, Cecchi, G (2002) Simulation infrastructure for modeling large scale neural systems. Proceedings of the International Conference on Computational Science (ICCS).

Presentations — General Audience

Kozloski J (2016) Why the brain is simpler than we think. TED@IBM 2016: Spark, <https://www.youtube.com/watch?v=x6L0jaEC9rM>

Kozloski J (2016) IBM Growth and Transformation Team, Stage Presentation to CEO

Kozloski J (2016) IBM CIO Leadership Exchange, Panama City, Panama

Kozloski J (2016) IBM Tech Talk Atlanta Finish Line Recruiting Event

Research Presentations

Kozloski J (2020) Network Dysfunction in Brain Injury and Neurodegeneration: Cause or Effect? The University of Chicago Neuroscience Institute, Computational Neuroscience Seminar Series

Kozloski J (2019) Multiscale Computational Models of Neuronal and Network Dysfunction in Huntington's Disease, 2nd International Conference on Neurovascular and Neurodegenerative Disease, Paris, France

Kozloski JR, Sihag S, Naze S, Taghdiri F, Tator CH, Wennberg R, Mikulis D, Green R, Colella B, Tartaglia MC (2019) Multimodal Brain Imaging Fusion Augments Blood Biomarkers for Post-concussion Syndrome, Concussion Research Symposium, Canadian Concussion Center, UHN Toronto, Canada, <https://www.youtube.com/watch?v=2i-iGJLXibA>

Allam S, Rumbell T, Hoang Trong T, Kozloski J (2019) Striatal population models of ionic conductances reveal mechanisms for conversion among healthy, disease, and drug-treated phenotypes, Society for Neuroscience poster abstract 615.07.

Rumbell T, Hoang Trong T, Allam S, Kozloski J (2019) Dopamine neuron population modeling and intracellular pathway modulation in a nigrostriatal model, Society for Neuroscience poster abstract 615.09

Kozloski J, Allam S, Hoang-Trong T, Ponzi A, Rumbell T (2018) From synapses to networks: a multi-scale approach for reverse phenotypic screening of HD models and therapeutic target identification, Poster Presentation, CHDI 13th Annual HD Therapeutics Conference, Palm Springs, CA

Kozloski J, Hoang-Trong T, Humble J, Naze S, Ponzi A (2018) From networks to imaging: a multi-scale network modeling approach to HD clinical progression and prognostic enrichment, Poster Presentation, CHDI 13th Annual HD Therapeutics Conference, Palm Springs, CA

Kozloski J (2017) Modeling Relationships Between Clinical Progression and Circuit Dysfunction in Huntington's Disease, NJIT Frontiers in Applied & Computational Mathematics Symposium "Listening to the Heart and Brain: Current Challenges in Multiscale Modeling

Kozloski J (2017) Modeling duality between clinical progression and circuit dysfunction in Huntington's disease to inform therapeutic intervention, Platform Presentation, CHDI 12th Annual HD Therapeutics Conference, Palm Springs, CA

Humble J, Kozloski (2017) Cannabinoid signaling and risk in Huntington's disease, Gordon Conference: Cannabinoid Function in the CNS, Waterville Valley, NH

Rumbell T, Kozloski J (2017) Efficient control of dopamine neuron physiology for rescuing disease phenotypes, 21st International Congress of Parkinson's Disease and Movement Disorders, Vancouver, BC, Canada.

Hoang Trong T, Rumbell T, Kozloski J (2017) The role of calcium microdomains in modifying synaptic efficacy via gain control of electrical propagation through MSN spines and dendrites, Society for Neuroscience poster abstract 91.08.

Humble J, Kozloski J (2017) Cannabinoid signaling, modulation and risk in Huntington's disease, Society for Neuroscience poster abstract 212.05.

Allam S, Rumbell T, Hoang Trong T, Ponzi A, Kozloski J (2017) Identifying functional regulatory units in Huntington's Disease Mouse Models using a population based evolutionary algorithm, Society for Neuroscience poster abstract 388.16.

Rumbell T, Kozloski J (2017) Identifying functional regulatory units controlling dopamine neuron subthreshold oscillation properties using a population-based approach to parameter optimization, Society for Neuroscience poster abstract 91.11.

Naze S, Humble J, Zheng P, Barton S, Rebec GV, Kozloski J (2017) Cortico-striatal phase-amplitude coupling in gamma genesis, Society for Neuroscience poster abstract 212.02.

Ponzi AP, Barton SJ, Rebec GV, Kozloski J (2017) Modeling striatal network dynamics in disease, Society for Neuroscience poster abstract 718.08.

Motley SE, Hoang Trong T, Kozloski J, Morrison JH, Kerr R (2016) Explicitly incorporating dendritic spines of different morphological classes into a multi-compartment model of a pyramidal neuron, Society for Neuroscience poster abstract 718 368.09.

Kozloski J, Hoang Trong T, Rumbell T, Zheng P (2016) A homeostatic brain model of plasticity and risk in Huntington's disease, Poster Presentation, CHDI 11th Annual HD Therapeutics Conference, Palm Springs, CA.

Kozloski J (2016) IEEE Technology Time Machine, <https://ieeetv.ieee.org/conference-highlights/brain-panelist-james-kozloski-2016-technology-time-machine?rf=channels|57&>

Kozloski J (2016) Neuroscience: Computing, Cognition, and the Future of Knowing, IBM Academy of Technology, Keynote Address, Somers, NY

Kozloski J (2016) In Search of a Fundamental Brain Architecture for Cognition, Computing, and the Future of Knowing, IBM Academy of Technology, Keynote Address, Manhattan, NY

Kozloski J (2015) Constraints for Large-Scale Neural Tissue Simulation Derived From a Homeostatic Brain Model of Plasticity and Risk in Huntington's Disease, OCNS 2015 Workshop: High-performance computing in neuroscience - from physiologically realistic neurons to full-scale brain models, Organizers Wolfram Schenck, Alex Peyser, Markus Butz-Ostendorf (Jülich and RIKEN), and Anders Lansner (KTH), Prague, Czech Republic.

Kozloski J (2015) Brain Systems Modeling using Multimodal, Multiscale Constraints: Applications in Neurodegenerative Disease Research, Mechanisms, and Progression. Presentation to Mt. Sinai School of Medicine.

Kozloski, J (2015) Brain Systems Modeling using Multimodal, Multiscale Constraints for Clinical Research and Diagnostic Support. Presentation to Carnegie Mellon University BrainHub.

Kozloski J (2014) Generative algorithms for scaling microstructural models of dendrites, axons, and synapses to whole tissues and brain. Presentation to Focus Program on Neurovascular Coupling, Fields Institute, U. Toronto

Kozloski J (2014) Scalable Reaction Diffusion Calculations over Gap Junction Coupled, Branched Neuron Topologies in Neural Tissue Simulations of the Inferior Olive. Mathematical Biology Seminar, New Jersey Institute of Technology.

Kozloski J, Wagner J, Memelli H, Gurev V (2014) A large-scale physiological model of Inferior Olive neurons reveals climbing fiber intra-burst frequency depends on Olivocerebellar axon morphology. OCNS 2014, Quebec City. BMC Neuroscience 2014, 15(Suppl 1):P149.

Kozloski J (2013) Brain Mapping: How the IBM's Computational Biology Center maps the structure and function of the human brain, IBM Academy of Technology THINK series, "Big Brains" event, Photo credits.

Kozloski J, Wagner J, Costa R, Memelli H, and Gurev V (2013) Modeling Synaptic Plasticity in Large-Scale Neural Tissue Simulations of Chronic Pain and Drug Treatments. Biomedical Research Current Challenges in Computing, Lawrence Livermore National Labs and IBM sponsors. Napa, CA.

Kozloski J, Gurev V (2013) Full-scale structural model of the Inferior Olive and Olivocerebellar projection constructed from constraining meshes and directed growth. OCNS 2013, Paris. BMC Neuroscience 2013, 14(Suppl 1):P190.

Kozloski J (2013) A Scalable Solution for Specifying and Solving Arbitrary Dense Neural Tissue Model Graphs in a Domain Decomposition: Plans and Implications for I/O Bound Applications and Analysis. "Blue Gene Active Storage" Workshop, Institute for Advanced Simulation, Juelich Supercomputing Centre, Juelich, Germany.

Kozloski J (2012) The Neural Tissue Simulator: An Ultrascaleable Solution to Arbitrary Reaction Diffusion Calculations over Generated Neural Tissue Topology, Presentation to the Center for Cell Analysis and Modeling, University of Connecticut Health Center. Invited seminar.

Kozloski J (2012) The Neural Tissue Simulator: An Ultrascaleable Infrastructure for Specifying and Solving Arbitrary Model-Graphs over Complex Neural Tissue Topology, Presentation to INCF, Karolinska Institute, Multiscale Modeling Workshop "From cellular/network models to tissue simulation", Organizer Erik de Schutter (OIST), Stockholm, Sweden.

Kozloski J (2012) The Neural Tissue Simulator: An Ultrascaleable Solution to Large-Scale Structural and Electrophysiological Simulations of Neuronal Circuit Function, Seminar at the Centre for Neural Engineering, University of Melbourne, Australia.

Kozloski J (2012) The Neural Tissue Simulator: An Ultrascaleable Solution to Arbitrary Reaction Diffusion Calculations over Complex Neural Tissue Topology, Seminar at the Department of Engineering Sciences and Applied Mathematics, Northwestern University.

Kozloski K (2012) Computing In The Brain, Computing For The Brain, itWORKS.OHOI annual conference of the Ohio Department of Education, Columbus, Ohio.

Kozloski J (2012) The Neural Tissue Simulator: How to specify and scale an arbitrary number of compartment variables over an arbitrary number of compartments, Presentation to NeuroML Workshop, Convergence in Computational Neuroscience, University of Edinburgh, Scotland.

Kozloski J (2011) Brain systems computation with the neural tissue simulator, OCNS 2011 Workshop: Supercomputational Neuroscience – tools and applications, Organizers Abigail Morrison (U. Freiburg), Markus Diesmann (Jülich and RIKEN), and Anders Lansner (KTH), Stockholm, Sweden.

Kozloski J (2010) A theory of loop formation and elimination by STDP, NIPS 2010 Workshop: Advances in Activity-Dependent Plasticity, Organizer Paul Munro (U. Pittsburgh).

Kozloski J (2010) The Neural Tissue Simulator, Poster presentation at the DIADEM 2010 - Final Round Conference, Howard Hughes Janelia Farm Research Campus. Organizer Giorgio Ascoli (Krasnow Institute, George Mason U.).

Kozloski J, Wagner J, Peck C (2009) A Model of Emotional and Pain Regulation By Means of Cortico-cortical Loop Formation and Elimination, Stockholm Brain Institute, Sandhamn Retreat, Sweden.

Kozloski J, Cecchi G (2009) STDP yields a stereotyped global network topology that generates, propagates, and boosts synfire activity, Society For Neuroscience poster abstract 40.5.

Kozloski, J., Eleftheriou, M., Fitch, B., Peck, C. (2009). Interoperable Model Graph Simulator for High-Performance Computing. Technical Report RC24811. Yorktown Heights, NY: IBM T. J. Watson Research Center.

Kozloski, J (2009) Neural tissue simulation on Blue Gene., The 9th Winter Workshop on Mechanisms of Brain and Mind. Hokkaido, Japan.

Kozloski J, Markram H (2008) Structural simulations and analysis of morphologically detailed neural microcircuits. Forum of European Neuroscience (FENS), Special Event Lecture, Plenary Hall, SE09-2-2.

Kozloski J, Eleftheriou M, Germain RS, Fitch B, and Peck C, (2008) Programming with the Large Scale Edge-Node Simulator on Blue Gene/L: A Case Study of 3D FFT, 13th SIAM Conference on Parallel Processing for Scientific Computing, abstract CP8-2.

Kozloski J, Peck C, Cecchi G, Rao R (2007) Layer 2/3 Is a neural multigrid: Information maximization in a local network explains V1 hypercolumn formation, Computational and Systems Neuroscience (COSYNE) abstract II-70.

Kozloski J, Cecchi GA, Peck CC, Rao AR (2007) A network for computing topographic infomax with an overcomplete basis: Correlates with the neocortical microcircuit, Dynamic Brain Forum (DBF), Riken Institute and Tamagawa University, Japan, 2007.

Rao AR, Cecchi GA, Peck CC, Kozloski J (2007) Performance characterization of an oscillatory neural network that achieves binding through phase synchronization Dynamic Brain Forum (DBF), Riken Institute and Tamagawa University, Japan.

Kozloski J, Peck C, Cecchi G, Rao R (2006) A multilevel, multiscale model of cortical map formation and synaptogenesis, Society for Neuroscience (SFN) abstract 619.8.

Peck CC, Streeter T, Kozloski J (2006) An integrated cerebellum model explaining associative learning, timing prediction, and motor control, Society for Neuroscience (SFN) abstract.

Rao AR, Cecchi GA, Peck CC, Kozloski J (2006) An optimization approach to achieve unsupervised segmentation in a network using dynamical units Proceedings of IEEE International Joint Conf on Neural Networks (IJCNN).

Rao AR, Cecchi GA, Peck CC, Kozloski J (2006) Translational invariance in a network of oscillatory units, Proceedings of SPIE, Electronic Imaging.

S. Liu, Cecchi GA, Rao AR, Peck CC, Kozloski J (2006) Inference and segmentation in cortical processing, Proceedings of SPIE, Electronic Imaging.

Rao AR, Cecchi GA, Peck CC, Kozloski J (2006) Self-organizing cortical maps showing joint frequency and orientation selectivity, Society for Neuroscience (SFN) Abstracts.

Kozloski J, Rao R, Cecchi G, Peck C (2005) Topographic map formation by maximizing information from naturalistic images in a microcircuit-inspired model of V1. Society for Neuroscience (SFN) abstract 582.6.

Rao RA, Peck CC, Cecchi GA, Kozloski J (2005) The organization of color in a 2D cortical map. Society for Neuroscience (SFN) abstract 743.9.

Cecchi GA, Kozloski J, Peck CC, Rao RA (2005) Mesoscopic modeling of thalamo-cortical circuitry: large-scale topology, oscillations and synchronization. Society for Neuroscience (SFN) abstract 617.12.

Peck CC, Caglar SG, Kozloski J, Rao RA, Cecchi GC (2005) Large-scale neocortical simulation on Blue Gene/L. Society for Neuroscience (SFN) abstract 688.5.

Kozloski J (2004) A Proposed method for recording intracellular signals using errors in intracellular biopolymer synthesis. Society for Neuroscience (SFN) abstract 1031.12.

Rao R, Cecchi G, Kozloski J, Peck CC (2004) Contour completion and figure-ground separation using self-organizing cortical maps. Society for Neuroscience (SFN) abstract 986.22.

Peck C, Cecchi G, Rao R, Kozloski J (2004) A thalamo-cortical microcircuit model for generating emergent oscillations and preventing runaway excitation in strong cortico-cortical loops Society for Neuroscience (SFN) slide presentation abstract 598.9.

Kozloski J, Hamzei-Sichani F, Yuste R (2003) Quantitative classification of layer V interneurons from mouse visual cortex: Evidence for interneurons classes with different sub-laminar input sampling. Society for Neuroscience (SFN) abstract.

Kozloski J (2002) Stereotyped microcircuits in neocortex and an organizing role for large-scale neural simulation. Yale University, Department of Cellular and Molecular Physiology. Invited seminar.

Peck C, Cecchi G, Rao R, Arnold W & Kozloski J (2002) Specification and simulation of patterned microcircuit connectivity in a Large-Scale Edge Node Simulation (LENS). Society for Neuroscience (SFN) abstract 405.22.

Hamzei-Sichani F, Kozloski J, Yuste R (2002) Factor analysis classification of layer 5 interneurons from mouse primary visual cortex. Society for Neuroscience (SFN) abstract 159.22.

Kozloski, J (2002) Simulating stereotyped topology in neocortical microcircuits. Workshop on The Structure of the Cortical Microcircuit abstract, Instituto Juan March de Estudios e Investigaciones, Madrid, Spain. Invited poster.

Kozloski J (2002) Stereotyped topology in the neocortical microcircuit. Neuroscience and Computation: From synaptic to brain imaging, Centre Emile Borel, Institut Henri Poincaré, Paris, France. Invited lecture.

Kozloski J, Hamzei-Sichani F, Yuste R. (2001) Quantitative classification of layer 5 neocortical interneurons using principal components and cluster analysis. Society for Neuroscience (SFN) slide presentation abstract 349.8.

Suzuki A, Kozloski J, Crawford JD (2001) Parallel inputs code for sound features in the sonic fish (*Pollimyrus*) auditory nerve. Society for Neuroscience (SFN) abstract 513.18.

Kozloski J (2000) Stereotyped excitatory microcircuits in mouse visual cortex revealed using optical probing and dual recording. Princeton University. Invited seminar.

Kozloski J (2000) Stereotyped local synaptic circuits in mouse visual cortex. Hunter College, New York, NY. Course guest lecturer.

Kozloski J (2000) Stereotyped local synaptic circuits in mouse visual cortex. Columbia University, Biological Sciences Departmental Retreat. Invited lecture.

Yuste R, Peterlin Z, Kozloski J (2000) Optical probing: a novel technique for revealing neuronal circuits. Hungarian Academy of Sciences, Budapest, Scientific Meeting. May, 2000.

Kozloski J, Hamzei F, & Yuste R (2000) Optical probing of microcircuits in visual cortex: neuronal targets of a subclass of layer 5 pyramidal neuron. Society for Neuroscience (SFN) abstract.

Kozloski J & Crawford JD (1998) Rate coding of sound features in second and third order auditory nuclei is computed from temporally structured first order spike trains. Society for Neuroscience (SFN) abstract 77.5.

Kozloski J & Crawford JD (1998) A model of computation through convergence and multiple spike initiation zones predicts the enhanced temporal representation of auditory signals in the medulla of *Pollimyrus*. International Society for Neuroethology (ISN) abstract.

Kozloski J & Crawford JD (1998) Chopper responses in the auditory medulla of a sonic fish. Association for Research in Otolaryngology (ARO) abstract 403.

Large E, Kozloski J & Crawford JD (1998) A dynamical model of temporal processing in the fish auditory system. Association for Research in Otolaryngology (ARO) abstract 396.

Kozloski J & Crawford JD (1997) Physiology of primary afferents and first order auditory neurons in the medulla of a sonic fish: *Pollimyrus adspersus*. Association for Research in Otolaryngology (ARO) abstract 566.

Huang X, Kozloski J & Crawford JD (1996) Sexually dimorphic swim bladder muscles in an electric fish. Society for Neuroscience (SNF) abstract 178.2.

Kozloski J & Crawford JD (1996) Time coding in the auditory medulla of a sonic fish. Society for Neuroscience (SFN) abstract 178.3.

Kozloski J (1996) Transformations in temporal coding from primary afferents to first order auditory centers in a sonic fish. Behavioral Neuroscience Retreat, University of Pennsylvania, Philadelphia, PA.

Kozloski J (1996) Temporal processing in the medulla of a sonic fish. Philadelphia Chapter of the Society for Neuroscience.

Kozloski J & Crawford JD (1995) Auditory pathways of a sonic fish: *Pollimyrus adspersus* (Mormyridae). Society for Neuroscience (SFN) abstract 361.7.

External Media

Forbes, Popular Science, Atlantic (Online & Print), Biotechn.asia, Wired UK, Science Alert, alphas, CBC Radio (Interview), Motherboard (Vice), Security Intelligence, Psychology Today, +21 International Media Articles

Internal Media

“Journey Into the Human Brain,” https://youtu.be/l1ZKl_kF8rQ

“Forget Me Not,” <https://youtu.be/-CofX1RlfWc>

Issued Patents

	Patent No.	Patent Name
1	10,658,531	Spalling techniques for manufacturing photodiodes
2	10,654,570	Vehicular alert system
3	10,643,256	Configuring a self-driving vehicle for charitable donations pickup and delivery
4	10,640,121	Vehicle Control For Reducing Road Wear
5	10,620,724	Pressure-sensitive authentication
6	10,609,901	Unmanned aerial vehicle for generating geolocation exclusion zones
7	10,599,114	Vehicle electronic receptionist for communications management
8	10,589,173	Contextual and differentiated augmented-reality worlds
9	10,559,215	Education reward system and method
10	10,552,880	System, method, and recording medium for cognitive and contextual queue management
11	10,546,432	Presenting location based icons on a device display
12	10,537,701	Alleviating movement disorder conditions using unmanned aerial vehicles
13	10,529,147	Self-driving vehicle road safety flare deploying system

14	10,521,961	Establishing a region of interest for a graphical user interface for finding and depicting individuals
15	10,489,043	Cognitive graphical control element
16	10,489,706	Discovering and using informative looping signals in a pulsed neural network having temporal encoders
17	10,491,473	Role and proximity-based management of networks
18	10,469,398	Selecting forecasting model complexity using eigenvalues
19	10,453,172	Sparse-data generative model for pseudo-puppet memory recast
20	10,453,345	Autonomous presentation of a self-driving vehicle
21	10,455,215	System, method, and recording medium for a closed-loop immersive viewing technology coupled to drones
22	10,455,287	Content delivery system, method, and recording medium
23	10,454,990	Dynamically adjusting quality of service using cognitive focus of attention detection
24	10,438,170	Blockchain for program code credit and programmer contribution in a collective
25	10,438,218	System, method, and recording medium for restaurant management
26	10,423,274	Touch input device with pathogen transmission mitigation
27	10,417,568	Discovering cognition bias toward data presentation styles through file system analysis
28	10,410,131	Reducing graphical text analysis using physiological priors
29	10,395,300	Method system and medium for personalized expert cosmetics recommendation using hyperspectral imaging
30	10,394,323	Templates associated with content items based on cognitive states
31	10,389,749	Blockchain tracking of virtual universe traversal results
32	10,387,849	System, method, and recording medium for a bi-directional feed between electronic calendar and credit-card authorization unit
33	10,380,805	Finding and depicting individuals on a portable device display
34	10,375,105	Blockchain web browser interface
35	10,373,068	Weight adjusted composite model for forecasting in anomalous environments
36	10,360,412	Contextual contemporaneous gesture and keyboard entry authentication
37	10,351,000	Intelligent vehicle fuel gauge
38	10,279,267	Monitoring game activity to detect a surrogate computer program
39	10,259,452	Self-driving vehicle collision management system
40	10,251,553	Dispensing drugs from a companion diagnostic linked smart pill
41	10,245,968	System and method of charging a vehicle using a dynamic power grid, and system and method of managing power consumption in the vehicle
42	10,244,971	Mouthguard for analysis of biomarkers for traumatic brain injury
43	10,242,237	Contemporaneous facial gesture and keyboard entry authentication
44	10,223,440	Question and answer system emulating people and clusters of blended people
45	10,216,909	Health monitoring
46	10,176,525	Dynamically adjusting insurance policy parameters for a self-driving vehicle
47	10,169,988	Aerial drone for correcting erratic driving of a vehicle

48	10,169,003	Cognitive scope analyzer
49	10,168,700	Control of an aerial drone using recognized gestures
50	10,168,683	Vehicle electronic receptionist for communications management
51	10,165,979	Helmet having a cumulative concussion indicator
52	10,162,345	Enhanced emergency reporting system
53	10,140,593	System, method and recording medium for doorbell control based on doorbell data and calendar data
54	10,130,303	Automatic adjustment of helmet parameters based on a category of play
55	10,117,032	Hearing aid system, method, and recording medium
56	10,115,107	Payment card fraud protection
57	10,114,890	Goal based conversational serendipity inclusion
58	10,109,214	Cognitive bias determination and modeling
59	10,108,935	Calendar adjusting device
60	10,061,326	Mishap amelioration based on second-order sensing by a self-driving vehicle
61	10,049,198	Securing a device using graphical analysis
62	10,043,194	Network demand forecasting
63	10,009,405	Dynamically adjusting quality of service using cognitive focus of attention detection
64	9,996,239	Enumeration and modification of cognitive interface elements in an ambient computing environment
65	9,996,217	Contextual determination of emotion icons
66	9,987,971	Drone-enhanced vehicle external lights
67	9,985,916	Moderating online discussion using graphical text analysis
68	9,953,029	Prediction and optimized prevention of bullying and other counterproductive interactions in live and virtual meeting contexts
69	9,953,028	Cognitive contextualization of emergency management system communications
70	9,943,689	Analyzer for behavioral analysis and parameterization of neural stimulation
71	9,942,234	Cognitive password entry system
72	9,942,186	Email chain navigation
73	9,912,831	Sensory and cognitive milieu in photographs and videos
74	9,896,100	Automated spatial separation of self-driving vehicles from other vehicles based on occupant preferences
75	9,886,572	Lie vault
76	9,869,560	Self-driving vehicle's response to a proximate emergency vehicle
77	9,860,123	Role and proximity-based management of networks
78	9,856,020	Drone-based mosquito amelioration based on risk analysis and pattern classifiers
79	9,852,646	Providing question answering responses to how-to procedural questions
80	9,848,269	Predicting harmful noise events and implementing corrective actions prior to noise induced hearing loss
81	9,846,844	Method and system for quantitatively evaluating the confidence in information received from a user based on cognitive behavior

82	9,836,973	Selectively controlling a self-driving vehicle's access to a roadway
83	9,836,927	Wearer role-based visually modifiable garment
84	9,836,695	Automated decision support provenance and simulation
85	9,804,954	Automatic cognitive adaptation of development assets according to requirement changes
86	9,798,299	Preventing substrate penetrating devices from damaging obscured objects
87	9,794,550	Eye-fatigue reduction system for head-mounted displays
88	9,779,756	Method and system for indicating a spoken word has likely been misunderstood by a listener
89	9,779,080	Text auto-correction via N-grams
90	9,774,993	System, method, and recording medium for geofence filtering
91	9,773,419	Pre-positioning aerial drones
92	9,772,714	Touch input device with pathogen transmission mitigation
93	9,771,083	Cognitive displays
94	9,763,571	Monitoring a person for indications of a brain injury
95	9,762,655	Directing communications to nodes of a social network using an elastic map
96	9,756,057	System and method for enhanced display-screen security and privacy
97	9,754,465	Cognitive alerting device
98	9,751,532	Controlling spacing of self-driving vehicles based on social network relationships
99	9,747,581	Context-dependent transactional management for separation of duties
100	9,747,276	Predicting individual or crowd behavior based on graphical text analysis of point recordings of audible expressions
101	9,731,726	Redirecting self-driving vehicles to a product provider based on physiological states of occupants of the self-driving vehicles
102	9,722,965	Smartphone indicator for conversation nonproductivity
103	9,721,397	Automatic toll booth interaction with self-driving vehicles
104	9,718,471	Automated spatial separation of self-driving vehicles from manually operated vehicles
105	9,711,027	Suggesting adjustments to a helmet based on analysis of play
106	9,710,792	Retrospective management of previously sent electronic messages
107	9,693,009	Sound source selection for aural interest
108	9,691,262	Informing first responders based on incident detection, and automatic reporting of individual location and equipment state
109	9,685,050	Alert sound alteration
110	9,674,670	Communicating with isolated mobile devices in indoor positioning systems
111	9,665,907	Automated transactional carbon offsetting
112	9,659,503	Ambulatory route management based on a personal drone
113	9,659,367	Head mounted video and touch detection for healthcare facility hygiene
114	9,633,538	System and method for wearable indication of personal risk within a workplace
115	9,607,573	Avatar motion modification
116	9,600,306	Client-side simulated virtual universe environment

117	9,571,785	System and method for fine-grained control of privacy from image and video recording devices
118	9,566,986	Controlling driving modes of self-driving vehicles
119	9,563,609	Systems and methods for customizing appearance and behavior of electronic documents based on a multidimensional vector of use patterns
120	9,560,075	Cognitive honeypot
121	9,558,181	Facilitating a meeting using graphical text analysis
122	9,552,222	Experience-based dynamic sequencing of process options
123	9,531,875	Using graphical text analysis to facilitate communication between customers and customer service representatives
124	9,513,632	Driving mode alerts from self-driving vehicles
125	9,508,360	Semantic-free text analysis for identifying traits
126	9,504,386	Controlling devices based on physiological measurements
127	9,483,948	Automated control of interactions between self-driving vehicles and pedestrians
128	9,481,366	Automated control of interactions between self-driving vehicles and animals
129	9,471,064	System and method to operate a drone
130	9,469,476	Smart mat for package deliveries
131	9,454,353	Initiating use of software as part of a messaging window
132	9,447,448	Drone-based microbial analysis system
133	9,435,659	Route planning to reduce exposure to radiation
134	9,431,003	Imbuing artificial intelligence systems with idiomatic traits
135	9,417,928	Energy efficient supercomputer job allocation
136	9,411,611	Colocation and anticolocation in colocation data centers via elastic nets
137	9,406,024	System and method for color paint selection and acquisition
138	9,405,346	Managing access to data on a client device during low-power state
139	9,402,576	Electronic communication warning and modification
140	9,384,661	Cognitive needs-based trip planning
141	9,361,409	Automatic driver modeling for integration of human-controlled vehicles into an autonomous vehicle network
142	9,349,100	Method for providing a prompt for real-time cognitive assistance
143	9,348,989	Contemporaneous gesture and keyboard entry authentication
144	9,311,360	Association of data to a biological sequence
145	9,270,714	Content preview generation using social network analysis
146	9,268,454	Trigger event based data feed of virtual universe data
147	9,262,748	Identifying locations of potential user errors during manipulation of multimedia content
148	9,253,433	Method and apparatus for tagging media with identity of creator or scene
149	9,224,178	Dynamic negotiation and authorization system to record rights-managed content
150	9,177,257	Non-transitory article of manufacture and system for providing a prompt to user for real-time cognitive assistance
151	9,166,943	Systems and methods for using social network analysis to schedule

		communications
152	9,157,755	Providing navigational support through corrective data
153	9,135,849	Variable operating mode HMD application management based upon crowd determined distraction
154	9,108,582	System and method for collaborative vehicle crash planning and sequence deployment
155	9,106,966	Multi-dimensional channel directories
156	8,964,995	Acoustic diagnosis and correction system
157	8,914,225	Managing vehicles on a road network
158	8,893,000	Relocation between virtual environments based upon promotional and alert conditions
159	8,832,823	User access control based on handheld device orientation
160	8,825,510	Smart reminder management
161	8,804,042	Preemptive preloading of television program data
162	8,781,668	Location-based vehicle powertrain regulation system
163	8,756,564	Techniques for providing environmental impact information associated with code
164	8,648,865	Variable rendering of virtual universe avatars
165	8,640,088	Software reuse utilizing naive group annotation of incomplete software descriptions employing a self-reporting element
166	8,589,076	Power usage planning for a vehicle
167	8,464,350	System and method for in-private browsing
168	8,458,352	Creating a virtual universe data feed and distributing the data feed beyond the virtual universe
169	8,296,072	Techniques for recording signals
170	8,244,805	Communication integration between a virtual universe and an external device
171	8,230,441	Virtual world subgroup determination and segmentation for performance scalability
172	8,056,121	Virtual universe account protection
173	7,953,519	Energy usage monitoring and balancing method and system
174	7,792,801	Controlling and using virtual universe wish lists
175	7,783,646	System, method, and computer readable media for identifying and rating virtual universe objects
176	7,756,691	Establishing relationships between components in simulation systems
177	7,287,015	Methods and apparatus for transmitting signals through network elements for classification

Grants & Awards

Individual Postdoctoral NRSA, "Two-Photon Imaging of Barrel Field Cortical Microcircuits." Submitted August 1998. Funded May 1999-May 2002.

Individual Predoctoral NRSA, "Neural Processing of Sonic Communication Signals." Submitted August 1996. Priority Score 102. Funded May 1996-August 1998.

Institutional Training Program in Behavioral Neuroscience, Predoctoral fellowship, University of Pennsylvania. September 1995-May 1997.

Institutional Training Grant, Predoctoral fellowship, The Monell Center for Smell and Taste. September 1993-August 1995.

Kosciuszko Foundation Graduate Scholarship, The Kosciuszko Foundation, New York, NY. 1994-95. A competitive scholarship awarded to Polish Americans pursuing graduate degrees.

Jefferson Scholarship, University of Virginia Alumni Association, 1988-92. A full scholarship for four years of undergraduate education awarded on the basis of scholarship, leadership, and citizenship.

Academic and Professional Honors

Elliot Stellar Award, Philadelphia Chapter of the Society for Neuroscience, May 1996.

Phi Beta Kappa, University of Virginia Chapter, 1990. College academic achievement.

Echols Scholar, University of Virginia, 1988-92. Pre-college academic achievement.

The Raven Society, University of Virginia, 1991. Scholarly contribution to the University.

Professional Society Memberships

Organization for Computational Neuroscience (OCNS), 2011.

Society for Neuroscience (SFN), 1995-2010.

International Society for Neuroethology (ISN), 1995-2001.

Supplementary Courses

Methods in Computational Neuroscience, The Marine Biological Laboratories, Woods Hole, MA, July 1999-August 1999. Drs. William Bialek and Rob de Ruyter van Steveninck directors.

German and American Young Scholars Institute on Behavioral Organization in Higher & Lower Animals, Bodega Marine Laboratory, Bodega Bay, CA, August 1997. Drs. Mark Konishi and Martin Heisenberg directors.

Summer School in Bioacoustics, Odense University, Odense, Denmark & University of Copenhagen, Copenhagen, Denmark, August 1996. Drs. Ole Larsen and Axel Michelsen and directors.

Neural Systems and Behavior, The Marine Biological Laboratories, Woods Hole, MA, June 1995-August 1995. Drs. Harold Zakon and Janis Weeks directors.

Teaching Experience

Adjunct Professor, Columbia University Department of Electrical Engineering. 2006-2011. Courses Taught: ELEN6082, Global Brain Modeling, with Dr. Charles Peck, IBM, fall semesters, 2006, 2007, 2008.

Faculty Lecturer, Methods in Computational Neuroscience, The Marine Biological Laboratories, Woods Hole, MA, August 2005. Drs. John White and Bard Ermentrout directors.

Teaching Assistant: Cellular Neurobiology, Spring 1996, University of Pennsylvania. Taught and advised 40 undergraduates in this 200 level Biology course.

Teaching Assistant: Introduction to Brain and Behavior, Fall 1995, University of Pennsylvania. Taught and advised 20 undergraduates in this 300 level Biology course.

Writing Instructor: Research Experience in Neuroethology, Fall 1995, University of Pennsylvania. Taught scientific writing to 15 undergraduates in this 300 level Biology course.

Summary of Research

March 2019-present, Hybrid AI/mechanistic models for design of the heart and brain therapeutics. IBM Watson Research Center, Yorktown Heights, New York.

March 2015-present, Global brain models of neurodegenerative disease pathophysiology and progression. IBM Watson Research Center, Yorktown Heights, New York.

May 2001-present, Implementation of self-organizing cognitive systems in biologically-based computational brain models. IBM Watson Research Center, Yorktown Heights, New York.

March 2007-present, Whole tissue modeling of brain structures using supercomputers, IBM Watson Research Center, Yorktown Heights, New York.

May 2006-February 2007, Computational neuroanatomical studies of simulated neocortical tissue: Blue Brain Project, IBM Watson Research Center, Yorktown Heights, New York and EPFL, Lausanne, Switzerland.

January 1999-May 2001, Functional imaging of visual cortical microcircuits. Using whole cell patch clamp recording, video microscopy, and two-photon imaging, tracing functional connectivity in cortical circuits. Postdoctoral project with Dr. Rafael Yuste, Columbia University.

May 1994-December 1998, Neuroanatomical and neurophysiological studies of medullary auditory centers in an electric fish, *Pollimyrus adspersus*. Traced the functional auditory pathway using simultaneous physiology and extracellular dye injections. Thesis project with Dr. John D. Crawford, University of Pennsylvania Auditory Neuroethology Laboratory.

August 1996-September 1996, Characterization of the frequency response properties of the Mormyrid ear using laser vibrometry. Collaborative study with Drs. Axel Michelsen and Jakob Christensen-Dalsgaard, Odense University, Denmark.

January 1994-July 1994, Behavioral learning studies in the golden hamster: an attempt to use Pavlovian conditioning to create tone-generated phase-shifting responses in circadian wheel running activity. Graduate rotation with Dr. Gary Pickard, University of Pennsylvania.

January 1994-May 1994, Morphological analysis of retinal ganglion cells which project to the suprachiasmatic nucleus: a study using retrograde rhodamine bead labeling and intracellular injections of Lucifer Yellow. Graduate rotation with Dr. Gary Pickard, University of Pennsylvania.

September 1993-December 1993, Data analysis and neurophysiology of single units in the superior colliculus and cerebellum of the behaving macaque. Graduate rotation with Dr. David Sparks, University of Pennsylvania.

June 1992-July 1993, Reverse genetic mapping of blm, the gene responsible for Bloom Syndrome in humans. Served as a senior research technician with Drs. James L. German III and Nathan E. Ellis, The Laboratory of Population Genetics and Computer Modeling at The New York Blood Center (cf. Ellis et al. 1995: "The Bloom's Syndrome gene product is homologous to RecQ helicases." Cell: 83(4):655:66).

January 1992-May 1992, Characterization of neurite outgrowth and morphological subtypes within basal retinal neuron populations in the sea slug, *Bulla*. Undergraduate senior project with Dr. Gene Block, Center for Biological Timing, University of Virginia.