

# PAUL SAJDA

## *Curriculum Vitae*

Vikram S. Pandit Professor of Biomedical Engineering  
Chair, Department of Biomedical Engineering  
Professor of Electrical Engineering and Radiology (Physics)  
Columbia University

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<http://liinc.bme.columbia.edu>

## FIELD OF SPECIALIZATION

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Neuroengineering: A multidisciplinary approach combining cognitive neuroscience with engineering to characterize the cortical networks underlying perceptual and cognitive processes, such as rapid decision-making in the human brain. My laboratory pursues basic and applied neuroscience research projects, emphasizing non-invasive multi-modal neuroimaging, visual perception, brain-computer interfaces, application of machine learning to the analysis of neural data, and computational modeling of large neural systems. I am also interested in the applications of these methods for better characterizing, understanding, and treating psychiatric illness.

## EDUCATION

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**Ph.D., Bioengineering, University of Pennsylvania** 1994

Dissertation: "Reverse Engineering of Intermediate-level Vision: Surface Segmentation and Depth-from-Occlusion"

Supervisor: Prof. Leif Finkel

Awarded Best Doctoral Thesis in Bioengineering (Pollack Award)  
and Neuroscience (Flexner Award)

**M.S.E., Bioengineering, University of Pennsylvania** 1992

**B.S., Electrical Engineering, Massachusetts Institute of Technology** 1989

Thesis: "Machine Implementation of a Human Motor Task:

The Yo-Yo Robot" (Sponsor: Prof. Christopher Atkeson)

Awarded Best Undergraduate Thesis in Electrical Engineering  
(David Adler Memorial Thesis Prize)

## APPOINTMENTS AND EMPLOYMENT

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Chair, Department of Biomedical Engineering 2023-present

Vikram S. Pandit Professor in Biomedical Engineering, Columbia University 2022-present

Vice Chair, Department of Biomedical Engineering 2020-2023

Professor, Biomedical Engineering, Electrical Engineering, and Radiology,  
Columbia University 2012-present

Affiliate Member, Zuckerman Mind Brain and Behavior Institute, Columbia University 2018-present

Visiting Professor, University of Glasgow 2015-2020

Member, Data Science Institute, Columbia University 2012-present

Member, Graduate Group, Neurobiology and Behavior, Columbia University 2008-present

Visiting Scientist, RIKEN Brain Sciences Institute, JAPAN 2008

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|-----------------------------------------------------------------------------------------------------|--------------|
| Director, Laboratory for Intelligent Imaging and Neural Engineering (LIINC),<br>Columbia University | 2000-present |
| Associate Professor, Biomedical Engineering and Radiology, Columbia University                      | 2000-2012    |
| Head, Adaptive Image & Signal Processing Group, Sarnoff Research Center                             | 1997-2000    |
| Technology Leader, Adaptive Image & Signal Processing, Sarnoff Research Center                      | 1996-1997    |
| Member of Technical Staff, Sarnoff Research Center                                                  | 1994-1996    |

## **FELLOWSHIPS AND HONORS**

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| Appointed to the Bush Fellows Research Study Team (BFRST)                                                                     | 2025 |
| Elected Fellow of the International Academy of Medical and Biological Engineering (IAMBE)                                     | 2023 |
| Elected President of IEEE Engineering in Medicine and Biology Society (EMBS) (23-24)                                          | 2021 |
| Awarded Vannevar Bush Faculty Fellow, Department of Defense                                                                   | 2019 |
| Elected Fellow of the American Association for the Advancement of Science (AAAS)                                              | 2017 |
| Elected Fellow of the Institute of Electrical and Electronic Engineers (IEEE)                                                 | 2012 |
| National Academies Keck's Future Initiative (NAKFI) Invited Member:<br>'The Informed Brain in a Digital World'                | 2012 |
| Elected Editor-in-Chief of IEEE Transactions on Neural Systems and<br>Rehabilitation Engineering                              | 2011 |
| Elected Fellow of the American Institute for Medical and Biological Engineering (AIMBE)                                       | 2009 |
| Awarded Japan Society for the Promotion of Science (JSPS) Fellowship                                                          | 2008 |
| National Science Foundation CAREER Award                                                                                      | 2002 |
| Sarnoff Technical Achievement Award for 'Computer Aided Diagnosis.'                                                           | 1996 |
| Solomon R. Pollack Award for the Outstanding Ph.D. Dissertation Bioengineering,<br>University of Pennsylvania                 | 1994 |
| Louis and Josepha B. Flexner Award for the Outstanding Ph.D.<br>Dissertation in the Neurosciences, University of Pennsylvania | 1993 |
| Graduate Fellow, Office of Naval Research National Defense Science and<br>Engineering (NDSEG)                                 | 1991 |
| University Fellow, University of Pennsylvania                                                                                 | 1989 |
| David Adler Memorial Thesis Prize for Outstanding Undergraduate<br>Thesis Research in Electrical Engineering, MIT             | 1989 |
| Eta Kappa Nu                                                                                                                  | 1988 |

## **SOCIETY MEMBERSHIP**

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Fellow International Academy of Medical and Biological Engineering, since 2023  
 Fellow American Association for the Advancement of Science, since 2000  
 Fellow American Institute for Medical and Biological Engineering, since 2009  
 Fellow Institute of Electrical and Electronic Engineers, since 1994  
 Member Engineering in Medicine and Biology Society, since 2000  
 Member Association for Research in Vision and Ophthalmology, since 1992  
 Member Association for Computing Machinery, since 2010  
 Member Society for Neuroscience, since 2002

## **OFFICES HELD IN PROFESSIONAL SOCIETIES**

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Past-President IEEE Engineering in Medicine and Biology Society (2025-2026)  
President IEEE Engineering in Medicine and Biology Society (2023-2024)  
Inaugural Chair IEEE BRAIN Technical Community (2021)  
Chair IEEE BRAIN Initiative (2015-present)  
Chair Neuroengineering Technical Community IEEE EMBS (2020-present)  
Non-voting member of IEEE Administrative Committee (2011-2017)  
Member Publications Committee of IEEE EMBS (2011-2017)  
Member IEEE Defense & Engineering R&D Committee (2006-2007)  
Member IEEE EMBS Technical Committee on Medical Imaging and Image Processing (2007-2012)  
Member IEEE EMBS Technical Committee on Neuroengineering (2008-present)

## **EDITORSHIPS**

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Topic Editor Advancing the use of Eye-Tracking and Pupillometric data in Complex Environments, Frontiers in Neuroscience (2020)  
Co-Editor Special Issue of the Proceedings of the IEEE, Advanced NeuroTechnologies for Brain Initiatives (ANTBI), 2017  
Editor-in-Chief IEEE Transactions on Neural Systems and Rehabilitation Engineering (2012-2017)  
Co-Editor Special issue on 'Single-trial analyses of behavioural and neuroimaging data in perception and decision-making,' Frontiers in Perceptual Science 2011  
Review Editor Frontiers in Decision Sciences, since 2010  
Associate Editor Frontiers in Perceptual Science, since 2009  
Associate Editor IEEE EMBC Annual Meeting Neural Engineering Theme (2008-2017)  
Co-Editor Special issue on 'Brain-Computer Interfaces,' IEEE Signal Processing Magazine, Jan 2008  
Co-Editor Special issue on 'Blind Signal Separation and Deconvolution' in International Journal of Imaging Systems and Technology, 2005  
Associate Editor IEEE Transactions on Biomedical Engineering, since 2002  
Associate Editor IEEE Transactions on Neural Systems and Rehabilitation Engineering

## **CONFERENCE CHAIRMANSHIPS AND PROGRAM COMMITTEES**

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Member International Program Committee, 2025 IEEE EMBC Annual Conference, July 2025, Copenhagen, DENMARK  
Member Steering Committee, IEEE Neural Engineering Conference, Nov 2025, San Diego, CA  
Co-Chair 2023 IEEE EMBS Special Topics Conference in Data Science and Engineering in Healthcare, Medicine and Biology, December 2023, MALTA  
Co-Chair 2022 IEEE EMBS - TEL AVIV UNIVERSITY PUBLIC FORUM Data Science and Engineering in Healthcare, Medicine and Biology (Tel Aviv, ISRAEL)  
Program Chair 2021 IEEE EMBS Grand Challenges Forum Data Science and Engineering Healthcare, Virtual  
Theme Chair 2021 IEEE EMBC Annual Meeting, Neural & Rehabilitation Engineering  
Co-Chair 2020 IEEE Brain Initiative Workshop on Advanced Neural Technologies, Oct, Virtual  
Track Chair 2020 Machine Learning in Science and Engineering (MLSE) Neuroscience Track, Virtual  
General Co-Chair 2019 IEEE International Conference on Neural Engineering, San Francisco CA  
Co-Chair 2018 IEEE Brain Initiative Workshop on Advanced Neural Technologies, Nov, San Diego, CA

Program Committee Co-Chair 2017 IEEE International Conference on Neural Engineering, Shanghai CHINA  
 Co-Chair 2017 IEEE Brain Initiative Workshop on Advanced Neural Technologies, Nov, Washington, DC  
 Steering Committee 2015 IEEE BRAIN Grand Challenges Workshop, Washington, DC  
 International Program Committee 2015 IEEE International Conference on Neural Engineering, Montpellier, FRANCE  
 Program Committee 2015 4th International Workshop on Symbiotic Interaction, Berlin GERMANY  
 Co-Chair 2015 Army Research Lab Workshop on Brain-Computer Interfaces, Aberdeen MD  
 Co-Organizer 2013 NSF Workshop on Mapping the Brain, Arlington, VA  
 Program Committee 2013 IEEE International Conference on Neural Engineering, San Diego, CA  
 Program Committee 2011 International Conference on Machine Learning (ICML), Seattle WA  
 Program Committee 2011 IEEE International Conference on Neural Engineering, Cancun MEXICO  
 Technical Program co-Chair 2011 IEEE CAS-FEST Workshop on Brain Machine Interfaces, Rio de Janeiro, BRAZIL  
 Organizing Committee and Theme Chair 2011 IEEE Conference on Engineering in Medicine and Biology, Boston MA  
 Organizing Committee and Theme Chair 2010 IEEE Conference on Engineering in Medicine and Biology, Buenos Aires ARGENTINA  
 Steering Committee IEEE EMBS Conference on Neural Engineering, 2009, Antalya, TURKEY  
 Program Committee IAPR Workshop on Cognitive Information Processing (CIP-2008), Santorini Greece  
 Organizing Committee and Theme Chair 2006 IEEE Conference on Engineering in Medicine and Biology, New York  
 Co-organizer and Co-chair Workshop on Applied Neural Computing, August 2006, New York  
 Program Committee 2005 IEEE Workshop on Learning in Computer Vision and Pattern Recognition  
 Program Committee 2nd International Conference on Neural Engineering, Washington D.C., 2005  
 Co-chair Neural Circuits and Networks Session, IEEE EMBS, 2004  
 Program Committee IEEE Workshop on Learning in Computer Vision and Pattern Recognition, 2003  
 Program Committee Chair, Biological Control Systems Session, IEEE EMBS Conference on Neural Engineering, 2003  
 Co-organizer Workshop 'Directions in Brain-Computer Interface Research,' Neural and Co-chair Information Processing Systems 2001, Whistler CANADA  
 Session Chairman IEEE Workshop on Neural Networks for Signal Processing, 1997  
 Program Committee European Signal Processing Conference (EUSIPCO08), Lausanne, Switzerland

## REVIEW PANELS

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NIH Review Panel Member (NCRR, CVP, SEP, BRAIN, P grants)  
 NSF Review Panel Member (BES, IIS, CRCNS, NCS)  
 Department of Defense Reviewer (ARO, ARL)  
 SERC Singapore Reviewer  
 FWF (Austria Science Foundation) Reviewer  
 Yorkshire Cancer Institute Reviewer  
 CCNY University Committee on Research Awards Reviewer  
 British MRC Reviewer  
 Wellcome Trust Reviewer

Science Foundation of Ireland Reviewer  
EPSRC Reviewer  
DFG Reviewer

## **PUBLICATIONS REVIEWED**

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Annals of Biomedical Engineering, Brain Research, Cerebral Cortex, Computer Vision and Image Understanding, Current Biology, European Conference on Computer Vision, eLife, EURASIP Journal of Applied Signal Processing, Experimental Brain Research, Frontiers in Decision Sciences, Frontiers in Neuroscience, Frontiers in Perceptual Science, Handbook of Brain Theory and Neural Networks (editor M. Arbib), Human Brain Mapping, IEEE Signal Processing Letters, IEEE Transactions on Biomedical Engineering, IEEE Transactions on Medical Imaging, IEEE Transactions on Neural Systems and Rehabilitation Engineering, IEEE Transactions on Neural Networks, IEEE Transaction on Pattern Analysis and Machine Intelligence, IEEE Transactions on Systems, Man and Cybernetics, Journal of Neural Engineering, Journal of Neuroscience, Journal of the Optical Society of America, Journal of Neurophysiology, Journal of Neuroscience Methods, Journal of Neuroscience, Journal of Vision, Journal of Visual Communication and Image Representation, Nature Communications, Neural Network Simulation Environments (editor J. Skrzypek), Neural Computation, Neural Information Processing Systems (NIPS), Neuroscience Letters, NeuroImage, Psychophysiology, PLOS Computational Biology, PLOS One, Proceedings of the National Academy of Science (PNAS), Science, Scientific Reports, Signal Processing Journal, Trends in Cognitive Science, Vision Research

## **INVITED TALKS**

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### **External Invited Seminars, Colloquia & Conference Talks**

Oct 2025 "Closed-loop Non-Invasive Neural Therapeutics," Distinguished Speaker Seminar, Bioengineering Department, University of California, Riverside  
Mar 2025 "Closed-loop Non-Invasive Neural Therapeutics," Department of Biomedical Engineering Distinguished Seminar, Purdue University  
Feb 2025 "The importance of being in-sync: closed-loop EEG-rTMS for personalizing target engagement for treatment of MDD," Invited talk at International Brain Stimulation Conference, Kobe, JAPAN  
Dec 2024 "Closed-loop Non-Invasive Neural Therapeutics," NC NM4R Speaker Series, Medical University of South Carolina  
Nov 2024 "Closed-loop Non-Invasive Neural Therapeutics," Department of Biomedical Engineering Distinguished Seminar, University of Houston  
June 2024 "Feeling better with NSYNC," invited plenary talk, BrainMind Forum on Neuromodulation, AI and BCI, New York  
Mar 2024 "Decision-Making in Humans Under Stress, Fatigue, and Uncertainty: Results from Individuals and Teams," Distinguished Speaker Seminar, AFRL  
Mar 2024 "Deep Learning for Fusion and Inference in Multimodal Neuroimaging," Machine Learning in Medicine (MLiM) seminar series, Cornell University  
Mar 2024 "Closed-loop Non-Invasive Neural Therapeutics," Bioengineering Distinguished Seminar Series, University of Illinois, Urbana-Champaign (UIUC)  
Jan 2024 "Closed-loop Non-Invasive Neural Therapeutics," BME Distinguished Speaker Seminar Series, University California Irvine  
Dec 2023 "Deep Learning for Fusion and Inference in Multimodal Neuroimaging," IEEE EMBS Special Topics Conference in Data Science and Engineering in Healthcare, Medicine and Biology, MALTA

Aug 2023 "Closed-loop Non-Invasive Neural Therapeutics," Keynote speaker, 16th International Conference on Brain Informatics, Hoboken, NJ

July 2023 "Closed-loop Non-Invasive Neural Therapeutics," Plenary speaker, Symposium on Neuroimaging, Neurostimulation, and Their Integration, 45th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Sydney, AUSTRALIA

May 2023 "Physiologically-Informed Artificial Intelligence (PI-AI)," Invited speaker, ANN-SONIC-NICO 10th International Workshop Network Theory, Northwestern University, Evanston, IL

Apr 2023 "Closed-loop EEG-TMS for Personalized Treatment of Major Depressive Disorder," Invited speaker, Workshop on Closed-loop Neural Stimulation, 10th IEEE EMBS International Conference on Neural Engineering, Baltimore, MD

Nov 2022 "Brain-body Measurements Augment Human-Agent Teaming," Invited talk for Army Research Laboratory National Academy of Science Technical Review Board Meeting, Aberdeen MD

Oct 2022 "Closed-loop Non-invasive Neural Therapeutics," Distinguished Lecture, Kennesaw State University

Oct 2022 "Data-driven Personalized Non-Invasive Neurostimulation for Treating Depression," Invited Plenary Talk, IEEE EMB-TAU Symposium on Data Science in Health, Medicine and Biology, Tel Aviv Israel

Sept 2022 "Closed-loop Non-invasive Neural Therapeutics," Distinguished Lecture, University of Delaware

Dec 2021 "Closed-loop Non-invasive Neural Therapeutics," Plenary Talk, IEEE EMBS 2021 Brain Mind Body Symposium and Workshop

June 2021 "Closed-loop non-invasive BCIs: From Performance Augmentation to Neural Therapeutics," Keynote BCI Society Annual Meeting

May 2021 "Closing-the-loop in Non-invasive Neurostimulation," invited speaker special symposium at the IEEE Neural Engineering Conference

Apr 2021 "Simultaneous EEG-fMRI for Inferring Brain Dynamics," Distinguished Lecture Series in Biomedical Engineering, University of Southern California

Mar 2021 "Future Neural Therapeutics," Invited speaker, IEEE BCI Standards Workshop

Mar 2021 "Simultaneous EEG-fMRI for Inferring Brain Dynamics," Distinguished Lecture Series in Biomedical Engineering, Penn State University

Feb 2021 "Machine Learning for Fusing Simultaneously Acquired EEG-fMRI," Invited Plenary Lecture, IEEE EMS Grand Challenges Forum Data Science and Engineering in Healthcare

Dec 2020 "Physiologically-informed Artificial Intelligence (PI-AI) for Improving Human Machine Interaction," MIT NanoBio Seminar Series, MIT, Virtual

Nov 2020 "The IEEE Brain Technology Community: Brain Machine Interfaces," Plenary speaker, Magnetism and the Brain: An Introduction to the IEEE Brain, annual IEEE MMM2020, Virtual

Sept 2020 "Simultaneous EEG-fMRI for Inferring Brain Dynamics," Neuroscience Distinguished Lecture, University of Massachusetts, Virtual

Aug 2020 "Physiologically-informed Artificial Intelligence (PI-AI) for Enabling Human Agent Teaming," Air Force Research Laboratory Distinguished Lecture, Virtual

June 2020 "Using real-time neurofeedback to regulate arousal for improving task performance," Gtech Internal Spring School

June 2019 "Multimodal Functional Neuroimaging of the Human Brain," IEEE International Summer School on Biocomplexity, Crete GREECE

June 2019 "Deep Learning for Neuroimaging," IEEE International Summer School Biocomplexity, Crete GREECE

June 2019 "Intent Switching and Co-Adaption of Man and Machine in a Closed-Loop Brain Computer Interface," ARO/NASA Life Sciences Workshop, Johnson Space Center, Houston TX

Apr 2019 "Machine Learning and Decoding Brain States in Perturbation-based Imaging," Workshop on Advanced TMS Techniques for Mental Health and Disability - Combining TMS with EEG or fMRI or Both, MUSC, Charleston SC

Nov 2018 "Fusing Simultaneously Acquired EEG and fMRI to Infer Spatiotemporal Dynamics of Cognition in the Human Brain," Plenary Speaker, IEEE Brain Initiative Workshop in Advanced Neurotechnologies, San Diego CA

Nov 2018 "Rehabilitating the Mind: Using AI to Track and Treat Mental Illness," ITU-WHO workshop on Artificial Intelligence for Health, New York City

Oct 2018 "Neuroengineering: A Multidisciplinary Effort to Measure, Stimulate, Model and Treat Diseases of the Brain," Keynote for UC Davis Office of Research, Neuroengineering Workshop

Oct 2018 "BCIs for Labeling our Environment," Invited Plenary Speaker, IEEE SMC Brain Machine Interface Workshop, Miyazaki JAPAN

Oct 2018 "Rehabilitating the Mind: Non-invasive Neurotechnology for Treating Psychiatric Illness," Invited Speaker International Conference on Neurorehabilitation (ICNR) 2018, Pisa ITALY

Apr 2018 "Fusing Simultaneously Acquired EEG and fMRI to Infer Spatiotemporal Dynamics of Cognition in the Human Brain," The BRAIN Center and IEEE EMBS Distinguished Lecture, University of Houston, TX

Apr 2018 "Investigating Human Perceptual-Decision Making using Simultaneously Acquired EEG and fMRI," Plenary Speaker, Maryland Neuroimaging Retreat 2018, Baltimore, MD

Nov 2017 "Integrating Brain-Computer Interface Technology With Augmented and Virtual Reality," invited lecture at Oculus Research, Redmond WA

Oct 2017 "Fusing Simultaneously Acquired EEG and fMRI to Infer Spatiotemporal Dynamics of Cognition in the Human Brain," BME Seminar Series, University of Florida, Gainesville, FL

Aug 2017 "Integrating Brain-Computer Interface Technology With Augmented and Virtual Reality," Invited Lecture at USC Institute for Creative Technology, Los Angeles, CA

June 2017 "Fusing Simultaneously Acquired EEG and fMRI to Infer Spatiotemporal Dynamics of Cognition in the Human Brain," Plenary Lecture, Cutting Edge EEG Workshop, Glasgow SCOTLAND

May 2017 "Integrating Brain-Computer Interface Technology With Augmented and Virtual Reality," Plenary Lecture, IEEE ANTBI Workshop, Shanghai, CHINA

Feb 2017 "Neuroimaging and Machine Learning and their potential impact on Mental Healthcare," 7th Advanced Institute on Global Healthcare Education, Cambridge, MA

Jan 2017 "Integrating Brain-Computer Interface Technology With Augmented and Virtual Reality," Keynote at IEEE International Conference on Consumer Electronics (ICCE), Las Vegas, Nevada

Jan 2017 "Fusing Simultaneously Acquired EEG and fMRI to Infer Spatiotemporal Dynamics of Cognition in the Healthy and Diseased Human Brain," Computational Biology Center Seminar, IBM Watson Research, Yorktown Heights, NY

Dec 2016 "Neural Correlates of the Aha Moment: Enabling Brain-Computer Interfaces for Labeling Our Environment," Invited MNE and IEEE Seminar Virginia Commonwealth University, Richmond, Virginia

Nov 2016 "Neural correlates of enhanced perception-action coupling in rapid decision making: Lessons from baseball," Plenary Speaker, pre-SFN Workshop on Advanced Neurotechnologies for Brain Initiatives, San Diego CA

Oct 2016 "Neural Correlates of the Aha Moment: Enabling Brain-Computer Interfaces for Labeling Our Environment," Invited Plenary Speaker, IEEE SMC Brain Machine Interface Workshop, Budapest Hungary

Nov 2015 "Capturing the Aha Moment: Neural Dynamics of Attentional Orienting in the Human Brain," BME Seminar Series, NJIT, Newark, NJ

Oct 2015 "Capturing the Aha Moment: Neural Dynamics of Attentional Orienting in the Human Brain," ECE Distinguished Speaker Series, University of Texas, San Antonio, San Antonio TX

Oct 2015 "Capturing the Aha Moment: Neural Dynamics of Attentional Orienting in the Human Brain," BME Seminar Series, City College of New York, CUNY, New York, NY

May 2015 "Capturing the Aha Moment: Neural Dynamics of Attentional Orienting in the Human Brain," Computational Biology Center Seminar, IBM Watson Research, Yorktown Heights, NY

Jan 2015 "Neural Correlates of the Aha Moment: Enabling brain-computer interfaces for labeling our environment," NYC Machine Learning Seminar, NY, NY

Nov 2014 "Neural Correlates of Spatiotemporal Event Recognition: Application to Brain-Computer Interfaces for Video Exploitation," Keynote address, International Workshop on Perception Inspired Video Processing, ACM Multimedia 2014 conference, Orlando FL

Oct 2014 "Capturing the Aha Moment: Neural Dynamics of Attentional Orienting in the Human Brain," Invited Seminar Department of Biomedical Engineering, Johns Hopkins University, MD

June 2014 "Your eyes give you away: Pupillary responses, EEG dynamics, and applications for BCI," JHU-APL Applied Neuroscience Seminar, Baltimore MD

Mar 2014 "Simultaneous EEG/fMRI: Why Bother?," Center for Functional fMRI, UCSD, San Diego CA

Mar 2014 "Your eyes give you away: Pupillary responses, EEG dynamics, and applications for BCI," Institute for Neural Computation, UCSD, San Diego CA

Feb 2014 "Neurally and ocularly informed graph-based models for searching 3D environments," Swartz Center for Cognitive Neuroscience, San Diego CA

Jan 2014 "Simultaneous EEG/fMRI: Why Bother?" The Center for Biomedical Imaging, Medical University of South Carolina, Charleston, SC

Nov 2013 "Neurally and ocularly informed graph-based models for searching 3D environments," Plenary Speaker, IEEE Neural Engineering Conference, San Diego CA

Sept 2013 "Neurally and ocularly informed graph-based models for searching 3D environments," Mathematical Biosciences Institute Colloquium, Ohio State University, OH

June 2013 "Multimodal Neuroimaging of Perceptual Decision Making," Workshop on Neuroimaging Data Analysis, Statistical and Applied Mathematical Sciences Institute, NC

Mar 2013 "Using Simultaneous EEG/fMRI to Elucidate the Cortical Networks Underlying Rapid Decision Making and Perceptual Discrimination," Workshop on Multimodal Neuroimaging, Institute for Pure & Applied Mathematics UCLA

Oct 2012 "Cortically-Coupled Computing for Image Search," Bioengineering Seminar Series, Georgia Tech, GA

June 2012 "Cortically-Coupled Computing for Media Retrieval," Keynote talk at ACM International Conference on Multimedia Retrieval, Hong Kong, CHINA

June 2012 "Cortically-Coupled Computing for Image Search," Invited Plenary 2nd Beijing BCI Symposium, Tsinghua University, CHINA

Oct 2011 "Cortically-coupled Computer Vision," ARO Workshop on Decision Making, Evanston, IL

Oct 2011 "Single-trial Analysis of Simultaneously Acquired fMRI and EEG: A Window into Latent Brain States," Department of Biomedical Engineering, Johns Hopkins University

July 2011 "Cortically-Coupled Computing: A Paradigm for Mutually-Derived Situational Awareness," Army Research Laboratory, Aberdeen Maryland

June 2011 "Cortically-Coupled Cognitive Navigation," DARPA BioNav Workshop, Washington DC

Mar 2011 "Single-trial Analysis of Simultaneously Acquired fMRI and EEG: A Window Into Latent Brain States," Biomedical Engineering Seminar Series, University of Minnesota

Feb 2011 "Cortically-Coupled Computer Vision: A Closed-loop BCI for Image Search," Annual Interdisciplinary Conference, Jackson Hole, WY

Dec 2010 "Single-trial Analysis of Simultaneously Acquired fMRI and EEG: A Window Into Latent Brain States," Bioengineering Seminar Series, University of Pennsylvania

Oct 2010 "Single-trial Analysis of Simultaneously Acquired fMRI and EEG: A Window Into Latent Brain States," Psychology Colloquium, Princeton University

Sept 2010 "Working with DARPA as an Academic," invited keynote speaker at DARPA Young Faculty Award Ceremonies, Arlington VA

June 2010 "Finding the Needle in the Haystack with BCI," Invited speaker, Beyond Brain Machine Interface Workshop: From Senses to Cognition, Long Beach, CA

May 2010 "Cortically-coupled Computer Vision," Translational Neuroscience Branch, Army Research Laboratory, Aberdeen, MD

Feb 2010 "Sparse decoding of neurodynamics generated by a large-scale model of V1," Annual Interdisciplinary Conference, Jackson Hole, WY

Feb 2010 "Cortically-coupled Computer Vision," Invited Keynote Address at 2010 International Conference in Intelligent User Interfaces, Hong Kong CHINA

June 2009 "Single trial analysis of simultaneously acquired fMRI and EEG," Bernstein Center for Computation Neuroscience, Berlin, GERMANY

June 2009 "Single trial analysis of simultaneously acquired fMRI and EEG," Centre for Cognitive Neuroimaging, Glasgow SCOTLAND

Apr 2009 "Visually-driven Rapid Decision Making: Neuroscientific Findings and Applications to Brain Computer Interfaces," Schnurmacher Institute for Vision Research Colloquia, SUNY State College of Optometry, New York, NY

Nov 2008 "Decoding Neural Activity at Multiple Spatial and Temporal Scales: The Science and Engineering of Mind Reading," Institute of Statistical Mathematics, Tokyo, Japan

Oct 2008 "Integrating EEG and fMRI for inferring Cortical Networks Underlying Rapid Decision Making," RIKEN-BSI Forum, Tokyo, Japan

Oct 2008 "Perceptual Decision Making via Sparse Decoding of Neural Activity from Spiking Neuron Model of V1," Dept. of Computer Science, Tsukuba University, Japan

Sept 2008 "Integrating EEG and fMRI for inferring Cortical Networks Underlying Rapid Decision Making," Center for Mind and Brain Studies, Princeton University, NJ

Sept 2008 "Cortical Processing Underlying Rapid Decision Making," Intelligence Science Board, Washington DC

Sept 2008 "A Large-scale Spiking Neuron Model of Visual Cortex as a Substrate for Optimizing Visual Perception," NGA Academic Research Partnership Annual Meeting, National Academy of Sciences, Washington, D.C.

July 2008 "Decoding Neural Activity at Multiple Spatial and Temporal Scales: The Science and Engineering of Mind Reading," Neuromorphic Engineering Workshop, Telluride CO

July 2008 "Perceptual Decision Making via Sparse Decoding of Neural Activity from a Spiking Neuron Model of V1," Methods of Information Theory in Computational Neuroscience, Portland OR

May 2008 "Integrating EEG and fMRI for inferring Cortical Networks Underlying Rapid Decision Making," Max Planck Institute, Berlin Germany

Apr 2008 "Spatio-temporal Linear Filters for Decoding Brain States," DARPA Workshop on Foundations of Neurally Enabled Human Machine Interfaces, Arlington VA

Feb 2008 "EEG-Informed fMRI Reveals Spatiotemporal Characteristics of Perceptual Decision Making," Annual Interdisciplinary Conference, Jackson Hole, WY

Sept 2007 "Using EEG and fMRI to Characterize the Cortical Networks Underlying Perceptual Decision Making in the Human Brain," Ohio State University, Columbus OH

Aug 2007 "Spatio-temporal Linear Filters for Decoding Brain State: Application to Performance Augmentation in High-throughput Tasks," Workshop on Innovation in Computational Approaches for Brain-Machine Interfaces, Inter. Joint. Conf. on Neural Networks, Orlando FL

Aug 2007 "Spatio-temporal Linear Filters for Decoding Brain States," 2nd APCTP Summer School for Brain Dynamics, Daejeon, KOREA

June 2007 "When Does the Brain Know That a Decision is Difficult to Make?", Human Brain Mapping Symposium on Perceptual Decision Making, Chicago, IL

Apr 2007 "Machine Learning for the Detection and Diagnosis of Disease," New York Academy of Sciences, New York, NY

Apr 2007 "Single-trial Neuroimaging: Identifying Neural Correlates of Trial-to-Trial Behavioral Variability," Department of Computer Science, University of Hawaii, Honolulu, HI

Mar 2007 "Single-trial Neuroimaging: Identifying Neural Correlates of Trial-to-Trial Behavioral Variability," Department of Biomedical Engineering, University of California, Irvine, Irvine, CA

Mar 2007 "Single-trial Neuroimaging: Identifying Neural Correlates of Trial-to-Trial Behavioral Variability," Department of Psychology, University of Glasgow, SCOTLAND

Feb 2007 "Circuitry & Classification of V1 Simple & Complex Cells," Annual Interdisciplinary Conference, Jackson Hole, WY

Dec 2006 "Cortically-coupled Computer Vision," Workshop on Current Trends in Brain-Computer Interfacing, Whistler & Vancouver, CANADA

Oct 2006 "Linear Multivariate Analysis of EEG for Uncovering Neural Signatures of Perceptual Decision Making," Society for Neuroscience Satellite Workshop on Network Analyses for the Cognitive and Clinical Neurosciences: Surveys and Critiques of fMRI, PET, and MEG/EEG Applications, Atlanta, GA

Sept 2006 "Contextual Integration in Cortical Networks," NGA Academic Research Partnership Annual Meeting, National Academy of Sciences, Washington, D.C.

Aug 2006 "Cortically-coupled Computer Vision," IEEE Workshop on Applied Neural Computing, New York, NY

May 2006 "Cortically-coupled Computer Vision," DARPA Neurotechnology for Intelligence Analysis, Santa Fe, NM

Feb 2006 "Single-trial Neuroimaging: Identifying Neural Correlates of Trial-to-Trial Behavioral Variability," Annual Interdisciplinary Conference, Jackson Hole, WY

Oct 2005 "Cortically-coupled Computer Vision," DARPA Neurotechnology for Intelligence Analysis, Washington, D.C.

Apr 2005 "Bayesian Cortical Networks for Contextual Integration," National Geospatial-Intelligence Agency, Washington, D.C.

Apr 2005 "Single-trial Detection of Visual Recognition and Discrimination Events in EEG and fMRI," Emerging Technologies in Medical Imaging, Istanbul TURKEY

Oct 2004 "Linear Spatial Weighting for Single Trial Discrimination in Electromagnetic Brain Imaging," NIPS Workshop on Brain-Computer Interfaces, Whistler & Vancouver CANADA

Oct 2004 "Single-trial Detection of Visual Recognition and Discrimination Events in EEG," Department of Biomedical Engineering, Oregon Graduate Institute, Portland, OR

Oct 2004 "Mechanisms of Spatial Summation in a Single Layer Spiking Neuron Model of Macaque Striate Cortex," Neurosciences Institute, Oregon Health Sciences University, Portland, OR

Sept 2004 "Inferring Direction of Figure Using a Recurrent Integrate-and-Fire Neural Circuit," IEEE Engineering in Medicine and Biology Annual Meeting, San Fransisco, CA

July 2004 "Mechanisms of Spatial Summation in a Single Layer Spiking Neuron Model of Macaque Striate Cortex," SJTU University, Shanghai CHINA

July 2004 "Blind Recovery of Biochemical Markers of Brain Cancer in MRSI," Sichuan University, Chengdu CHINA

July 2004 "Identifying the Cortical Origins of Response Time Variability: Single-Trial Detection of Visual Recognition and Discrimination Events in EEG," Tsinghua University, Beijing CHINA

June 2004 "Single-Trial Detection of Visual Recognition and Discrimination Events in EEG," Departments of Psychology and Cognitive Neuroscience, Princeton University

Feb 2004 "Mechanisms of Spatial Summation in a Single Layer Spiking Neuron Model of Macaque Striate Cortex," Department of Biomedical Engineering, City College of New York

Sept 2003 "Spatial Signatures of Visual Object Recognition Events Learned from Single-trial Analysis of EEG," IEEE Engineering in Medicine and Biology Annual Meeting, Cancun, MEXICO

Aug 2003 "Scene Construction and Recognition: A Probabilistic Framework for Integration within and between Cortical Hypercolumns," NIMA Neuroscience Enabled Computer Vision Symposium, Washington, D.C.

Aug 2003 "Recovery of Constituent Spectra Using Non-negative Matrix Factorization," SPIE Wavelets X, San Diego, CA

July 2003 "Single-Trial Detection of Visual Recognition and Discrimination Events in EEG: Enabling Cognitive Interfaces," Siemens Corporate Research, Princeton, NJ

Apr 2003 "Single-trial Detection of Visual Recognition and Discrimination Events in EEG: Enabling Cognitive Interfaces," Brain Signal Processing Group, RIKEN, JAPAN

Apr 2003 "Bayesian Network Models for Inferring Intermediate-level Visual Representations," University of Tsukuba, JAPAN

Dec 2002 "Multi-scale Probabilistic Models of Natural Images Applications to Medical Image Analysis," Siemens Corporate Research, Princeton, NJ

Sept 2002 "A Multi-scale Probabilistic Network Model for Detection, Synthesis, and Compression in Mammographic Image Analysis," Department of Radiology, Medical Image Processing Group, University of Pennsylvania

Dec 2000 "Neurocomputational Models for Exploiting Context in Visual Scene Analysis," Biologically-based Computer Vision Invited Workshop, NIMA, Washington, D.C.

May 1999 "Hierarchical Neural Networks for Object Recognition: Applications to Mammographic Computer-aided Diagnosis," School of Engineering, Harvard University, MA

Mar 1999 "Neurocomputational Models for Exploiting Context in Visual Scene Analysis," SRI, Menlo Park, CA

Aug 1998 "Training Neural Networks for Computer-Aided Diagnosis: Experience in the Intelligence Community," Pacific Medical Technology Symposium, Honolulu, HI

Apr 1998 "Neuroscience-inspired Assisted Target Recognition," National Reconnaissance Office, Washington, D.C.

Oct 1997 "Hierarchical Neural Networks for Object Recognition: Applications to Mammographic Computer-aided Diagnosis," University of Pennsylvania, PA

July 1997 "Hierarchical Neural Networks for Object Recognition: Applications to Mammographic Computer-aided Diagnosis," Princeton University, NJ

Apr 1997 "Training Neural Networks for Computer-aided Diagnosis: Experience in The Intelligence Community," Office of Women's Health (DHHS), Washington, D.C.

June 1996 "Training Neural Networks for Computer-aided Diagnosis: Experience in the Intelligence Community," United States Congress, Washington, D.C.

Apr 1995 "A Hierarchical Image Probability Model for Mammographic Mass Detection," Rossmann Laboratories, Department of Radiology, Univ. of Chicago, IL

Nov 1994 "A Hierarchical Image Probability Model for Mammographic Mass Detection," Neural Networks in Medicine, Denver, CO

Oct 1994 "A Hierarchical Image Probability Model for Mammographic Mass Detection," United States Senate, Washington, D.C.

Sept 1994 "Construction of illusory Surfaces by Intermediate-level Visual Cortical Networks," Massachusetts Institute of Technology (Center for Biological and Computational Learning), MA

Sept 1994 "Data Fusion with a Hierarchical Neural Network," ONR Workshop on Sensor Fusion, Woods Hole, MA

Mar 1994 "Intermediate-level Vision: Surface Segmentation and Depth-from Occlusion," Massachusetts Institute of Technology (Media Lab), MA

Nov 1993 "Surface Segmentation and Depth-from-Occlusion," NEC Research Institute, Princeton, NJ

Nov 1993 "Reverse Engineering of Intermediate-level Vision: Surface Segmentation and Depth-from-Occlusion," David Sarnoff Research Center, Princeton, NJ

Nov 1993 "Intermediate-level Vision: Surface Segmentation and Depth-from-Occlusion," Rutgers University, NJ

May 1993 "Reverse Engineering of Intermediate-level Vision: Surface Segmentation and Depth-from-Occlusion," Army Research Laboratory, Aberdeen, MD

June 1992 "The NEXUS Neural Simulation Environment," McDonnell Summer Program in Cognitive Neuroscience, Dartmouth, NH

### **Internal Invited Seminars and Colloquia (selected)**

May 2023 "Closed-loop Non-Invasive Neural Therapeutics," Data Science Health Science Forum

May 2023 "An Orthotic for Your Brain," Invited speaker, Thinking Bigger Summit, Columbia Business School

Mar 2022 "Neuromodulation: Research directions leading to closed-loop control of neural activity," Columbia Frontiers in Engineering and Medicine Symposium: Neuromodulation

July 2020 "Simultaneous EEG-fMRI for Inferring Brain Dynamics," Neurosurgery Grand Rounds, Columbia University Medical Center, NY, NY

Dec 2018 "Rehabilitating the Mind: Non-invasive Neurotechnology for Treating Mental Illness," Neurosurgery Grand Rounds, Columbia University Medical Center, NY, NY

Feb 2018 "Fusing Simultaneously Acquired EEG and fMRI to Infer Spatiotemporal Dynamics of Cognition in the Human Brain," Psychiatry Grand Rounds, Columbia University Medical Center, NY, NY

Mar 2016 "Neural correlates of enhanced perception-action coupling in rapid decision making: Lessons from baseball," Teachers College Neuroscience Seminar Series, Columbia University, NY, NY

Sept 2014 "Measuring the Brain's Aha Moment," Explore the Frontiers of the Mind, Zuckerman Mind Brain and Behavior Institute, Carlyle Hotel, NY NY

Mar 2013 "Multimodal Neuroimaging of Perceptual Decision Making," University Seminar, Cognitive and Behavioral Neuroscience

Nov 2011 "Single-trial Analysis of Simultaneously Acquired fMRI and EEG: A Window into Latent Brain States," New York State Psychiatric Institute

Oct 2009 "Signal processing challenges for analysis of simultaneously acquired fMRI and EEG," Department of Electrical Engineering, Columbia University

Mar 2006 "Single-trial Neuroimaging: Identifying Neural Correlates of Trial-to-Trial Behavioral Variability," Department of Psychology, Columbia University

Feb 2006 "Single-trial Neuroimaging for Identifying Neural Correlates of Trial-to-Trial Behavioral Variability," Sergievsky Center and the Taub Institute, Columbia University  
Oct 2002 "Multi-scale Probabilistic Models of Natural Images Applications to Medical Image Analysis," Department of Applied Mathematics, Columbia University  
Sept 2002 "Linear Spatial Weighting for Single-trial Discrimination in Encephalography," Department of Medical Informatics, Columbia University  
Feb 2002 "Neurocomputational Models for Medical Image Analysis: Capturing Contextual Cues for Improved Classification," Department of Ophthalmology Research Seminar, Columbia University  
Apr 2001 "Predicting Motor Commands Using Magnetoencephalography (MEG)," Neurobiology Seminar Series, Columbia University

## POPULAR PRESS

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May 2022 "Brain Games: How the Mind Performs Under Pressure," Columbia Magazine  
Apr 2020 "Technology Melds Minds with Machines, and Raises Concerns," Undark  
Mar 2019 "Study demonstrates that a brain-computer interface can improve your performance," Medical Xpress  
Mar 2019 "New neurofeedback system helps people manage arousal and maintain peak performance," ZME Science  
Dec 2018 "Avoidant griever's unconsciously monitor and block mind-wandering contents, study shows," News-Medical.net  
Dec 2018 "Editing consciousness: How bereaved people control their thoughts without knowing it," Medical Xpress  
July 2018 "Training in musical improvisation may teach your brain to think differently," Science Daily  
Jun 2018 "Human/AI teaming collaboration coming from ARL, IEEE Brain collaboration," Military Embedded Systems  
Nov 2017 "Machine learning reveals what suicidal thoughts look like in the brain," Newsweek  
July 2017 "How to make soldiers' brains better at noticing threats," The Economist  
June 2017 "Silicon Valley's Latest Craze: Brain Tech," IEEE Spectrum  
Feb 2017 "Elon Musk says humans must become cyborgs to stay relevant. Is he right?," The Guardian  
Aug 2016 "Scientists examine what happens in the brain when a bat tries to meet a ball," The Washington Post  
Nov 2015 "New IEEE Brain Initiative A No-Brainer," IEEE Technical Community Spotlight  
July 2015 "Take me out to the Brain Game," SB Nation  
Jun 2015 "Those Virtual Feelings," Motherboard  
Jan 2015 "THE NEXT BIG BRANIAC," New York Observer  
July 2014 "NeuroScout Gets into Batters' Heads to Rate Hitters," Scientific American  
May 2014 "Wearable Computers Will Transform Language," IEEE Spectrum  
Dec 2013 "The Power of the Unconscious," BBC World Radio  
Dec 2013 "Five Mysteries of the Brain," BBC News  
Mar 2013 "This is Your Brain on Baseball," Psychology Today  
Jul 2012 "From Bench to Bunker How a 1960s discovery in neuroscience spawned a military project," The Chronicle of Higher Education  
Mar 2012 "BBC Documentary Out of Control," highlighted research on brain computer interfaces for image search  
Nov 2011 "Black Friday, and Happy Christmas Shopping from your neurons!," Significance Magazine

Oct 2011 "Ailment: Too Much Information Cure: Mind-Reading Machines," Discover Magazine  
 Dec 2010 "Computer Vision," Radio Interview, WTOP and National Academy of Engineering  
 Nov 2010 "Computers Get Help from the Human Brain," MIT Technology Review  
 Feb 2010 "Your Brain's Search Engine," Forbes Video Breakout  
 Nov 2008 "The Brain," History Channel documentary  
 Oct 2008 "Brain-machine interfaces charge ahead," Biosciences Technology  
 Aug 2008 "Hacking Our Vision System" (video), IEEE Spectrum on-line  
 Apr 2008 "A Brainy Approach to Image Sorting," IEEE Spectrum  
 Dec 2007 "Mind-Reading Machines," Biztech  
 Jan 2007 "Brain-Computer Interfaces: Where Human and Machine Meet," IEEE Computer Magazine  
 Aug 2006 "Aha! Someday, image analysis may take place at the speed of thought," HSToday  
 Jul 2006 "This Is a Computer on Your Brain," Wired News  
 Jul 2006 "Man and Machine Vision in Perfect Harmony," New Scientist  
 Jul 2006 "Subliminal Search," MIT Technology Review  
 Dec 2001 "Eyesight to the Blind," CIO Magazine  
 Oct 1999 "Spies in the Sky vs. Breast Cancer: High Tech Wizards Spotting Tumors Missed by Doctors," New York Daily News  
 May 1999 "Sensory Licenses Sarnoff Speech Enhancement Algorithms," EE Times

## DEPARTMENTAL AND UNIVERSITY SERVICE

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|              |                                                                                        |
|--------------|----------------------------------------------------------------------------------------|
| 2024-present | Provost's Morningside Leadership Council                                               |
| 2024         | President's Senior Faculty Leadership Council                                          |
| 2024         | President's Committee on Financial Transparency                                        |
| 2023-present | Chair, Department of Biomedical Engineering                                            |
| 2023-present | SEAS Executive Committee                                                               |
| 2023         | Appointed Ivy+ Provost Leadership Fellow                                               |
| 2020         | Vice Chair, Department of Biomedical Engineering                                       |
| 2017         | Administrative Committee (at-large member) Department of Biomedical Engineering        |
| 2017         | Co-chair, DBME ABET Committee                                                          |
| 2014         | Advisory Committee, Presidential Scholars in Society and Neuroscience                  |
| 2013         | Co-Director, Center for Neural Engineering and Computation (CNEC)                      |
| 2013         | Executive Committee, Columbia Data Science Institute (DSI)                             |
| 2011         | Chair, Neuroengineering Faculty Search Committee                                       |
| 2010         | SEAS Tenure Ad-hoc                                                                     |
| 2009         | University Tenure Ad-hoc                                                               |
| 2008         | Member, SEAS Global Development Team                                                   |
| 2008         | Member Faculty Advisor Committee NWC Science Building                                  |
| 2008         | Member Provost Committee on the Future of Science and Engineering at Columbia          |
| 2007         | Chair, BME Faculty Search Committee (Neural Engineering)                               |
| 2007         | Chair, ABET Committee                                                                  |
| 2006-present | Member DBME Administrative Committee                                                   |
| 2005         | Faculty Mediator                                                                       |
| 2005-2007    | Member of University Task Force on Diversity (chaired by Jean Howard and Norma Graham) |

|           |                                                 |
|-----------|-------------------------------------------------|
| 2005-2007 | DBME ABET Committee                             |
| 2005-2007 | Chair, Undergraduate Curriculum Committee       |
| 2003      | Speaker, SEAS Family Weekend                    |
| 2003      | Speaker, SEAS Engineering Invitationals         |
| 2001      | Engineering School Library Committee            |
| 2001-2006 | Chair, Laboratory Committee                     |
| 2000-2005 | Biomedical Engineering Imaging Search Committee |
| 2000      | Inaugural Symposium Hospitality Committee       |
| 2000-2007 | Biomedical Engineering Undergraduate Committee  |
| 2000-2003 | BME Sophomore Advising                          |

## TEACHING EXPERIENCE

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### Courses Taught

*{Number in brackets is the mean score of the overall instructor evaluation (from 1.0-lowest to 5.0-highest).}*

|                                                                                                                                                |      |
|------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 2025 BMEN E4470: Deep Learning for Biomedical Signal and Sequence Processing [Enrollment 64 students students) [4.11]                          | 2025 |
| 2025 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 23 students students) [3.80]                                     | 2025 |
| 2023 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 50 students students) [4.00]                                     | 2023 |
| 2023 BMEN E4470: Deep Learning for Biomedical Signal and Sequence Processing (Enrollment 60 students students) [4.24]                          | 2023 |
| 2022 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 43 students students) [4.33]                                     | 2022 |
| 2022 BMEN E4010, Biostatistics for Engineers (Enrollment 106 students students) [4.06]                                                         | 2022 |
| 2021 EEBM E6099: Topics in Computational Neuroscience and Neuroengineering: Brain Computer Interfaces (Enrollment 20 students students) [4.33] | 2021 |
| 2020 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 24 students students) [No evals due to COVID]                    | 2020 |
| 2020 BMEN E4000: Special Topics: Deep Learning for Biomedical Signal and Sequence Processing (Enrollment 29 students students) [4.27]          | 2020 |
| 2019 BMEN E4000: Special Topics: Deep Learning for Biomedical Image and Signal Processing (Enrollment 42 students students) [4.17]             | 2019 |
| 2019 BMEN E4010, Biostatistics for Engineers (Enrollment 92 students students) [3.96]                                                          | 2019 |
| 2018 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 31 students students) [4.53]                                     | 2018 |
| 2018 EEBM E6090: Topics in Computational Neuroscience and Neuroengineering: Brain Computer Interfaces (Enrollment 18 students students) [4.56] | 2018 |
| 2017 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 21 students students) [4.44]                                     | 2017 |
| 2017 BMEN E4010, Biostatistics for Engineers (Enrollment 96 students students) [4.34]                                                          | 2017 |
| 2016 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 15 students students) [4.33]                                     | 2016 |

2016 EEBM E6090: Topics in Computational Neuroscience and Neuroengineering: Brain Computer Interfaces (Enrollment 16 students students) [4.75] 2016

2015 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 33 students students) [4.25] 2015

2015 BMEN E4010, Biostatistics for Engineers (Enrollment 85 students students) [4.35] 2015

2014 EEBM E6099: Topics in Computational Neuroscience and Neuroengineering: Brain Computer Interfaces (Enrollment 17 students students) [4.9] 2014

2013 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 26 students students) [4.6] 2013

2013 BMEE E6030, Neural Modeling and Neuroengineering (Enrollment 5 students students) [4.5] 2013

2013 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 23 students students) [4.0] 2013

2011 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 15 students students) [3.8] 2011

2011 EEBM E6099: Topics in Computational Neuroscience and Neuroengineering: Brain Computer Interfaces (Enrollment 16 students students) [3.7] 2011

2010 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 14 students students) [4.3] 2010

2010 BMEE E6030, Neural Modeling and Neuroengineering (Enrollment 6 students students) [4.7] 2010

2008 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 21 students students) [4.1] 2008

2008 BMEN E 3810, Biomedical Engineering Lab 1 (Enrollment 58 students students) 2008

2007 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 8 students students) [4.5] 2007

2007 BMEN E6480, Computational Neural Modeling and Neuroengineering (Enrollment 9 students students) [4.4] 2007

2007 BMEN E4894, Biomedical Imaging (Enrollment 22 students students) [3.6] 2007

2006 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 13 students students) [4.6] 2006

2005 BMEN E3910, Biomedical Engineering Design (Enrollment 59 students students) [4.1] 2005

2005 BMEN E4420, Biomedical Signal Processing and Signal Modeling (Enrollment 17 students students) [4.0] 2005

2005 BMEN E3910, Biomedical Engineering Design (Enrollment 69 students students) [3.3] 2005

2005 BMEN 6001, Advanced Quantitative Physiology (Enrollment 32 students students) [N/A] 2005

2005 BME E3810, Biomedical Engineering Laboratory I (Enrollment 56 students students) 2005

2004 BMEN 3910, Biomedical Engineering Design (Enrollment 43 students students) [4.0] 2004

2004 BMEN E6480, Computational Neural Modeling and Neuroengineering (Enrollment 24 students students) [3.9] 2004

2004 BME E3810, Biomedical Engineering Laboratory I (Enrollment 72 students students) [N/A] 2004

2004 BMEN 6001, Advanced Quantitative Physiology (Enrollment 42 students students) [N/A] 2004

2003 BMEN 6001, Advanced Quantitative Physiology (Enrollment 34 students students) [N/A] 2003

2003 BMEN 3910, Biomedical Engineering Design (Enrollment 39 students students) [3.5] 2003

2003 BMEN 3820, Quantitative Physiology II (Enrollment 48 students students) [3.8] 2003

2003 BMEN 6001, Advanced Quantitative Physiology (Enrollment 42 students students) [N/A] 2003

2003 BME E3810, Biomedical Engineering Laboratory I (Enrollment 63 students students) [N/A] 2003

|                                                                                                            |      |
|------------------------------------------------------------------------------------------------------------|------|
| 2002 BMEN E6480, Computational Neural Modeling and Neuroengineering (Enrollment 9 students students) [4.5] | 2002 |
| 2002 BMEN E3910, Biomedical Engineering Design (Enrollment 35 students students) [4.0]                     | 2002 |
| 2002 BME E3810, Biomedical Engineering Laboratory I (Enrollment 38 students students) [N/A]                | 2002 |
| 2001 BMEN E4894, Biomedical Image Analysis (Enrollment 5 students students) [4.0]                          | 2001 |
| 2001 BMEN E6480, Computational Neural Modeling and Neuroengineering (Enrollment 5 students students) [5.0] | 2001 |
| 2001 BMEN E3810, Biomedical Engineering Laboratory I (Enrollment 40 students students) [N/A]               | 2001 |
| 1993 Teaching Assistant for graduate course Computational Neuroscience and Neuroengineering                | 1993 |
| 1992 Course Assistant for McDonnell Foundation Summer Institute in Cognitive Neuroscience                  | 1992 |
| 1992 Teaching Assistant for the Introduction to Bioengineering                                             | 1992 |
| 1989 Teaching Assistant for seminar Motor Control and Motor Learning                                       | 1989 |

## GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS SUPERVISED

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### Postdoctoral Fellows

Linbi Hong Ph.D. (Indian Institute of Science Education and Research) 2022-2024. Simultaneous EEG-fMRI imaging and analysis. Current position: Associate Research Scientist Columbia University

Kanika Bansal Ph.D. (Indian Institute of Science Education and Research) 2018-2022. Complex Systems analysis of Brain Network Dynamics. Current position: Senior Fellow at the Army Research Laboratory

James McIntosh Ph.D. (University College London) 2017-2020. Observing and manipulating decision variables in human decision making, Current position: Research Scientist Columbia University Irving Medical Center

Nick Waytowitch Ph.D (Old Dominion) 2015-2017. Real-time brain-computer interface systems. Current position: Research Scientist, Army Research Laboratory

Andrew Goldman (University of Oxford) 2015-2019. Neural basis for musical improvisation. Current position: Assistant Professor, Jacobs School of Music, Indiana University

Josef Faller Ph.D. (TU Berlin) 2015-2020 Real-time measurement of cognitive control during an aircraft boundary avoidance task. Current position: Research Scientist at Facebook Reality Labs.

Sergül Aydoğru Ph.D. (USC) (2014-2015) Deep learning for neural signal processing. Current position: Assistant Professor, Stevens Institute of Technology

Stefan Haufe Ph.D. (Technical University of Berlin, Marie Curie Fellow) 2014-2015. Simultaneous EEG-fMRI for assessment of Major Depressive Disorder. Current position: Professor TU Berlin and ERC Research Group Leader, Charité, Berlin

Sameer Saproo, Ph.D. (UCSD) 2014-2016. Neural markers of cognitive workload and decision confidence. Current position: Research Manager, Intel AI.

Noam Schneck Ph.D. (Swarthmore) 2014-Present. Tracking neural markers of psychiatric disease. Current position: Assistant Professor of Psychiatry, CIUMC.

Jason Sherwin, Ph.D. (Georgia Tech) 2010-2014. Situational awareness and the human brain. Current position: Research Assistant Professor, SUNY Downstate; CEO deCervo LLC.

Bryan Conroy, Ph.D. (Princeton University) 2010-2013. Mathematical models for fusing simultaneous EEG and fMRI. Current position: Senior Scientist and Manager, Philips Research North America.

Eric Pohlmeier, Ph.D. (Northwestern) 2008-2010. Real-time, closed-loop brain computer interfaces for monitoring visual attention. Current position: Research Scientist, Johns Hopkins University Applied Physics Lab.

Mads Dyrholm, Ph.D. (Technical University of Denmark) 2006-2008. Multivariate methods for analysis of EEG and fMRI. Current position: DSP Engineer, Jabra.

Robin Goldman, Ph.D. (UCLA) 2004-2005, co-mentor with T. R. Brown. Simultaneous recordings of fMRI and EEG to assess cognition and perception. Current position: Research Scientist, University of Wisconsin, Madison.

Kyungim Baek, Ph.D. (University of Colorado) 2002-2005. Bayesian models of cortical integration. Current position: Associate Professor, University of Hawaii.

Jim Wielaard, Ph.D. (CCNY) 2001-2005. Large-scale conductance based neuronal models of primary visual cortex. Current position: Industry Consulting Associate Professor, NYU.

## **Doctoral Students**

Ankur Samanta (Candidate May 2029): Reinforcement learning with Human Feedback informed via Physiology and Prospect Theory

Anirudh Natarajan (Candidate May 2029): Modeling effects of neurostimulation on learning and performance in real-world sensorimotor tasks

Victoria Liu (Candidate May 2028): Multi-modal neuroimaging and perturbation for inferring causality in the human brain.

Chichi Chang (Candidate May 2027): Brain-gut biomarkers of cognitive impairment

Shruti Kumar (Candidate May 2027): Neuroimaging informed computational models of decision making under stress and fatigue.

Nikolas Papadopoulos (Candidate May 2027): Eye-movements for informing-AI systems in image analysis.

Yinuo Qin (Candidate, May 2024): Virtual reality systems for investigating human-machine teaming

Xiaoxiao Sun (Candidate May 2024): Integrating fMRI, EEG, and TMS for perturbation based neuroimaging

Sharath Koorathota (Degree conferred, May 2023): Multimodal deep learning systems for analysis of human behavior, preference and state. Current Position: Consultant BCG.

Hengda He (Degree conferred, May 2023): Functional neuroimaging for investigating the interactions between cortical and brainstem systems in the human brain. Current Position: Postdoctoral Fellow, Columbia University Irvine Medical Center

Arunesh Mittal (Degree conferred, 2023): Joint multimodal variational autoencoders for inference in simultaneously acquired EEG/fMRI. Current Position: Consultant, McKinsey & Co.

Pawan Lapborisuth (Degree conferred, December 2022): Dissertation title: 'Brain Dynamics of Attention Reorienting in Naturalistic Paradigms', Current position: Technical Research Staff, Point72/Mets.

Xueqing Liu (Degree conferred, May 2022): Dissertation title: 'Fusing Simultaneously Acquired EEG-fMRI using Deep Learning', Current position: Research Scientist, Waymo Inc.

Kaveri Thakoor (Degree conferred, May 2022): Dissertation title: 'Convolutional Neural Networks for Detection of Diseases of the Eye', Winner of 2022 Morton B. Friedman Memorial Prize for Excellence. Current position: Assistant Professor in Ophthalmology and Biomedical Engineering. Columbia University

Linbi Hong (Degree conferred May 2020): Dissertation title: 'Mapping the Spatiotemporal Interactions of the Human Brain's Attention Reorienting and Arousal Systems Using Multimodal Recording Techniques', Current position: Postdoctoral Researcher, Columbia University

Tao Tu (Degree conferred May 2020): Dissertation title: 'Machine Learning for Fusion and Inference of Simultaneous EEG/fMRI During Rapid Decision-Making', Current position: Research Scientist, Google Research.

Bin Lou (Degree conferred May 2015). Dissertation title: 'The Time Course of a Perceptual Decision: Linking Neural Correlates of Pre-stimulus Brain State, Decision Formation and Response Evaluation'. Current position: Senior Scientist, Siemens Corporate Research

Jordan Muraskin (Degree conferred May 2015). Dissertation title: 'Using Neuroimaging to Investigate the Effect of Expertise on Rapid Perceptual Decision Making'. Current position: CTO, deCervo LLC

Jennifer Walz (Degree conferred May 2014). Dissertation title: 'Exposing Internal Attentional Brain States using Single-Trial EEG Analysis with Combined Imaging Modalities'. Current position: Research Scientist, Stanford University.

Xiaowei Zou (Degree conferred May 2014; co-sponsor with T.R. Brown MUSC) Dissertation title: 'Magnetic Resonance Imaging Applications of Pseudo-Random Amplitude Modulation'. Current position: MR Physicist, Neuro42.

David Jangraw (Degree conferred May 2014). Dissertation title: 'Neural and Ocular Signals Evoked by Visual Targets in Naturalistic Environments'. Current position: Assistant Professor of Biomedical Engineering, University of Vermont.

Jianing Shi, (Degree conferred May 2010). Dissertation title: 'Linking Neural Activity with Perceptual Decision Making via Sparse Decoding'. Current position: co-Founder Zap Surgical Systems and FemtoMetrix.

An Luo, Ph.D. (Degree conferred October 2008) Dissertation title: 'Spatio-temporal EEG Analysis for Tracking Brain State during Complex Visual Tasks'. Current position: Director of Research, Amazon AI

Marios Philiastides, Ph.D. (Degree conferred October 2007.) Dissertation title: 'Spatiotemporal Characteristics of the Neural Correlates of Perceptual Decision Making in the Human Brain' (Thesis Awarded Distinction). Currently position: Professor, University of Glasgow.

Xiaowei Li, Ph.D. (Degree conferred October 2007). (co-mentor with X.E. Guo) Dissertation title: 'Topological Modeling of Trabecular Bone Imaged via CT and MRI.' Current position: Associate Professor, University of Pennsylvania.

Adam Gerson, Ph.D. (Degree conferred October 2006.) Dissertation title: 'A System for Single-trial Spatiotemporal Analysis of the Electroencephalogram based on Linear Discrimination'. Masters Thesis: 'Unsupervised Unmixing Methods for Brain Signal Analysis'. Current position: unknown.

Shuyan Du, Ph.D. (Degree conferred October 2006) Dissertation title: 'Machine Learning for Recovering Spectral Signatures of Disease'. Awarded the Michael Merickel Award for Best Student Paper in Medical Imaging. SPIE Medical Imaging Conference (2004). Currently position: Research Director of Imaging, Bristol-Meyers Squibb.

### **Masters Students (selected from over 100)**

Yida Lin (2020): Brain dynamics of musicians, (current position: Software engineer, Amazon)

Xiaoxiao Sun December 2020: Closed-loop neurostimulation.

Jonathan Koss (2018): Deep learning for fusing simultaneously acquired EEG-fMRI, (current position: PhD student at Yale University)

Neil Weiss May 2016: Virtual reality for BCI. (current Position: Facebook Reality Labs)

Atin Saha May 2011: Neural signals of solvable versus unsolvable visual puzzles.

Sakellarios Zairis May 2009. Brain Computer Interfaces for Image Triage. (current position: M.D./Ph.D. candidate at Columbia Medical School).

Won-Young (Jason) Lee, May 2008, Perturbing cortical networks underlying perceptual decision making using transcranial magnetic stimulation.

Sudhin Thomas M.S. May 2005, Image analysis using matrix decompositions (current position: Ph.D. candidate at Cornell).

Michael Prerau M.S. May 2003, EEG correlates of perfect pitch (current position: Ph.D. candidate at Boston University).

Feng Han M.S. May 2002, Probabilistic Inference in Visual Saliency (current position: Ph.D. candidate at Berkeley).

### **Undergraduate Students Supervised (selected)**

Sona Bose Roy May 2017. Real-world flight navigation and cognitive work-load (current position: Research engineer, MIT Lincoln Labs)

Megan deBettencourt, May 2010, Statistical methods for improving EEG/fMRI sensitivity (current position: Ph.D. student in Neuroscience at Princeton University)

Ravi Chacko, May 2010, Brain-computer interfaces, (current position: Resident Physician, University of Chicago)

Gaurav Singal, May 2005, Cue Integration for Visual Tracking (current position: M.D./Ph.D. candidate at Harvard/MIT HST).

Jeremy Lewi B.S. May 2004, Machine Learning for Visual Processing, SEAS Valedictorian (current position: Research Engineer at Google).

### **Doctoral Dissertation Committees (selected from over 100)**

Elsa D. Angelini (Advisor, A. Laine) Quantification of Cardiac Function with Real-time Three-dimensional Ultrasound

Yinpeng Jin (Advisor, A. Laine) Multi-scale Processing for 3D Tomographic Images

Dong-Qing Zhang (Advisor: Shih-Fu Chang, EE) Statistical Part-based Model for Object/Scene Detection

Volodymyr Nikolenko (Advisor: Rafael Yuste, Biological Sciences) Two-photon Uncaging for Inferring Intracortical Connectivity

Etay Ziv (Administrative Advisor: Paul Sajda; Research Advisor: Chris Wiggins, Applied Physics and Applied Math) Quantitative, Predictive Modeling of Biochemical Networks: A Machine Learning and Information-theoretic Approach

Ting Song (Advisor: Andrew Laine) Optimization of MR Protocols for Spatial-Temporal Analysis of 4D Dynamic Renal Images

Sandhitsu Das (Advisor: Leif Finkel, University of Pennsylvania, Dept. of Bioengineering) Cortical Mechanisms for Spatiotemporal Integration and Biological Motion Recognition

Yingli Yang (Advisor: T.R. Brown, Chair of Thesis Committee: P. Sajda) Sequence Development and Data Processing of Echo Planar Chemical Shift Imaging

Christoforos Christoforou (Advisors: R. Haralick and L. Parra, CCNY) The Bilinear Brain: Bilinear Methods for EEG Analysis and Brain Computer Interfaces.

X. Henry Zhang (Advisor: X.E. Guo) High Resolution Imaging Based Patient Specific Biomechanical Assessment of Bone Quality.

Amin Katouzian (Advisor: A.F. Laine) Quantifying Atherosclerosis: IVUS Imaging For Lumen Border Detection And Plaque Characterization

Noah Lee (Advisor: A.F. Laine) Synergizing Human-machine Intelligence: Visualizing, Labeling, and Mining the Electronic Health Record

Gary Yi Hou (Advisor: E. Konofagou) Biomechanical assessment and monitoring of thermal ablation using Harmonic Motion Imaging for Focused Ultrasound (HMIFU)

David Guillaume (Advisor: A.F. Laine) Compressive Sensing Applied to Medical Ultrasound Image Formation

## **PATENTS**

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Pending CLOSED-LOOP SIMULTANEOUS FUNCTIONAL MAGNETIC RESONANCE IMAGING (fMRI)-ELECTROENCEPHALOGRAM (EEG)-TRANSCRANIAL MAGNETIC STIMULATION (TMS) SYSTEM. US20230143233A1

12,511,691 Optimization of Trading Performance Using Both Brain State Models and Operational Performance Models

12,125,593 Systems and Methods for fusing EEG and fMRI through hierarchical deep transcoding. US-20220215955-A1

11,755,108 Systems and Methods for Deep Reinforcement Learning Using a Brain-Artificial Intelligence Interface, US Patent App. 16/149,785, 20190101985-A1

11,602,293 Identifying and strengthening physiological/neurophysiological states predictive of superior performance

10,835,147 Method for predicting efficacy of a stimulus by measuring physiological response to stimuli

10,299,695 Systems and Methods for Identifying and Tracking Neural Correlates of Baseball Pitch Trajectories

8,671,069 / 9,665,824 Rapid Image Annotation Via Brain State Decoding And Visual Pattern Mining.

7,835,787 / 8,731,650 Single trial detection in encephalography

7,013,283 System and method for providing programming content in response to an audio signal

6,454,410 Mosaicing and enhancement of images for ophthalmic diagnosis and documentation

6,324,532 Method and apparatus for training a neural network to detect objects in an image

6,208,983 Method and apparatus for training and operating a neural network for detecting breast cancer

6,018,728 Method and apparatus for training a neural network to learn hierarchical representations of objects and to detect and classify objects with uncertain training data

4,892,405 Method and apparatus for providing quality assurance and calibration assurance in a spectrophotometer

## **CONSULTING AND ENTREPRENEURSHIP**

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2025-Present NeuroNYC Inc., Science Advisor

2019-present OpenBCI, Brooklyn NY. Scientific Advisor.

2019-present Optios Inc, San Diego CA. Senior Science Advisor, Interim Chief Science Officer

2016-present BraiQ, New York, NY, co-Founder, and Scientific Advisor. Focus on developing technology that uses neuro-physio markers of arousal, stress, and engagement to build trust between humans and machines in autonomous vehicles. Selected as one of the 9 teams in NYC Media Lab Combine (including a \$25K gift to Columbia to support the startup) and one of 12 out of 500 teams for TechStars Mobile (\$120K investment).

2014-2017 deCervo LLC, New York, NY. Scientific Advisor. Developing brain-computer interfacing technology to efficiently and accurately measure how and when athletes make decisions specific to their sport.

2007-2019 Neuromatters LLC, New York, NY. Founder and Chairman of the Board. Design and development of Cortically-Coupled Computer Vision systems for multimedia search and retrieval.

2004 Biofield Corporation, Alpharetta, GA. Assisted with the development and evaluation of pattern classification techniques for a new class of breast cancer diagnostic tool. Assisting in FDA Pre-Market (PMA) Approval Process for the company's products.

2000-2001 Sarnoff Corporation, Princeton, NJ. Worked with technical staff and program managers to develop strategies for commercialization of several medical imaging technologies.

## PUBLICATIONS

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### Journal Publications

122. Samanta, A., Magesh, A., Jain, A., Asadi, K., Yu, Y., Jiang, D., Vidolov, B., Hassani, K., Sajda, P., Bhandari, J., & Efroni, Y. (2026). Structure Enables Effective Self-Localization of Errors in LLMs. arXiv preprint arXiv:2602.02416.
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112. Xie, Z., Peng, Y., Suh, J. P., Feiner, S., & Sajda, P. (2024). PhysioLabXR: A Python platform for real-time, multi-modal brain-computer interfaces and extended reality experiments. *Journal of Open Source Software*, 9(93), 5854.

111. Koorathota, S., Ma, J. L., Faller, J., Hong, L., Lapborisuth, P., & Sajda, P. (2023). Pupil-linked arousal correlates with neural activity prior to sensorimotor decisions. *Journal of Neural Engineering*, 20(6), 066031.
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36. Wielaard, J., & Sajda, P. (2006). Inferring neural circuitry from modulation metrics: Lessons from a computational model of primary visual cortex. Computational and Systems Neuroscience (COSYNE) Meeting, Salt Lake City, UT, #229.
35. Zhao, Q., Stoyanova, R., Du, S., Sajda, P., & Brown, T. R. (2006). Software tool for comprehensive assessment and interpretation of metabolomic data. ISMRM 2006.
34. Thakur, S., Su, Y., Karimi, S., Du, S., Sajda, P., Huang, W., & Parra, L. (2006). Spectral separation analyses of proton MRSI data: Validation with tumor grade of brain glioma. International Society for Magnetic Resonance in Medicine, 14th Scientific Meeting & Exhibition, Seattle, WA, May 6--12, 2006.
33. Stoyanova, R., Du, S., Wang, Y., Zhao, Q., Holmes, E., Utzinger, J., Sajda, P., & Brown, T. R. (2006). Across-species metabolomics: Identification of common spectral changes in mouse and hamster urine caused by parasite infection. ISMRM 2006.
32. Du, S., Mao, X., Sajda, P., & Shungu, D. C. (2006). Blind recovery of <sup>1</sup>H MRSI spectral signatures of Batten disease and MELAS. ISMRM 2006.
31. Du, S., Sajda, P., Koniarek, J., & Smith, R. T. (2006). Automatic segmentation of drusen in fundus images using non-negative matrix factorization. ARVO 2006.
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29. Zhao, Q., Stoyanova, R., Du, S., Sajda, P., & Brown, T. R. (2006). High-resolution spectroscopy: A software program for comprehensive assessment and interpretation of metabolomic data. 47th Experimental Nuclear Magnetic Resonance Conference (ENC), April 23--28, 2006, Pacific Grove, CA.
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27. Sajda, P., Philiastides, M. G., & Gerson, A. D. (2005). Using electroencephalography to characterize perceptual decision-making in the human brain. 2nd Annual Computational Cognitive Neuroscience Conference, Washington, D.C.
26. Philiastides, M. G., & Sajda, P. (2005). The timing of components indicative of stimulus evidence during perceptual decision-making. Society for Neuroscience, 35th Annual Meeting, Washington, D.C., Nov. 12--16. Abstract #934.1.
25. Gerson, A. D., Friedman, D., & Sajda, P. (2005). Imaging differences in cortical function between young and aging populations using single-trial analysis of EEG. Society for Neuroscience, 35th Annual Meeting, Washington, D.C., Nov. 12--16. Abstract #127.11.
24. Wielaard, J., & Sajda, P. (2005). Direction tuning of surround suppression via short-range isotropic connectivity in V1. Society for Neuroscience, 35th Annual Meeting, Washington, D.C., Nov. 12--16. Abstract #389.5.

23. Baek, K., & Sajda, P. (2005). A probabilistic network model of the influence of local figure-ground representation [Abstract]. *Journal of Vision*.
22. Wielaard, J., & Sajda, P. (2005). The role of the LGN on the spatial frequency dependence of surround suppression in V1: Investigations using a computational model [Abstract]. *Journal of Vision*.
21. Goldman, R., Gerson, A., Cohen, M., Brown, T. R., & Sajda, P. (2005). Simultaneous EEG and fMRI for event-related studies. 11th Annual OHBM Meeting, Toronto, Canada.
20. Wielaard, J., & Sajda, P. (2005). Extraclassical receptive field phenomena & short-range connectivity in V1. ECVF 2005, A Coruna, Spain.
19. Parra, L., Gerson, A., & Sajda, P. (2004). Origins of response time variability in a rapid serial visual presentation task. Computational and Systems Neuroscience Meeting, Cold Spring Harbor, NY. #150.
18. Wielaard, J., & Sajda, P. (2004). Revisiting Hubel and Wiesel: Classification of simple and complex cells in a spiking neuron model of macaque striate cortex. Computational and Systems Neuroscience Meeting, Cold Spring Harbor, NY. #214.
17. Du, S., Shungu, D. C., Mao, X., & Sajda, P. (2004). Blind removal of lipids in 1H MRSI using constrained non-negative matrix factorization. International Society for Magnetic Resonance in Medicine (ISMRM), Kyoto, Japan.
16. Wielaard, J., & Sajda, P. (2004). Spatial frequency dependence of mechanisms for surround suppression and receptive field size growth in a model of macaque V1. Society for Neuroscience, 34th Annual Meeting, San Diego, CA, Oct. 23--27. Abstract #410.1.
15. Gerson, A., & Sajda, P. (2004). Assessing asymmetry in behavioral response and associated neural activity for a rapid serial visual presentation task. Society for Neuroscience, 34th Annual Meeting, San Diego, CA, Oct. 23--27. Abstract #481.5.
14. Philiastides, M. G., & Sajda, P. (2004). Single-trial prediction of visual discrimination using an EEG-derived neurometric function. Society for Neuroscience, 34th Annual Meeting, San Diego, CA, Oct. 23--27. Abstract #819.1.
13. Gerson, A., Parra, L., & Sajda, P. (2003). Single-trial event detection of visual object recognition in EEG. Human Brain Mapping 2003, New York, NY.
12. Wielaard, J., & Sajda, P. (2003). Intracellular classification of simple and complex cells within a spiking neuron model of macaque striate cortex. Society for Neuroscience Annual Meeting, 484.10.
11. Tang, A. C., McKinney, C. J., Sutherland, M. T., Parra, L., Reeb, B. C., Malaszenko, N. A., Gerson, A., & Sajda, P. (2003). Source localization from high-density EEG during a real-world task. Society for Neuroscience Annual Meeting, 619.19.
10. Gerson, A., & Sajda, P. (2002). Single-trial de-noising of EEG with a wavelet domain hidden Markov tree. 2nd International Workshop on Brain-Computer Interfaces, Rensselaerville, NY.
9. Parra, L., Tang, A., Pearlmutter, B., Zhang, Z., & Sajda, P. (2001). Predicting motor commands using magnetoencephalography. Society for Cognitive Neuroscience Annual Meeting.
8. Berger, J., Asmuth, J., Madjarov, B., & Sajda, P. (2000). Mosaicking and enhancement of slit-lamp biomicroscope fundus images. [ARVO abstract]. *Investigative Ophthalmology & Visual Science*, 40(4), S165, 854.
7. Nishikawa, R. M., Gatsonis, C., Schnall, M. D., Giger, M. L., Sajda, P., & Chen, M. (1999). Large scale observer study to measure the benefits of computer-aided detection to screening mammography. *Radiology*, 213(P), 150.
6. Korsun, V., Pearson, J., & Sajda, P. (1997). Transferring technology from the intelligence community to the medical community. *Journal of Digital Imaging*, 3(Suppl. 1), 143.

5. Spence, C., Pearson, J., & Sajda, P. (1996). Learning hierarchical representations of objects. DARPA Image Understanding Workshop, 1415--1427.
4. Sajda, P., Spence, C., & Pearson, J. (1996). Learning image context for improved computer-aided diagnosis. DARPA Image Understanding Workshop, 1375--1380.
3. Spence, C., Sajda, P., Hsu, S., & Pearson, J. (1994). Neural network/pyramid architectures that learn target context. DARPA Image Understanding Workshop, 853--862.
2. Finkel, L. H., & Sajda, P. (1992). Proto-objects: An intermediate-level visual representation. Technical Digest of the Annual Meeting of the Optical Society, 187.
1. Sajda, P., & Finkel, L. H. (1992). Extraction of depth-from-occlusion by a physiologically based network. Investigative Ophthalmology and Visual Science (Supplement), 33, 707.

### **Publications Outside Primary Research Area**

21. Jing, D., Lu, X. L., Luo, E., Sajda, P., Leong, P. L., & Guo, X. E. (2013). Spatiotemporal properties of intracellular calcium signaling in osteocytic and osteoblastic cell networks under fluid flow. *Bone*, 53(2), 531--540.
20. Liu, X. S., Zhang, X. H., Rajapakse, C. S., Wald, M. J., Magland, J., Sekhon, K. K., Adam, M. F., Sajda, P., Wehrli, F. W., & Guo, X. E. (2010). Accuracy of high-resolution in vivo micro magnetic resonance imaging for measurements of microstructural and mechanical properties of human distal tibial bone. *Journal of Bone and Mineral Research*, 25(9), 2039--2050.
19. Liu, X. S., Bevill, G., Keaveny, T. M., Sajda, P., & Guo, X. E. (2009). Micromechanical analyses of vertebral trabecular bone based on individual trabeculae segmentation of plates and rods. *Journal of Biomechanics*, 42(3), 249--256.
18. Liu, X. S., Huang, A. H., Zhang, X. H., Sajda, P., Ji, B., & Guo, X. E. (2008). Dynamic simulation of three-dimensional architectural and mechanical alterations in human trabecular bone during menopause. *Bone*, 43(2), 292--301.
17. Liu, X. S., Zhang, X. H., Sajda, P., Saha, P. K., Wehrli, F. W., & Guo, X. E. (2007). Contributions of trabecular rods of various orientations in determining the elastic properties of human vertebral trabecular bone. ASME 2007 Summer Bioengineering Conference, Keystone, CO, June 20--24.
16. Liu, X. S., Sajda, P., Saha, P. K., Wehrli, F. W., Bevill, G., Keaveny, T. M., & Guo, X. E. (2007). Orientation analyses of individual trabecular plates and rods: An application of complete volumetric decomposition. ASME 2007 Summer Bioengineering Conference, Keystone, CO, June 20--24.
15. Zhang, X. H., Liu, X. S., Sajda, P., Saha, P. K., Wehrli, F. W., & Guo, X. E. (2007). Roles of trabecular rods in determining elastic moduli of human vertebral trabecular bone. 53rd Annual Meeting of the Orthopaedic Research Society, San Diego, CA, February 11--14.
14. Liu, X. S., Sajda, P., & Guo, X. E. (2006). Simulating microstructural and mineralization changes during the treatment of postmenopausal osteoporosis by bisphosphonate. 53rd Annual Meeting of the Orthopaedic Research Society, San Diego, CA, February 11--14.
13. Guo, X. E., Liu, X. S., & Sajda, P. (2006). Simulation of 3D architectural and mechanical changes in human trabecular bone during menopause. 2006 Biomedical Engineering Society Annual Meeting, Chicago, IL, October 11--14.
12. Liu, X. S., Huang, A. H., Sajda, P., & Guo, X. E. (2006). Realistic simulation of 3D architectural and mechanical alterations in human trabecular bone during menopause. 5th World Congress of Biomechanics, Munich, Germany, July 29--August 4.

11. Liu, X. S., Sajda, P., Saha, P. K., Wehrli, F. W., & Guo, X. E. (2006). Quantification of the roles of trabecular micro-architecture and trabecular type in determining the elastic modulus of human trabecular bone. *Journal of Bone and Mineral Research*, 21(10), 1608--1617.
10. Liu, X. S., Gupta, A., Bevill, G., Sajda, P., Keaveny, K. M., & Guo, X. E. (2006). Micromechanical analysis of human vertebral trabecular bone at individual trabecula level. *ASME Summer Bioengineering Conference*, Amelia Island, FL, June 22--26.
9. Liu, X. S., Huang, A. H., Sajda, P., & Guo, X. E. (2006). Realistic simulation of 3D architectural and mechanical alterations in human trabecular bone during menopause. *ASME Summer Bioengineering Conference*, Amelia Island, FL, June 22--26.
8. Liu, X. S., Gupta, A., Bevill, G., Sajda, P., Keaveny, K. M., & Guo, X. E. (2006). Micromechanical analysis of individual trabeculae in a  $\mu$ CT-based nonlinear finite element model of human vertebral trabecular bone. *Transactions of the 51st Annual Meeting of the Orthopaedic Research Society*, Chicago, IL, March 19--22.
7. Liu, X. S., Sajda, P., Saha, P. K., Wehrli, F. W., & Guo, X. E. (2006). A 3D morphological analysis of trabecular bone based on individual trabeculae segmentation. *Transactions of the 51st Annual Meeting of the Orthopaedic Research Society*, Chicago, IL, March 19--22.
6. Liu, X. S., Huang, A. H., Sajda, P., & Guo, X. E. (2006). Simulating 3D architectural and mechanical changes in human trabecular bone during menopause. *Transactions of the 51st Annual Meeting of the Orthopaedic Research Society*, Chicago, IL, March 19--22.
5. Liu, X. S., Sajda, P., Saha, P. K., Wehrli, F., & Guo, X. E. (2005). A 3D morphological analysis based on individual trabeculae segmentation for human trabecular bone. *Biomedical Engineering Society Annual Meeting*, Baltimore, MD, September 28--October 1, Abstract #952.
4. Liu, X. S., Saha, P. K., Wehrli, F., Sajda, P., & Guo, X. E. (2005). Contribution of micro-architecture to the elastic modulus of trabecular bone. *Transactions of the 51st Annual Meeting of the Orthopaedic Research Society*, Washington, D.C., Feb 20--23, Abstract #192.
3. Liu, X. S., Sajda, P., Saha, P. K., Wehrli, F., & Guo, X. E. (2004). Skeleton micro-architecture predicts elastic modulus of trabecular bone. *2004 BMES Annual Meeting*, Abstract #447.
2. Wei, L., Sajda, P., Laine, A. F., & Guo, X. E. (2003). A novel approach to model trabecular bone using topological image analysis. *49th Annual Meeting of the Orthopaedic Research Society*.
1. Guo, X. E., Wei, L., Sajda, P., & Laine, A. F. (2003). New finite element modeling technique of trabecular bone based on digital topological analysis. In *Medical Imaging 2003: Image Processing* (Kenneth M. Hanson, Ed.), *Proceedings of SPIE Vol. 5032*.

## RESEARCH GRANTS AND CONTRACTS AWARDED

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### Active Grants

| Title / PI                                                                                                                                                         | Sponsor | Amount      | Dates     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----------|
| RECOVERS: Realigning emotion and cognition via precision regulation of networks<br>HR00112320032<br><i>P. Sajda</i>                                                | DARPA   | \$8,852,129 | 8/23-2/27 |
| Using the dLPFC/ACC Sub-architecture to Enable Meta-learning and Theory of Mind for Human-robot Teams Playing Hide and Seek<br>W911NF-22-2-0113<br><i>P. Sajda</i> | ARL     | \$1,600,000 | 5/22-6/26 |
| Google-Gift for Eye-tracking research (to student                                                                                                                  | Google  | \$30,000    | 9/25      |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------|-----------|
| W911NF-22-2-0113<br><i>P. Sajda</i>                                                                                                                                             |     |                               |           |
| Population-Based Training for Multi-Human Multi-Machine Teaming with Enhanced Performance via Neurostimulation<br>Subcontract DUKE 313-000141<br>B. Chen (PI), P. Sajda (co-PI) | ARL | Columbia Portion<br>\$750,000 | 5/23-8/27 |

### Pending Grants

| Title / PI                                                                                                                                                     | Sponsor | Amount      | Dates           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----------------|
| The OPENER-D Trial: Optimizing Personalized EEG Network Entrainment for Recovery of Depression<br><i>Lisa Marie McTeague (Contact-PI) / Paul Sajda (Co-PI)</i> | NIH     | \$7,647,714 | 04/2026-03/2030 |

### Training and Conference Grants

| Title / PI                                                                                                | Sponsor | Amount      | Dates        |
|-----------------------------------------------------------------------------------------------------------|---------|-------------|--------------|
| Columbia University Vision Training Grant<br><i>Mason (PI) / Sajda (Mentor)</i><br><i>5T32EY013933-09</i> | NIH/NEI | \$2,500,000 | 01-present   |
| Core Support for Vision Research<br><i>Goldberg (PI) / P. Sajda (Co-I)</i><br><i>1P30EY019007-01A2</i>    | NIH/NEI | \$4,000,000 | 7/10-present |

### Past Grants

| Title / PI                                                                                                                                                             | Sponsor | Amount                                  | Dates       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------------------------------|-------------|
| Vannevar Bush Faculty Fellowship: Measuring, Tracking and Modulating Human Decision-Making Neural Circuits 'In the Wild'<br><i>P. Sajda</i><br><i>N00014-20-1-2027</i> | OSD/ONR | \$3,000,000                             | 12/19-12/25 |
| Center of Excellence in the Neuroscience of Decision Making at Columbia University<br><i>P. Sajda</i><br><i>FA9550-22-1-0337</i>                                       | AFOSR   | \$3,000,000                             | 8/22-7/25   |
| Columbia Program for Human-Guided Intelligent Systems (HGIS)<br><i>P. Sajda</i><br><i>W911NF-23-2-0067</i>                                                             | ARL     | \$1,929,138                             | 2/23-2/26   |
| DURIP: An integrated fMRI-EEG-TMS (fET) instrument for causal analysis of brain function<br><i>P. Sajda</i><br><i>W911NF-23-1-0397</i>                                 | ARO     | \$499,916                               | 9/23-9/24   |
| Micro and Meso Signatures of Success in Human-Autonomy Teams<br><i>C. Riedl (Northeastern U) / P. Sajda (Columbia PI)</i><br><i>W911NF-1920135</i>                     | ARL     | \$1,500,000<br>(Sajda lab<br>\$515,472) | 4/20-4/24   |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------|------------|
| MRI-guided, personalized TMS for treatment refractory depression<br><i>D. Javitt (PI) / P. Sajda (Co-PI)</i>                                                                   | Columbia BiomedX               | \$70,000                                            | 8/20-8/22  |
| Neural Network Models of Competency Status To Enhance Human-Agent Team Performance<br><i>P. Sajda</i><br><i>UDELAWARE 59130</i>                                                | Univ. Del./ARL                 | \$191,998                                           | 5/21-4/24  |
| CHS: Small: Optimizing Human-Machine Performance via Neurofeedback and Adaptive Autonomy<br><i>P. Sajda</i><br><i>1816363</i>                                                  | NSF                            | \$498,785                                           | 9/18-8/22  |
| GCR: Emotionally Responsive Computation and Communication<br><i>D. Rubenstein (PI) / P. Sajda (Co-PI)</i><br><i>1934968</i>                                                    | NSF                            | \$800,000 (Sajda lab \$208,136)                     | 10/19-9/22 |
| NCS-FO: Developing dyadic fMRI methodology to quantify and model human brain-to-brain interactions<br><i>R. Lee (PI) / P. Sajda (Co-PI)</i><br><i>1926789</i>                  | NSF                            | \$999,834 (Sajda lab \$100,016)                     | 9/19-8/22  |
| Physiologically-informed Just-in-time Agent Intervention Facilitates Trust-formation in Heterogeneous Teams<br><i>P. Sajda</i><br><i>W911NF-2120125</i>                        | ARL                            | \$89,970                                            | 4/21-4/22  |
| EEG/fMRI Controlled TMS Real-time Neural Feedback in Anti-Depressive Treatment<br><i>T.R. Brown (MUSC PI) / P. Sajda (Columbia PI)</i><br><i>R21/R33MH106775-01</i>            | NIH/NIMH                       | \$3,211,339 (Sajda lab \$800,016)                   | 6/15-1/22  |
| Intent Switching and Co-Adaption of Man and Machine in a Closed-Loop Brain Computer Interface<br><i>P. Sajda</i><br><i>W911NF-16-1-0507</i>                                    | ARO                            | \$392,704                                           | 8/16-12/20 |
| NRI: Collaborative Research: Multimodal Brain Computer Interface for Human-Robot Interaction<br><i>Allen (PI) / P. Sajda (Co-PI)</i><br><i>1527747</i>                         | NSF                            | \$736,552 (Sajda lab \$365,266)                     | 5/16-5/20  |
| Cognition and Neuroergonomics Collaborative Technology Alliance (CanCTA)<br><i>P. Sajda</i><br><i>W911NF-10-2-0022</i>                                                         | Army Research Laboratory (ARL) | \$5,000,000 per year (Sajda lab \$750,000 per year) | 4/14-12/20 |
| A Physiologically-Informed Artificial Intelligence (PI-AI) Framework for Human-Agent Teaming<br><i>P. Sajda</i><br><i>W911NF-19-2-0139</i>                                     | ARL                            | \$125,753                                           | 4/19-4/20  |
| RI: Medium: Assessing Speaker and Teacher Effectiveness through Gestural Analysis, EEG Recordings, and Eye Tracking<br><i>Kender (PI) / P. Sajda (Co-PI)</i><br><i>1513853</i> | NSF                            | \$899,796 (Sajda lab \$375,000)                     | 9/15-8/19  |

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------|------------|
| Neural correlates of learning and confidence during decision making and their utility in developing intelligent information technologies<br><i>Philiastides (PI) / Sajda (Co-PI)</i><br><i>ES/L012995/1</i> | ESRC                           | \$750,000 (Sajda lab \$200,000)  | 4/15-4/18  |
| Image Database and Neuroimaging Data Collection for Rapid Visual Decision Making<br><i>P. Sajda</i><br><i>DCS APX03-S005</i>                                                                                | Army Research Laboratory (ARL) | \$684,000                        | 6/12-9/17  |
| Multimodal Neuroimaging for Mapping Decision Making in the Human Brain<br><i>P. Sajda</i><br><i>R01-MH085092-01A1</i>                                                                                       | NIH/NIMH                       | \$1,772,320                      | 8/09-12/15 |
| Cortical Networks Underlying Rapid Decision Making<br><i>P. Sajda</i><br><i>W911NF-11-1-0219</i>                                                                                                            | Army Research Office (ARO)     | \$1,033,255                      | 5/11-12/15 |
| Hyperspectral Imaging of the Normal and Age-related Macular Degeneration Fundus<br><i>R.T. Smith (PI) / P. Sajda (Co-I)</i><br><i>NEI R01 EY 021470</i>                                                     | NIH/NEI                        | \$4,000,000 (Sajda share \$150K) | 4/11-3/15  |
| Constructing Mutually-derived Situational Awareness via EEG-Informed Graph-based Transductive Inference<br><i>P. Sajda</i><br><i>W911NF-10-2-0022</i>                                                       | Army Research Laboratory (ARL) | \$345,784                        | 5/11-9/14  |
| Cortically-Coupled Computer Vision Phase 3<br><i>P. Sajda</i><br><i>N10PC20050</i>                                                                                                                          | DARPA                          | \$1,668,763                      | 2/10-1/12  |
| A Large-Scale Spiking Neuron Model of Visual Cortex as a Substrate for Optimizing Visual Perception<br><i>P. Sajda</i><br><i>HM1582-07-1-2002</i>                                                           | NGA                            | \$1,668,763                      | 3/07-10/10 |
| Cortically-Coupled Computer Vision Phase 2<br><i>P. Sajda</i><br><i>NBCHC080029</i>                                                                                                                         | DARPA                          | \$2,885,252                      | 10/07-4/10 |
| A Non-invasive Single-trial In Vivo Neuroimaging System<br><i>P. Sajda</i><br><i>R21/R33 EB004730</i>                                                                                                       | NIH/NIBIB                      | \$1,470,000                      | 8/04-7/09  |
| Biomedical Image Engineering of Macular Images<br><i>T. Smith (PI) / P. Sajda (Co-I)</i><br><i>1R01EY015520-01A2</i>                                                                                        | NIH/NEI                        | \$2,551,292                      | 9/05-9/10  |
| Implicit Learning In Osteocyte Network Under Mechanical Loading<br><i>X.E. Guo (PI) / P. Sajda (Co-I)</i><br><i>1RC1AR058453-01</i>                                                                         | NIH/NIAMS                      | \$1,000,000                      | 9/9-8/11   |
| Micro-Mechanical Modeling of Trabecular Bone<br><i>X.E. Guo (PI) / P. Sajda (Co-I)</i>                                                                                                                      | NIH/NIAMS                      | \$2,265,826                      | 5/06-5/11  |

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------|-------------|
| <i>IR01AR051376-01A1</i>                                                                                                                                                   |                                 |             |             |
| Cortically-Coupled Computer Vision<br><i>P. Sajda</i><br><i>HM1582-05-C-0043</i>                                                                                           | DARPA/NGA                       | \$1,064,288 | 10/05-9/07  |
| Workshop on Hybrid Neuro-Computer Vision Systems<br><i>S-F Chang and P. Sajda</i><br><i>IIS-0958402</i>                                                                    | NSF                             | \$50,000    | 9/05        |
| CAREER: Probabilistic Models for Integrating<br>Biochemical and Morphological Markers for Cancer<br><i>P. Sajda</i><br><i>BES-01-3380</i>                                  | NSF                             | \$367,257   | 6/02-5/07   |
| Bayesian Cortical Networks for Contextual Integration<br><i>P. Sajda</i><br><i>HM1582-05-C-0008</i>                                                                        | NGA                             | \$977,000   | 10/04-9/07  |
| Bayesian Hypercolumns for Intelligent Image Analysis<br><i>P. Sajda</i><br><i>N00014-01-1-0625</i>                                                                         | ONR/MURI                        | \$917,010   | 5/01-4/07   |
| Metabolic Patterns in 1H NMR Spectra of Biofluids, R33<br><i>T. Brown (PI) / P. Sajda (Co-PI)</i><br><i>DK070301-01</i>                                                    | NIH/NIDDK                       | \$1,900,000 | 9/04-7/08   |
| Augmented Visual Search with Real-Time EEG Analysis<br><i>P. Sajda</i>                                                                                                     | DARPA                           | \$174,000   | 5/03-12/04  |
| Scene Construction and Recognition: A Probabilistic<br>Framework for Integration Within and Between Cortical<br>Hypercolumns<br><i>P. Sajda</i><br><i>NMA201-02-C-0012</i> | NIMA                            | \$313,375   | 10/01-10/04 |
| Neural Models for Perceptual Salience for Augmented<br>Cognition<br><i>P. Sajda</i><br><i>#4900000156</i>                                                                  | DARPA                           | \$22,926    | 3/03-12/03  |
| Adaptive Brain-Computer Interfaces for Augmented<br>Cognition and Action<br><i>P. Sajda</i>                                                                                | DARPA                           | \$325,151   | 4/02-12/03  |
| Development of an MEG Brain-Computer Interface<br><i>P. Sajda</i>                                                                                                          | NIMA/Sarnoff                    | \$75,498    | 9/00-6/01   |
| Information Theory for Computer-Aided Diagnosis<br><i>P. Sajda</i><br><i>DAMD17-98-1-8061</i>                                                                              | U.S. Army<br>Medical<br>Command | \$475,000   | 8/98-8/01   |
| Medical Technology Transfer and Development<br><i>P. Sajda</i>                                                                                                             | NIMA/DARPA                      | \$2,000,000 | 3/00-7/01   |
| Perceptually Optimized Workstation for Image Analysts<br><i>P. Sajda</i>                                                                                                   | NIMA                            | \$275,000   | 8/99-7/00   |
| Neuroscience Inspired Image Analysis<br><i>P. Sajda</i>                                                                                                                    | NIMA                            | \$300,000   | 4/98-6/99   |

|                                                                                                           |                      |             |             |
|-----------------------------------------------------------------------------------------------------------|----------------------|-------------|-------------|
| Pattern Analysis Algorithms for Breast Cancer Detection<br><i>P. Sajda</i>                                | Biofield Corporation | \$750,000   | 6/97-2/99   |
| Breast Cancer Technology Transfer<br><i>P. Sajda</i>                                                      | NRO                  | \$1,000,000 | 10/96-12/98 |
| Clinical Evaluation of Intelligence Community<br>Computer-Aided Diagnosis Technologies<br><i>P. Sajda</i> | DHHS                 | \$150,000   | 9/96-12/98  |