Roman Genov

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RESEARCH INTERESTS

Analog integrated circuits and systems for energy-constrained biological, medical, and consumer sensory applications, such as implantable, wearable and disposable sensory microsystems, sensory-edge machine learning accelerators and wireless sensors; applications include brain-chip interfaces, neuro-stimulators, computational image sensors, and molecular biosensors.

EDUCATION

The Johns Hopkins University, Ph.D., Electrical and Computer Engineering, Baltimore, MD, 8/2002.
Dissertation: Massively Parallel Mixed-Signal VLSI Kernel Machines.
Advisor: Gert Cauwenberghs

Massachusetts Institute of Technology, Visiting Student, Cambridge, MA, 1/1999-8/1999.
Artificial Intelligence Lab / Center for Biological and Computational Leaning.

The Johns Hopkins University, M.S.E., Electrical and Computer Engineering, Baltimore, MD, 1998.

Rochester Institute of Technology, B.S., Electrical Engineering, Rochester, NY, 1996.

ACADEMIC AND INDUSTRIAL POSITIONS

University of Toronto, Toronto, ON, 7/2014-Present.
Professor, Department of Electrical and Computer Engineering.
Electronics Group and Biomedical Engineering Group.

University of Toronto, Toronto, ON, 7/2008-6/2014.
Associate Professor, Department of Electrical and Computer Engineering.
Electronics Group and Biomedical Engineering Group.

University of Toronto, Toronto, ON, 9/2002-6/2008.
Assistant Professor, Department of Electrical and Computer Engineering.
Electronics Group and Biomedical Engineering Group.

The Johns Hopkins University, Baltimore, MD, 9/96-8/2002.
Research Assistant, Department of Electrical and Computer Engineering.
Adaptive Microsystems Laboratory.

Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland, 6/1998-7/1998.
Visiting Researcher, Autonomous Systems Lab.

Xerox Corporation, Webster, NY, 3/1996-8/1996.
Design Engineer CO-OP, Advanced Development Team in the Color Imaging Systems Division.

Atmel Corporation, Columbia, MD, 6/1995-12/1995.
Design Engineer Intern, Chesapeake Design Center.

AWARDS AND HONORS

International

John Bandler Memorial 3MT Award (Best Thesis Pitch, top-3), IEEE International Microwave Symposium, IMS, (with M. Abdolrazzaghi and G. Eleftheriades, ~10,000 attendees), June 2024.

Best Poster Award, International Conference on Computational Photography, ICCP, (with K. Kutulakos, 95 accepted posters), 2021.

Jack Kilby Award for Outstanding Student Paper, IEEE International Solid-State Circuits Conference, ISSCC (with H. Kassiri, the highest ranked student paper), 2018.

Best Paper Award, IEEE Transactions on Biomedical Circuits and Systems, TBioCAS (with R. Shulyzki, the top paper, one paper is selected among all published papers over two years, USD $2000 prize), 2017.

Best Paper Award, IEEE International Symposium on Circuits and Systems, ISCAS (with H. Kassiri, the top paper, selected by IEEE Biomedical Circuits and Systems Technical Committee, 1687 submitted papers conference-wide), 2016.

Best Paper Award, IEEE Biomedical Circuits and Systems Conference, BioCAS (with H. Jafari, the best paper overall, 199 submitted papers), 2011.

AMD/CICC Student Award at IEEE Custom Integrated Circuits Conference, CICC (with M. Nazari, $200 prize, one of the highest ranked student papers, 305 submitted papers), 2010.

Best Student Paper Award nomination at IEEE Biomedical Circuits and Systems Conference, BioCAS (with K. Abdelhalim, top seven student papers, 126 submitted papers), 2010.

Best Student Paper Award, IEEE International Symposium on Circuits and Systems, ISCAS (with A. Nilchi, $400 prize, one of the two best student papers, 1631 submitted papers), 2009.

Best Paper Award, IEEE International Symposium on Circuits and Systems, ISCAS (with A. Nilchi, the top paper, selected by IEEE Sensory Systems Technical Committee, 1631 submitted papers conference-wide), 2009.

Best Student Paper Contest Finalist, IEEE International Symposium on Circuits and Systems (with F. Shahrokhi, top nine student papers out of 783 regular papers), ISCAS 2009.

National

Award for Excellence in Microsystems CAD Tools and Design Methodology, the winner of CMC TEXPO National Student Research Annual Competition, June 2022 (with R. Silva, $3,000 prize).

RBC Prize for Innovation & Entrepreneurship, 1st Prize Early-Stage Competition in 2021 (with G. O'Leary, T. Valiante, $10,000 prize).

GlobalFoundries Micro-Nanosystems Design Award, the winner of CMC TEXPO National Student Research Annual Competition, 2021 (with R. Gulve, $3,000 prize).

Brian L. Barge Award for Excellence in Microsystems Integration, the winner of CMC TEXPO National Student Research Annual Competition in 2008 (with H. Jafari, $3,500 prize), in 2012 (with H. Kassiri and N. Soltani, $3,500 prize), and in 2018 (with R. Pazhouhandeh, $3,500 prize).

Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Accelerator Award (awarded to top Canadian research programs superior in originality and innovation; up to 125 awards are offered nation-wide in all NSERC disciplines, $120,000), 2017.

1st Rank in Collaborative Health Research Projects competition by Canadian Institutes of Health Research (scored first among 116 submitted proposals), 2016.

The MEMSCAP Microsystems Design Award, the winner of CMC TEXPO National Student Research Annual Competition (with A. Bagheri and S. Gabran, $3,000 prize), 2012.

DALSA Corporation Award for Excellence in Microsystems Innovation, the winner of a CMC TEXPO National Student Research Annual Competition (with A. Olyaei, $3,000 prize), 2006 and (with K. Abdelhalim, $3,000 prize) 2009.

Canadian Institutes of Health Research (CIHR) BioContact Next Generation Award (with M.

Derchansky, $2,000 prize), 2005.

Provincial / Local

Stanley Ho Professorship in Microelectronics, Endowed Chair, 2025-2029.

John W. Senders Award for Imaginative Design (For Imaginative and Successful Application of Engineering to the Design of a Medical Device, won by a Capstone Design Project team I co-supervised, $2,900), Apr. 2024.

Schulich Leaders Scholarship (won by Anush Mutyala, a high-school intern, based on research done in our lab, $120,000), 2024.

Connaught Innovation Award (for the development of promising technology; $75,000; $50,000; $50,000, $75,000, $75,000), 2016, 2019, 2021 2022, and 2024.

Photonics Innovation Centre Award (for a Best Multidisciplinary Project in the Field of Photonics, won by PhD student R. Gulve, $10,000 prize), 2020.

Analog Devices Outstanding Student Designer Award (for Excellence in Analog, Mixed-Signal, Digital IC Design, or System-Level IC Architectures, won by PhD student M. ElAnsary, $1,500 prize), 2018.

Ontario Neurotech Entrepreneurs Award (for AI-powered software to help physicians more accurately and efficiently identify seizure-producing brain regions, with D. Groppe and T. Valiante, $50,000), 2017.

Ontario Brain Institute Entrepreneur Award (for neurotechnology with high commercialization potential, with H. Kassiri, N. Soltani, $50,000), 2015.

Heffernan/Co-Steel Innovation Commercialization Fellowship (for research with high commercialization potential, with H. Kassiri, N. Soltani, $34,000), 2015.

Teaching

Departmental Teaching Award, as voted by undergraduate students, Department of Electrical and Computer Engineering, University of Toronto (top four professors in the department, by popular student vote), 2015.

Undergraduate Teaching Award for teaching excellence, University of Toronto Students Union (five awards across the university), 2008-2009.

RESEARCH GRANTS AND CONTRACTS	Annual	Total
"Personalized Contingent Neurostimulation for Epilepsy by Machine Learning in Organic Brain Interfaces," PI, Canadian Institutes of Health Research (CIHR) and Natural Sciences and Engineering Council of Canada (NSERC), Collaborative Health Research Projects, 4/2020-3/2023.	$250,000	$750,000
"Closed-loop Artificially Intelligent Fiber-selective Peripheral Nerve Interface for Neuroprosthetic Applications," CARTE Seed Project Funding, 4/2020-3/2022.	$60,000	$120,000
"CenteR for Advancing Neurotechnological Innovation to Application (CRANIA)," co-PI, Canadian Foundation for Innovation ($6.5M), 2018-2023.	$208,000	$1,041,000
"Programmable Camera Systems for Transport-Aware Imaging," co-PI, NSERC Research Tools and Instruments, 4/2018-3/2019.	$148,509	$148,509
"Heterogeneous Integration of High-Density Analog Crossbar for Advanced Data Processing," co-PI, Natural Sciences and Engineering Council of Canada (NSERC), Strategic Projects, 10/2017-09/2020.	$127,200	$636,000
"Artificially Intelligent Neurostimulators for Drug-Resistant Epilepsy," PI,	$220,000	$1,100,000

Canadian Institutes of Health Research (CIHR), Project Grant, 4/2017-3/2022.		
"Transport-Aware Image Sensors," PI, Natural Sciences and Engineering Council of Canada (NSERC), Discovery Award, 05/2017-04/2022.	$58,000	$290,000
"Wireless Neurophotonic Probes for the Interrogation of Neurons in Memory Circuits," co-PI, Canadian Institutes of Health Research (CIHR) and Natural Sciences and Engineering Council of Canada (NSERC), Collaborative Health Research Projects, 4/2017-3/2020.	$62,000	$186,000
"A Clinical Study of Seizure-Aborting Implantable Neuro-stimulation Efficacy in Treating Drug-Resistant Epilepsy," PI, University of Toronto EMHSeed Award, 1/2017-12/2018.	$30,000	$60,000
"Artificially Intelligent Neurostimulators for Drug-Resistant Epilepsy," PI, Canadian Institutes of Health Research (CIHR), Project Grant, Bridge Funding, 9/2016-9/2017.	$100,000	$100,000
"Patient-Specific Adaptive Closed-Loop Neurostimulation for Optimum Treatment of Intractable Epilepsy," PI, Canadian Institutes of Health Research (CIHR) and Natural Sciences and Engineering Council of Canada (NSERC), Collaborative Health Research Projects, 4/2016-3/2019.	$77,400	$232,200
"Computational and Optical Processing Architectures for Next-Generation Mobile Cameras," co-PI, Natural Sciences and Engineering Council of Canada (NSERC), Strategic Projects, 10/2014-09/2017.	$50,500	$151,500
"Validation of Monitoring Changes in Brain Synchrony to Anticipate Seizures and Implement Feedback Stimulation to Stop Seizure Occurrence," Co-I, Ontario Brain Institute, 3/2011-4/2013.	$20,000	$40,000
"Fully Implantable Wireless Multi-Electrode ECoG Monitoring Systems," PI, Natural Sciences and Engineering Council of Canada (NSERC), Collaborative Health Research Projects, 4/2012-3/2015.	$60,833	$182,500
"Research Instruments for Experimental Characterization of Wireless Biomedical Sensory Microsystems," PI, NSERC Research Tools and Instruments, 4/2012-3/2013.	$145,545	$145,545
"Electronic Microsystems for Ubiquitous Biomedical Sensing," PI, Natural Sciences and Engineering Council of Canada (NSERC), Discovery Award, 05/2012-04/2017.	$21,750	$108,750
"A Low-cost, Compact Spectral Imaging Microsystem for Rapid, Regenerative and Highly Selective Nucleic Acid Detection," PI, Natural Sciences and Engineering Council of Canada (NSERC), Strategic Projects, 10/2010-09/2013.	$75,150	$225,450
"Micromachined Electrodes and Integrated Circuits for Implantable Cortical Brain Interfaces," PI, Natural Sciences and Engineering Council of Canada (NSERC), Strategic Projects, 10/2009-09/2012.	$78,240	$234,720
Short-term contract, PI, Industrial Partner, 2/2008-3/2008.	$10,000	$10,000
"Electro-Optical Microsystem for DNA Detection," PI, Ontario Centres of Excellence, Centre for Photonics, 1/2008-9/2008.	$30,000	$30,000
"2-D Integrated Microsystem for Neural Recording and Stimulation in the Brain," peer-reviewed Hybrid Integration project, PI, Canadian Microelectronics Corporation, 12/2007-9/2008.	$8,000	$8,000
"Integrated Neural Interfaces for Epileptic Seizure Monitoring," Co-I, subcontract from Prof. P. Carlen, University Health Network, University of Toronto, 9/2006-8/2008.	$13,250	$26,500

"Hybrid Integration Technologies for Optical DNA Detection," peer-reviewed Hybrid Integration project, PI, Canadian Microelectronics Corporation, 1/2008-12/2008.	$14,000	$14,000
"Smart Sensory Microsystems," PI, Natural Sciences and Engineering Council of Canada (NSERC), Discovery Award, 05/2007-04/2012.	$22,500	$112,500
NSERC Industrial Postgraduate Scholarship (recipient: M.A.Sc. student Farzaneh Shahrokhi), Medtrode Corporation, 9/2006-8/2008.	$6,000	$12,000
"Hybrid Integration Technologies for Brain-Chip Interfaces," Hybrid Integration project, PI, Canadian Microelectronics Corporation, 2006.	$5,000	$5,000
Infrastructure Operating Fund Award, PI, Canada Foundation for Innovation (CFI), 4/2006-3/2010.	$7,517	$30,068
"Intelligent Sensory Integrated Systems," PI, New Opportunities Award, Canada Foundation for Innovation (CFI), 11/2005-3/2008.	$33,408	$100,226
"Intelligent Sensory Integrated Systems," PI, Ontario Research Fund, 11/2005-3/2008.	$33,408	$100,226
"Real-time Human Gate Recognition for Automated Surveillance," Co-I with D. Hatzinakos, K. Plataniotis, and P. Klentrou, Communications and Information Technology Ontario (CITO), 6/2004-5/2006.	$17,225	$34,450
"Autonomous Integrated Vision Systems," PI, Natural Sciences and Engineering Council of Canada (NSERC), Discovery Award, 05/2003-04/2007.	$20,850	$83,400
"Mixed-Signal VLSI Circuits and Systems," PI, Connaught Foundation, 10/2002.	$10,000	$10,000
"Mixed-Signal VLSI Circuits and Systems," PI, University of Toronto, ECE Dept., 10/2002.	$100,000	$100,000

CURRENT GRADUATE / POST-GRADUATE RESEARCH ADVISEES

Post-Doctoral Fellows / Scientists

Jianxiong (Jay) Xu, PhD from University of Toronto, 5/2024-current.

PhD Students

Roberto Rangel, 9/2019-current.
Mohammad Abdolrazzaghi, 9/2020-current (co-supervised with Prof. G. Eleftheriades).
Sudip Nag, 1/2021-current.
Mustafa Kanchwala, 9/2021-current.
Ayandev Barman, 9/2021-current.
Yu Huang, 5/2022-current (co-supervised with Prof. X. Liu).
Hao Yang, 1/2024-current.
Jangwon Suh, 9/2024-current.
Chu King Kung, 9/2024-current.

MASc Students

Xiaonong (Frank) Sun, 5/2022-current.
Andre Miguel Cornejo Marin, 1/2023-current (co-supervised with Prof. T. Valiante).

MEng Project Students

Ge (Carol) Gao, 5/2023-12/2023
Project: Energy-Efficient Analog-to-Digital Converters for Implantable Wireless Brain-Computer Interfaces

Aryasree Remadevi, 1/2024-current
Project: Chip-scale Artificially Intelligent Electrical Stimulator for Highly Localized Brain and Peripheral Nerve Neuromodulation
Yuanze Yang, 1/2024-current
Project: Developing a Neural Recording and Stimulating System for Peripheral Nerves
Yixu Ye (Henry), 1/2024-current
Project: Developing a Neural Recording and Stimulating System for Peripheral Nerves
Songyu Yang, 1/2024-current
Project: Estimating Rodent Pose using Computer Vision and Neural Signal Recordings
Hengjia Zhang (Bruce), 1/2024-current
Project: Estimating Rodent Pose using Computer Vision and Neural Signal Recordings
Boshen Zhang, 1/2024-current
Project: Multi-Camera Control with Coded-Exposure Imaging System for Enhanced Scene Modeling
Kailun Jin, 1/2024-current
Project: Simultaneous Operation of RFDC and ADC Readout Methods in Software-Defined Camera Systems for Hybrid Imaging Applications
Qiaosong Deng, 1/2024-current
Project: Spiking Neural Networks for Brain-Computer Interfaces

FORMER GRADUATE RESEARCH ADVISEES

Former Post-Doctoral Fellows

Tariq Salam (PhD, Ecole Polytechnique, Montreal), Post-Doctoral Fellow, 03/2012-01/2015 (co-supervised with Profs. Perez Velazquez and Carlen, 50%).
Project: Seizure Anticipation and Closed-Loop Abortion in Rodent Models of Epilepsy
Upon completion: Vice-President of Technology at Avertus, Toronto
Currently: Bioelectronics R&D Engineer at GlaxoSmithKline, Stevenage, UK

Hyunjoong Lee (PhD, Seoul National University, South Korea), Post-Doctoral Fellow, 09/2014-01/2016 (co-supervised with Prof. Kutulakos, 50%).
Project: CMOS Structured-Light Computational Imagers
Upon completion: Electronics and Telecommunications Research Institute, South Korea

Enver Kilinc (PhD, EPFL, Switzerland), Post-Doctoral Fellow, 03/2015-02/2016 (co-supervised with Prof. Gulak, 50%).
Project: Implantable Transceiver and Antenna Design
Upon completion: Post-Doctoral Fellow, University of Toronto
Currently: Co-founder/CTO Co-founder, Micromensio, Toronto

Nikola Katic (PhD, EPFL, Switzerland), Post-Doctoral Fellow, 04/2016-06/2017 (co-supervised with Prof. Kutulakos, 50%).
Project: Transport-aware Image Sensors
Upon completion: Senior Analog Design Engineer at Synopsys, Toronto
Currently: Senior Analog Design Engineer, Intel, Toronto

Xuan-Thuan Nguyen (PhD, University of Electro-Communications, Japan), Post-Doctoral Fellow, 3/2018-2/2019.
Project: Digital Accelerators of Machine Learning Algorithms for Closed-loop Neurostimulation
Upon completion: Digital Designer at Tradetone Research Labs, Toronto

David Groppe (PhD, UCSD, USA) Post-Doctoral Fellow / Research Scientist, 09/2016-09/2019 (co-supervised with Prof. T. Valiante, 50%).
Project: Machine Learning Algorithms for Closed-loop Neurostimulation
Upon completion: Clinical Data Scientist at Persyst Development Corporation, Toronto

Zhengfan Xia (PhD, Tohoku University, Japan), Post-Doctoral Fellow, 10/2017-10/2019 (co-supervised with Prof. R. Kutulakos, 50%).
Project: Digital Systems for Computational Photography Cameras
Upon completion: Digital Designer at Tradetone Research Labs, Toronto

Amirali Amirsoleimani (PhD, University of Windsor, Canada), Post-Doctoral Fellow, 2/2018-06/2021.
Project: Monolithic CMOS-Memristor Integrated Systems
Upon completion: Assistant Professor at York University, Toronto

Joshua Olorocisimo (PhD from Nara Institute of Science and Technology, Japan), Post-Doctoral Fellow, 12/2023-9/2024.
Project: Selective Stimulation of Peripheral Nerves
Upon completion: Biomedical Data Analytics, Toronto

Former PhD Students

Karim Abdelhalim, Ph.D. Degree, 09/2007-01/2013.
Funding Award: Alexander Graham Bell Canada Graduate Scholarship
Thesis: Wireless Neural Recording and Stimulation SoCs for Monitoring and Treatment of Intractable Epilepsy
Upon graduation: IC Design Engineer at Broadcom Inc, Irvine, CA
Currently: Senior Staff Engineer at Inphi, Orange County, CA

Derek Ho, Ph.D. Degree, 09/2007-01/2013 (co-supervised with Prof. G. Gulak).
Funding Award: NSERC Postgraduate Scholarships – Doctoral (PGS D) Award
Thesis: CMOS Imager Design Optimizations for DNA Fluorescence Biosensing
Upon graduation: Associate Professor, Department of Physics, City University of Hong Kong

Hamed Jafari, Ph.D. Degree, 09/2007-05/2013.
Thesis: CMOS Universal Real-time Label-free DNA Analysis System-on-chip
Upon graduation: IC Design Engineer at Semtech/Snowbush, Toronto, Ontario
Currently: CTO and Co-Founder at EnviroSen, Toronto

Hossein Kassiri, Ph.D. Degree, 02/2011-12/2015.
Thesis: Multi-Modal Densely-Integrated Closed-Loop Neurostimulators for Monitoring and Treatment of Neurological Disorders
Upon graduation: Assistant Professor, Department of Electrical Engineering and Computer Science, York University, Toronto

Nima Soltani, Ph.D. Degree, 09/2011-12/2015.
Thesis: Inductively-Powered Implantable Integrated Circuits for Amperometric Brain Chemistry
Upon graduation: Analog and Mixed-Signal Design Engineer at Synopsis, Toronto
Currently: Analog and Mixed-Signal Design Engineer at Intel, Toronto

Maged ElAnsary, Ph.D. Degree, 9/2015-12/2019.
Thesis: Multi-modal Fully-wireless SoCs for Interfacing with the Nervous System
Upon graduation: Analog and Mixed-Signal Design Engineer at Rambus, Toronto

Reza Pazhouhandeh, 9/2015-11/2019.
Thesis: BRAINI: Bidirectional Rail-to-Rail Artifact-Immune Neural-Interface
Upon graduation: Analog and Mixed-Signal Design Engineer at AnalogX, Toronto

Navid Sarhangnejad, 9/2014-3/2021.
Thesis: Per-Pixel Coded-Exposure CMOS Image Sensors
Upon graduation: Analog IC Design Engineer at Huawei, Toronto

Gerard O'Leary, 9/2017-2/2022.
Thesis: Closed-Loop Neuroelectronic Interfaces: In Vitro to Silicon to Clinical Translation
Upon graduation: CEO, NerveX, Toronto

Nafiseh Ghoroghchian, 9/2017-12/2022 (co-supervised with Prof. Draper, 50%).
Funding Award: Connaught Award

Thesis: Graph-Based Learning for System Analysis and Control: Applications in Brain Networks
Upon graduation: Machine Learning Data Scientist, Foqus Technologies Inc, Toronto

Rahul Gulve, 9/2017-9/2023.
Thesis: Computational CMOS Image Sensors: Pixel-Wise Programmable Exposure and High-Dynamic-Range Flux Readout
Upon graduation: Analog IC Design Engineer, Alphawave Inc, Toronto

Jianxiong (Jay) Xu, 9/2018-5/2024.
Thesis: Spatially Zooming Energy-Efficient Integrated Neural Interfaces with Quantization Noise Suppression
Upon graduation: Post-Doctoral Fellow at the University of Toronto

Former MASc Students

Ashkan Olyaei, M.A.Sc. Degree, 09/2003-04/2006.
Thesis: ViPro: Focal-Plane CMOS Spatially-Oversampling Computational Image Sensor
Upon graduation: Staff Manager / Senior Staff RF-Analog Design Engineer at Marvell Semiconductor, San Jose, CA

Rafal Karakiewicz, M.A.Sc. Degree, 09/2003-08/2006.
Thesis: Mixed-Signal VLSI Adiabatic Array Computing
Upon graduation: Analog IC Design Engineer at Synopsis, Snowbush, Toronto
Was at: Analog IC Design Manager at Intel, Toronto, ON

Joseph Aziz, M.A.Sc. Degree, 09/2004-10/2006 (co-supervised with Prof. B. Bardakjian).
Thesis: Multi-Channel Signal-Processing Integrated Neural Interfaces
Upon graduation: Analog IC Design Engineer at Broadcom, Textronix, Inphi
Currently: Touch ASIC Architect at Apple, Cupertino, CA

Alireza Nilchi, M.A.Sc. Degree, 09/2005-11/2007.
Thesis: Focal-Plane CMOS Algorithmically-Multiplying Computational Image Sensor
Upon graduation: Analog IC Design Engineer at Intel, Toronto
Currently: Senior Staff Scientist at Broadcom, Irvine, CA

Meisam Nazari, M.A.Sc. Degree, 01/2006-06/2008.
Thesis: CMOS Wide-Dynamic-Range High-Throughput Potentiostat
Upon graduation: PhD student at California Institute of Technology
Currently: Postdoctoral Fellow at California Institute of Technology

Ritu Raj Singh, M.A.Sc. Degree, 09/2006-11/2008.
Thesis: Luminescence Contact Imaging Microsystems
Upon graduation: PhD student at University of Texas, Austin
Currently: Senior IC Design Engineer at InSilixa, Sunnyvale, CA

Farzaneh Shahrokhi, M.A.Sc. Degree, 09/2006-01/2009.
Thesis: Multi-Channel Fully Differential Digital Integrated Neural Recording and Stimulation Interfaces
Upon graduation: IC Design Engineer at Synaptics Inc, Santa Clara, CA

Ruslana Shulyzki, M.A.Sc. Degree, 09/2006-09/2009.
Thesis: Bidirectional Integrated Neural Interface for Adaptive Cortical Stimulation
Upon graduation: IC Design Engineer at Ignis Innovation Inc, Waterloo, Ontario
Currently: Analog IC Design Engineer at Intel, Toronto

Arezu Bagheri, M.A.Sc. Degree, 09/2010-09/2013.
Thesis: High-Integration-Density Neural Interfaces for High-Spatial-Resolution Intracranial EEG Monitoring
Upon graduation: IC Design Engineer at Semtech/Snowbush, Toronto, Ontario
Currently: Senior Analog Mixed-Signal Design Engineer at Peregrine Semiconductor, San Diego

Arshya Feyzi, M.A.Sc. Degree, 09/2011-10/2014. (co-supervised with Prof. G. Gulak).

Thesis: A CMOS Multi-Modal Contact-Imaging Scanning Microscope
Upon graduation: IC Design Engineer at Analog Devices, Boston, MA

Wilfred Cho, M.A.Sc. Degree, 09/2015-10/2017.
Thesis: Proxy Relearning for Feature-Driven Pattern Recognition in High-Dimensional Imbalanced Time Series Data Sets
Upon graduation: Machine Learning Engineer at Evolv Technologies

Gerard O'Leary, M.A.Sc. Degree, 09/2015-01/2018.
Thesis: Intelligent Medical Devices for Brain State Classification and Responsive Neuromodulation
Upon graduation: PhD student at the University of Toronto

Gairik Dutta, M.A.Sc. Degree, 7/2016-1/2019.
Thesis: Column-Parallel 7μm-pitch 2nd-order ΔΣ ADCs for Computational Image Sensors
Upon graduation: IC Design Engineer at Rambus, Toronto

Nikita Gusev, M.A.Sc. Degree, 9/2017-9/2019.
Thesis: System-Level Design of Coded-Exposure Cameras for Computational Imaging Applications
Upon graduation: Design Engineer at Alphawave, Toronto

Camilo Tejeiro, M.A.Sc. Degree, 1/2018-4/2020.
Thesis: Low-power Edge-combining Ring-oscillator-based RF Transmitters for Flexible-electrode Neural Microimplants
Upon graduation: IC Design Engineer at Synopsys, Toronto

Saima Ali, 9/2017-9/2020 (co-supervised with Prof. M. Popovic).
Thesis: Design of a Wireless Communication System for Neural Implants
Upon graduation: PhD student, University of Toronto

Jamie Koerner, M.A.Sc. Degree, 9/2018-10/2020 (co-supervised with Prof. T. Valiante).
Funding Award: NSERC Postgraduate Scholarships Award
Thesis: Machine Learning-Driven Patient-Specific Early Seizure Detection for Neuromodulation Devices
Upon graduation: PhD student, Massachusetts Institute of Technology

Motasem Sakr, M.A.Sc. Degree, 9/2019-9/2021.
Thesis: Hardware-Efficient Accelerators for Mask Generation in Coded-Exposure Cameras
Upon graduation: IC Design Engineer at NVIDIA, Toronto

Don Nguyen, M.A.Sc. Degree, 9/2019-4/2023.
Thesis: Selected Topics in Computational Imaging: From Pixel Simulation to Applications of Coded-Exposure Cameras

Former MEng Students

Yu Hu, M.Eng. Degree, 5/2014-8/2014.
Project: High-Voltage Neural Stimulator with Adaptive Loading Consideration

Atul Patridar, M.Eng. Degree, 5/2014 -8/2014.
Project: Wireless Radio Connectivity for Responsive Neuro-Stimulation Implants

Jiaming Liu, M.Eng. Degree, 5/2014-8/2014.
Project: Wirelessly Powering for Responsive Neuro-Stimulation Implants

Aditi Chemparathy, M.Eng. Degree, 10/2013-12/2014.
Project: Low-Latency Sleep Stage Classifier

Kevin Lee, M.Eng. Degree, 05/2015-09/2015.
Project: High-Speed I/O Design for Pixel Programmable CMOS Image Sensor

Hardik Patel, M.Eng. Degree, 05/2015-12/2015.
Project: Optoelectronic Testing Platform for 3D Image Sensors Characterization

Asish Abraham, M.Eng. Degree, 04/2016-05/2017.

Project: ASIC Implementation of a Low-Power Microcontroller for Implantable Biomedical System Control

Goutham Palaniappan, M.Eng. Degree, 04/2016-08/2017.
Project: Wireless Powering Systems for Neural Implants

Veronica Li, M.Eng. Degree, 12/2016-08/2017.
Project: Low-noise Microelectronic Interface for Brain-Monitoring Microelectrode Arrays

Naba Siddiqui, M.Eng. Degree, 01/2017-08/2017.
Project: 3D Graphical User Interface for Localizing Intracranial Electrode Locations

Xu (Jay) Jianxiong, Candidate for M.Eng. Degree, 4/2017-8/2018.
Project: Wireless Power Transfer to Integrated Circuits

Jaimin Joshi, Candidate for M.Eng. Degree, 4/2017-7/2018.
Project: Digital Systems for Real-Time Impedance Spectroscopy

Srinidhi Balasubrahmanya, Candidate for M.Eng. Degree, 6/2017-7/2018.
Project: High-speed Wireline Communications

William Isaac, Candidate for M.Eng. Degree, 8/2018-5/2019.
Project: Bio-electronic Systems for Neural Recording

Atul Grover, Candidate for M.Eng. Degree, 4/2019-9/2019.
Project: Implementation of Support Vector Machine on Memristive Hardware

Szu-Chieh Fang, Candidate for M.Eng. Degree, 4/2019-1/2020.
Project: Design of a Software Interface for a Memristive Machine Learning Platform

Chenxi Tang, Candidate for M.Eng. Degree, 2/2019-4/2020.
Project: Digitally Assisted Analog Front Ends

Jaina Patel, Candidate for M.Eng. Degree, 4/2019-5/2020.
Project: FPGA-based ASIC Test Framework

Kartik Sunil Sharma, Candidate for M.Eng. Degree, 6/2019-5/2020.
Project: Design and verification of on-chip Impedance Measurement Systems

Rakshith Ramesh, Candidate for M.Eng. Degree, 5/2020-8/2020.
Project: Electronic Interfacing with In-vitro Microelectrode Arrays

Yaoming Yin, Candidate for M.Eng. Degree, 1/2020-12/2020.
Project: Layout Design and Characterization of ADC Circuits for Coded-Exposure Image Sensors

Yushi Gavin Guan, Candidate for M.Eng. Degree, 5/2020-4/2021.
Project: Seizure Generation by Generative Adversarial Networks

Guanyan Han, Candidate for M.Eng. Degree, 5/2021- 8/2021.
Project: Successive-Approximation ADC for an Image Sensor

Sanjana Seerala, 5/2021- 8/2022.
Project: Real-time Neural Spike Sorting Hardware Development

Sheng Zhao, 1/2022-8/2022.
Project: Digital Circuit Design for Coded-Exposure Image Sensors

Nicholas Popowich, 1/2022-8/2022.
Project: Coded-Exposure Image Sensor Technology Porting

Eiley Tarlton, 5/2022-12/2022.
Project: Next-Generation Brain Machine Interface ASIC Validation and Testing

Ge (Carol) Gao, 5/2023-12/2023
Project: Energy-Efficient Analog-to-Digital Converters for Implantable Wireless Brain-Computer Interfaces

Haotian Zhu, 1/2023-5/2023.
Project: Development of Coded-Exposure Hybrid Imaging Applications with a Custom Image Sensor

Savo Bajic, 1/2023-9/2023.
Project: Camera System for Time-of-Flight 3D Imaging with Custom Coded-Exposure Image

Sensor

Akshith Rajkumar, 1/2023-5/2023.

Project: Camera System for Computational Photography with Custom Coded-Exposure Image Sensor

Zhengyu Cai, 5/2023-12/2023.

Project name: Efficient Learning Schemes for Spiking Neural Networks (co-supervised with Prof. A. Amirsoleimani)

UNDERGRADUATE CAPSTONE DESIGN PROJECT AND THESIS ADVISEES

2003-2004	King Sun (Francis) Tam	(capstone design project)
	T.K. Chan	(capstone design project)
	Po-Yu Liu	(capstone design project)
2004-2005	Mustafa Alam	(capstone design project)
	Ahmad Attia	(capstone design project)
	Ajmal Khan	(capstone design project)
	Taha Sheikh	(capstone design project)
	Houman Akbari	(capstone design project)
	Negar Habibi	(capstone design project)
	Yasaman Faghih	(capstone design project)
2005-2006	John Tan	(capstone design project, co-supervised with Prof. B. Bardakjian)
	Colin Li	(capstone design project, co-supervised with Prof. B. Bardakjian)
	Chuan Qin	(capstone design project, co-supervised with Prof. B. Bardakjian)
	Ruslana Gelman	(capstone design project)
	Angie Mehta	(capstone design project)
2006-2007	Khaled Qasmieh	(capstone design project)
	Khalil Oudah	(capstone design project)
	Tina Tahmoures-Zadeh	(capstone design project)
	Jon Perras	(undergraduate thesis)
2007-2008	Natasha Baker	(capstone design project)
	Brian Choi	(capstone design project)
2008-2009	David Wu	(capstone design project)
	Kim Liu	(capstone design project)
	Eric Pai	(capstone design project)
	Ryan Payogo	(capstone design project)
	Fady Akladios	(capstone design project)
	Benny Tu	(capstone design project)
	David Crockett	(capstone design project)
	Vadim Smolyakov	(undergraduate thesis)
2009-2010	Chi Kin Chong	(capstone design project)
	Muhammad Farhandar	(capstone design project)
	Robert Gunabalendra	(capstone design project)
	Horia Popovici	(capstone design project)
	Visnuthanan Siritharan	(capstone design project)
	John Sison	(capstone design project)
	Darshan Thothiraling	(capstone design project)
	Wen Jie Yan	(capstone design project)

	Xin Yun Zhang	(capstone design project)
	Zhao Yuan Zheng	(capstone design project)
	Miaad Seyed Aliroteh	(undergraduate thesis)
2011-2012	Adam Shier	(capstone design project)
	Nikita Tarakanov	(capstone design project)
2012-2013	Siddharth Kaul	(capstone design project)
	Chan Hu Ngen	(capstone design project)
	Junaid Ikram	(capstone design project)
	Sheraz Qadeer	(capstone design project)
2013-2014	Richard Gao	(undergraduate thesis)
2014-2015	Derek Peterson	(undergraduate thesis)
	Kyeong (Kris) Kang	(undergraduate thesis)
	Guang-Yo (Zack) Tzeng	(undergraduate thesis)
	Chang Liu	(undergraduate thesis)
2015-2016	David Galus	(undergraduate thesis)
	Terrence Cole Millar	(undergraduate thesis)
	Dan Litovitz	(capstone design project)
	Chi-Chun Tien	(capstone design project)
2017-2018	Peter Zhi Xuan Li	(undergraduate thesis)
2018-2019	Nhien Tran-Nguyen	(undergraduate thesis)
	Francis Kang	(undergraduate thesis)
	Derek Lam	(undergraduate thesis)
2019-2020	Yae Seoung (Yuni) Kim	(undergraduate thesis)
2021-2022	Ashley Hung	(capstone design project)
	Timothy Yeung	(capstone design project)
	Jaden Reimer	(capstone design project)
2022-2023	Fatima Siddiqui	(capstone design project)
	Khalil Scott	(capstone design project)
	Mina Assaad	(capstone design project)
	Mehak Kalra	(capstone design project)
	Kevin Kim	(undergraduate thesis)
2023-2024	Selena Liu	(capstone design project)
	Aurora Nowicki	(capstone design project)
	Kimberley Orna	(capstone design project)
	Junyu Ma	(capstone design project)
	Hao Zhu	(capstone design project)
	Yichen Xu	(capstone design project)
	Pablo Medina Lara	(capstone design project)
2024-2025	Serena Liu	(undergraduate thesis)

UNDERGRADUATE RESEARCH ADVISEES

2004	Alborz Jooyaie	(NSERC USRA summer student)
2005	John Tan	(NSERC USRA summer student)
	Hsiang-Hua (Andy) Hung	(NSERC USRA summer student)
	Ruslana Gelman	(NSERC USRA summer student)
	Jasper Chan	(NSERC USRA summer student)
2006	Gaurav Jain	(NSERC USRA summer student)
	Stephen Chin	(NSERC USRA summer student)
	Khalil Oudah	(summer student)

2011	Amogh Vidwans	(MITACS summer student from India)
2013	Kevin Gumba	(NSERC USRA summer student)
	Alison Ma	(NSERC USRA summer student)
	Renan Goulart Heinzen	(summer student from Brazil)
	Caroline Marinho Mano	(summer student from Brazil)
	Pedro Veit Michel	(summer student from Brazil)
	Willian Beneducci	(summer student from Brazil)
2014	Marcelo Bissi Pires	(summer student from Brazil)
	Fadime Bekmambetova	(NSERC USRA summer student)
	Fu-Der (Fred) Chen	(NSERC USRA summer student)
	Behraz Vatankhahghadim	(NSERC USRA summer student)
2015	Peter Zhi Xuan Li	(NSERC USRA summer student)
	Seyedeh Sana Tonekaboni	(NSERC USRA summer student)
	Christopher Lucasius	(NSERC USRA summer student)
	Sepehr Semsar	(NSERC USRA summer student)
	Alan Li	(NSERC USRA summer student)
	Gairik Dutta	(MITACS summer student from India)
	Shreedutt Hegde	(MITACS summer student from India)
	Jesse Barcelos	(summer research student)
	Chengzhi (Winston) Liu	(summer research student)
	Terrence Cole Millar	(summer research student)
2016	Mary Catherine McIntosh	(NSERC USRA summer student)
	Anastasia Kolesnikov	(NSERC USRA summer student)
	Peter Tanugraha	(NSERC USRA summer student)
	Ethan Wen	(summer intern from Department of Math)
	Dayeol Choi	(summer intern from Department of Math)
	Peter Zhi Xuan Li	(volunteer research student)
	Akshay Kamath	(MITACS summer student from India)
	Sepehr Semsar	(summer research student)
	Kamyar Ghofrani	(summer research student from U. of Waterloo)
	R. Andrei Romero Alvarez	(summer research student from Department of CS)
	Ji Tong (Michael) Yin	(summer research student, from Department of EngSci)
	Terrence Cole Millar	(summer intern)
	Nikita Gusev	(NSERC USRA summer student)
	Winston Liu	(research student)
	Vincent Lo	(summer research student)
	Nafis Ahbab	(summer research student)
	Anas Ahmed	(summer research student)
	Sanjana Seerala	(summer research student)
2017	Ali Haydaroglu	(NSERC USRA summer student)
	Yin Tai Huang	(NSERC USRA summer student)
	Hui Feng Ke	(NSERC USRA summer student)
	Shichen Lu	(NSERC USRA summer student)
	Gilead Posluns	(NSERC USRA summer student)
	Shahryar Rajabzadeh	(NSERC USRA summer student)
	Hui Di Wang	(NSERC USRA summer student)
	Jinzhuo (Sarah) Tang	(UTEA-NSE summer student)
	Ziming (Michael) Xiong	(summer research student)
	Qingchong Zeng	(summer research student)
	Ken Chen	(summer research student)

2018	*Led by G. O'Leary:*	
	Farhad Yusufali	(NSERC USRA summer student)
	Francis Kang	(NSERC USRA summer student)
	Adam Gierlach	(NSERC USRA summer student)
	Jamie Koerner	(NSERC USRA summer student)
	Sonali Dey	(First Year Student Research Fellowship)
	Led by R. Pazhouhandeh:	
	Michael Karras	(NSERC USRA summer student)
	Zhiwei Liu	(NSERC USRA summer student)
	Nhien Tran-Nguyen	(NSERC USRA summer student)
	Saad Jameel	(summer research student)
	Led by M. ElAnsary	
	Zihan (Simon) Zhao	(NSERC USRA summer student)
	Michelle Tessy	(NSERC USRA summer student)
	M.Mustafa Arif	(NSERC USRA summer student)
	Led by R. Gulve	
	Tobias Rozario	(ECE Admission Research Scholar)
	Yangfan Wang	(NSERC USRA summer student)
	Alexander Buck	(NSERC USRA summer student)
	Yuanli (Danny) Ding	(NSERC USRA summer student)
	Xinyi (Cindy) Hou	(summer research student)
	Qingchong Zeng	(summer research student)
	Tianyi (Ronan) Zhang	(summer research volunteer)
2019	*Led by G. O'Leary:*	
	Nizar Islah	(NSERC USRA summer student)
	Aditya Saigal	(NSERC USRA summer student)
	Adam Gierlach	(NSERC USRA summer student)
	Shounak Sural	(MITACS summer student from India)
	Bipasha Goyal	(ESROP summer student)
	Led by A. Amirsoleimani:	
	Nhien Tran Nguyen	(NSERC USRA summer student)
	Martin Ffrench	(NSERC USRA summer student)
	Tony Liu	(summer research volunteer)
	Led by R. Gulve:	
	Sharon Lin	(NSERC USRA summer student)
	En Xu Li	(NSERC USRA summer student)
	Dylan Hai-Hien Dao	(NSERC USRA summer student)
	Xin Chen	(UTEA-NSE summer student)
	Yifan Cui	(UTEA-NSE summer student)
	Rain Wu	(summer research student)
	Led by J. Sales:	
	Sidharth Thomas	(MITACS summer student from India)
2020	*Led by A. Amirsoleimani:*	
	Louis Primaue	(NSERC USRA research student)
	Tony Liu	(summer research student)
	Benjamin Chang	(summer research student)
	Tengyu Song	(summer research student)
	Chenqi Li	(summer research student)
	Shawn Zhang	(summer research student)
	Shakiba Tonekabonipour	(summer research student)

	Michael Xiong	(summer research student)
	Szu-Chieh Fang	(summer research student)
	Daniel Pinheiro Leal	(summer research student)
	Vince Tran	(summer research student)
	Vince Tran	(NSERC USRA research student, Fall term)
	Led by G. O'Leary:	
	Jake Sprenger	(FYSRP summer student)
	Ahmed Abdelmoneim	(summer research student)
	Rakshith Ramesh	(summer research student)
	Maitreyi Joshi	(summer research student)
	Nizar Islah	(summer research student)
	Yushi Gavin Guan	(summer research student)
	Zhiyu Yang	(MITACS summer student from China)
	Led by R. Gulve:	
	Alex Buck	(summer research student)
	Sean Wu	(ESROP summer student)
	Kathy Zhuang	(ESROP summer student)
	Abdullah Mohammed	(summer research student)
	Margarita Diaz	(summer research student)
	Abhay Gopinathan	(summer research student)
	Drini Kerciku	(summer research student)
	Zongyan (Paul) Yao	(ESROP summer student)
	Selina Wan	(summer research student)
	Led by J. Sales:	
	Samantha Unger	(NSERC USRA research student)
	Karissa Chan	(NSERC USRA research student)
	Colin Graham	(summer research student)
2021	*Led by J. Sales:*	
	Albert Huang	(NSERC USRA research student)
	Haoxiang Yang	(NSERC USRA research student)
	Arielle Zhang	(summer research student)
	Patty Liu	(NSERC USRA research student)
	Guozhen Ding	(summer research student)
	Led by G. O'Leary:	
	Cameron Rodriquez	(summer research student)
	Robert Purcaru	(summer research student)
	Soliman Ali	(NSERC USRA research student)
	Kevin Zhu	(NSERC USRA research student)
	Fabin Flasius	(summer research student)
	Chirag Sethi	(summer research student)
	Led by R. Rangel:	
	Qianqian Zhang	(summer research student)
	Leo Hanxu	(NSERC USRA research student)
	Arash Dehkordi	(summer research student)
	Iliya Shofman	(summer research student)
	Nicholas Popowich	(summer research student)
	Xiaonong Frank Sun	(NSERC USRA research student)
	Led by A. Amirsoleimani:	
	Tony Fu	(summer research student)
	Jack Cai	(ESROP research student)

	Brian Chen	(ESROP research student)
	Vince Tran	(summer research student)
	Ali Alsharaawi	(summer research student)
	Rishabh Saini	(summer research student)
	Xuening Ding	(summer research student)
	Jonathan Wu	(summer research student)
	Tianyi Tim Zhang	(NSERC USRA research student)
	Rico Zhu	(summer research student)
	Kevin Wang	(summer research student)
	Louis Primaue	(Part-time summer research student)
	Benjamin Cheng	(Part-time summer research student)
	Chenqi Li	(Part-time summer research student)
2022	*Led by N. Ghoroghchian:*	
	Hanna Singurdson	(NSERC USRA research student)
	Lokeesan Kaneshwaran	(NSERC USRA research student)
	Nick Nabavi	(summer research student)
	Led by J. Sales:	
	Shafinul Haque	(NSERC USRA research student)
	Kemeng Han	(UTEA-NSE summer student)
	Yuan (Jenny) Sui	(summer research student)
	Ourong Lin	(summer research student)
	Led by A. Amirsoleimani:	
	Xun Cai	(NSERC USRA research student)
	Yan Zhu	(summer research student)
	Timothy Zhang	(summer research student)
	Arielle Zhang	(summer research student)
	Louis Primeau	(summer research student)
	Chenxin Zheng	(summer research student)
	Jonathan Woo	(summer research student)
	Xuening Dong	(summer research student)
	Ali Al-sharaawi	(summer research student)
	Brian Chen	(summer research student)
	Hao You	(summer research student)
	Muhammad Ahsan Kaleem	(NSERC USRA research student)
	Led by S. Nag:	
	Mengyan Zhu	(summer research student)
	Kevin Kim	(summer research student)
	Led by R. Rangel:	
	David Shemesh	(NSERC USRA research student)
	Bora Bayazit	(UTEA-NSE summer student)
	Deeksha Tewari	
	Karthikeyan R	(MITACS summer student from India)
	Led by M. Abdolrazzaghi:	
	Aditya Sharma	(MITACS summer student from India)
	Led by F. Torres:	
	Aditya Mohan	(MITACS summer student from India)
2023	*Led by R. Silva/A. Barman:*	
	Harry Wang	(NSERC USRA research student)
	Aaron Zhou	(NSERC USRA research student)
	Linda Zhao	(NSERC USRA research student)

	Jingmin Wang	(UTEA-NSE summer student)
	Kevin Zhu	(ESROP research student)
	Brett (Jiaxin) Yang	(UTEA-NSE summer student)
	Alex Yuan	(NSERC USRA research student)
	Benjamin Chapman	(NSERC USRA research student)
	Amy Luo	(summer research student)
	Demeng (Derek) Chen	(summer research student)
	Elizabeth Sumual	(summer research student)
	Led by S. Nag:	
	A. Constas-Malevanets	(NSERC USRA research student)
	Xiangxuan (Noah) Kong	(UTEA-NSE summer student)
	Hanrui Xing	(NSERC USRA research student)
	M. V. Sai Aditya	(MITACS summer student)
	Led by Y. Huang	
	Shreyan Mahalanabis	(summer research student)
	Led by M. Kanchwala:	
	Mikael Haji	(High-school research student)
	Anush Mutyala	(High-school research student)
	Led by J. Xu:	
	Sophie Wu	(summer research student)
	Haley Han	(summer research student)
	Junyu Ma	(summer research student)
	Hanzhang Xing	(summer research student)
	Jackie Tran	(summer research student)
	Jenny Sui	(summer research student)
	Led by A. Amirsoleimani:	*(co-supervised at York University)*
	Andy Gong	(summer research student)
	Vince Tran	(summer research student)
	Ellina Zhang	(summer research student)
	Jack Cai	(summer research student)
	Muhammad Ahsan Kaleem	(summer research student)
	Rudy Jin	(summer research student)
	Hao You	(summer research student)
2024	*Led by R. Silva/A. Barman:*	
	Mateusz Kazimierczak	(summer research student)
	Jiaheng (Ronaldo) Luo	(UTEA-NSE summer student)
	Karthik Purushotham	(summer research student)
	Runze Zhu	(UTEA-NSE summer student)
	Chenjia Hu	(summer research student)
	Asmita Zjigyasu	(MITACS summer student)
	Led by M. Kanchwala:	
	Weian Deng (Victor)	(summer research student)
	Christina Pizzonia	(NSERC USRA research student)
	O. Dahanaggamaarachchi	(summer research student)
	Jason Zhang	(summer research student)
	Koosha Omidian	(GSRA research student)
	Diba Alam	(summer research student)
	Led by S. Nag:	
	Matvii Prytula	(MITACS summer student)

Jin Che	(NSERC USRA research student)
Led by M. Abdolrazzaghi:	
Yanze Wang	(MITACS summer student)
Led by J. Xu:	
Jia Hua Li	(First Year Fellowship student)
Lingyun Xu	(summer research student)
Stella Yuan	(summer research student)
Rhianna Supriya Singh	(ESROP research student)
Yishan Chen	(summer research student)
Pasha Ho	(summer research student)
Shucheng Gong	(summer research student)
Chaeyoung Lim	(NSERC USRA research student)
Mason Cai	(summer research student)
Hao You	(summer research student)
Joshua Ma	(summer research student)
Led by A. Amirsoleimani:	*(co-supervised at York University)*
Lucas Choi	(summer research student)
Yixin Zha	(summer research student)
Xunhao Lu	(summer research student)

TEACHING

"Selected Topics in Circuits and Systems – VLSI Circuits and Systems for Pattern Recognition," ECE1390, 9/2003-12/2003 (5 graduate students).

"VLSI Design Methodology," ECE1388, 9/2004-12/2004 (26 graduate students), 9/2005-12/2005 (16 graduate students), 9/2006-12/2006 (13 graduate students), 9/2007-12/2007 (25 graduate students), 9/2008-12/2008 (13 graduate students), 9/2009-12/2009 (33 graduate students), 9/2010-12/2010 (12 students), 9/2011-12/2011 (25 students), 9/2012-12/2012 (21 students), 9/2013-12/2013 (42 students), 9/2014-12/2014 (17 students), 9/2015-12/2015 (19 students), 9/2016-12/2016 (48 students), 9/2017-12/2017 (27 students), 9/2018-12/2018 (25 students), 9/2019-12/2019 (27 students), 1/2021-4/2021 (22 students), 9/2021-12/2021 (19 students), 9/2022-12/2022 (30 students), 9/2023-12/2023 (35 students), 9/2024-12/2024 (35 students).

"Analog Electronics," ECE530, 1/2004-4/2004 (55 students), 1/2005-4/2005 (65 students), 1/2006-4/2006 (89 students), 1/2007-4/2007 (66 students), 1/2008-4/2008 (44 students), 1/2009-4/2009 (54 students), 1/2010-4/2010 (52 students).

"Digital Electronics," ECE334, 1/2012-4/2012 (97 students), 1/2013-4/2013 (81 students), 1/2014-4/2014 (97 students), 1/2015-4/2015 (132 students, 2 sections), 1/2016-4/2016 (103 students), 1/2017-4/2017 (122 students), 1/2018-4/2018 (59 students), 9/2019-12/2019 (70 students), 1/2021-4/2021 (78 students), 9/2021-12/2021 (81 students), 9/2022-12/2022 (67 students).

"Electronics," ECE360 09/2011-12/2011 (73 students), 9/2012-12/2012 (78 students), 9/2013-12/2013 (64 students), 9/2015-12/2015 (49 students), 9/2016-12/2016 (45 students).

"Introductory Electronics," ECE231, 1/2003-4/2003 (89 students), 1/2004-4/2004 (87 students), 1/2005-4/2005 (88 students), 1/2006-4/2006 (70 students), 1/2007-4/2007 (60 students), 1/2008-4/2008 (107 students), 1/2009-4/2009 (103 students; 320 students coordinated), 1/2010-4/2010 (91 students, 315 students coordinated).

"Introduction to Electrical and Computer Engineering," ECE101, 2011-2016 (one lecture per year).

"Electrical and Computer Engineering Seminar," ECE201, 2015 (one lecture per year).

"Engineering Science Seminar," ESC301, 2024 (one lecture per year).

SHORT COURSES/TUTORIALS

"Implantable Neurotechnologies: from Circuits and Signals to Systems and Applications," half-day tutorial (with N. Thakor and M. Sawan), IEEE International Symposium on Circuits and Systems, 2016.

"Amperometric Electrochemical Sensing in CMOS: Applications, Methods and Implementations," invited plenary tutorial (with P. Mohseni), Biomedical Circuits and Systems Conference, San Diego, Nov. 10, 2011.

"Pattern Recognition at 1GOPS/mW and Beyond: Massively Parallel Mixed-Signal VLSI Storage, Computing and Data Conversion," half-day intensive course, Microelectronics Strategic Alliance of Quebec (ReSMiQ), Montreal, QC, March 4, 2005.

INVITED PRESENTATIONS

"Artificially Intelligent Closed-Loop Neurostimulators: Trade-offs Between Local and Remote Computing," IEEE Custom Integrated Circuits Conference, invited featured presentation, Denver, USA, Apr. 24, 2024.

"Three Degrees of Selectivity in Electronic Neuromodulation: Time, Data and Space," IEEE Custom Integrated Circuits Conference, Brain-computer-interfaces invited panel presentation, Denver, USA, Apr. 22, 2024.

"Fast Pixel-Programmable Image Sensors for Versatile Low-Cost Imaging with Software-Defined Cameras," Rice University, invited seminar, March 8, 2024.

"Artificially-Intelligent Closed-Loop Neurostimulators for the Treatment of Neurological Disorders," IEEE Biomedical Circuits and Systems Conference, invited keynote talk, Toronto, Oct. 20, 2023.

"Extending the Impact of Computational Imaging Beyond Phone Cameras: Fast Pixel-Programmable Image Sensors - the 'FPGAs' of the Image Sensors World," Instituto de Microelectrónica de Sevilla, invited seminar, Sept. 18, 2023.

"Extending the Impact of Computational Imaging Beyond Phone Cameras: Fast Pixel-Programmable Image Sensors - the "FPGAs" of the Image Sensors World," University of Victoria, invited seminar, June 26, 2023.

"Full-Day Live Demo: Low-Cost Coded-Exposure-Pixel Cameras for Robust High-Speed Computational Imaging at up to 18,000 Exposures-per-Second," Conference on Computer Vision and Pattern Recognition, June 22, 2023.

"Coded Two-Bucket Sensors for Active and Passive Imaging," Opening Plenary Talk, International Workshop on Image Sensors and Imaging Systems (IWISS), Shizuoka University, Hamamatsu, Japan, Dec. 12, 2022 (presented by collaborator Prof. Kyros Kutulakos).

"Artificially-Intelligent Closed-Loop Neurostimulators," Neuroengineering Seminar, Institute for Neural Computation and Institute of Engineering in Medicine, invited seminar, University of California San Diego, Aug. 8, 2022.

"Fast Field-Programmable Coded Image Sensors for Versatile Low-Cost Computational Imaging," Seminar, Institute for Neural Computation, University of California San Diego, invited seminar, Aug. 5, 2022.

"Artificially-intelligent Closed-loop Neurostimulators for the Treatment of Neurological Disorders," IEEE European Solid-State Circuits Conference (ESSCIRC'21), Educational Workshop on Emerging Solutions for Sensors and Imagers, Circuits and Systems, Grenoble, France, Sept. 20, 2021.

"Design Challenges in Closed-loop Neuromodulators: Case Study of Intractable Epilepsy," IEEE Custom Integrated Circuits Conference (CICC'21), Forum on Human Brain-Machine Interfaces, online, Apr. 29, 2021.

"Coded-pixel Multi-exposure Single-shot Image Sensors," IEEE European Solid-State Circuits Conference (ESSCIRC'20), Educational Workshop on Emerging Solutions for Imaging Devices,

Circuits and Systems, online, Sept. 2020.

"Coded-exposure-pixel Image Sensors," Imaging and Applied Optics Congress, Computational Optical Sensing and Imaging Meeting, online, June 24, 2020.

"Electronic Design Challenges in Closed-loop Neuromodulation," CRANIA Conference, Toronto, Sept. 16, 2019.

"Demo: Dual-Tap Pipelined-Code-Memory Coded-Exposure-Pixel CMOS Image Sensor for Multi-Exposure Single-Frame Computational Imaging," IEEE International Solid-State Circuits Conference (ISSCC'2019), Live Demonstration, San Francisco, Feb. 2019.

"Active Illumination and Imaging across 10^-3-10^-12 s Timescales for General LOS/NLOS Scene Understanding: Programmable-pixel Image Sensors", 36-month PI Review Meeting (with S. Narasimhan, K. Kutulakos), Arlington, VA, Apr. 3, 2019.

"CMOS Image Sensors with Per-Pixel Coded Exposure," Computational Light Transport Workshop, Banff International Research Station, Banff, AB, February 11, 2019.

"Implantable Chips for Neural Recording and Stimulation," EAEEG 72nd Annual Meeting, Toronto, Feb. 18. 2018.

"Energy-Efficient Computational Light Transport Parsing: Computational Cameras," 24-month PI Review Meeting (with S. Narasimhan, K. Kutulakos), Arlington, VA, Mar. 13, 2018.

"Brain Monitoring and Modulation Building next generation Responsive Brain Stimulators," Ontario Brain Institute EpLink Workshop (with T. Valiante), Nov. 11, London, 2017.

"Energy-Efficient Computational Light Transport Parsing: Programmable-pixel Image Sensors", 18-month PI Review Meeting (with S. Narasimhan, K. Kutulakos), Arlington, VA, Sept. 26, 2017.

"Electrochemical Monitoring of Epilepsy: the Technology," Invited Talk, 2017 EpLink Fellows Meeting, University of Toronto, Faculty of Medicine, Apr. 7, 2017.

"Pixel-programmable Structured-Light CMOS Imagers," Annual Meeting, Orlando, FL, Mar. 14, 2017.

"Pixel-programmable Structured-Light Imaging Device Design," Site Visit, Pittsburgh, PA, January 30, 2017.

"Brain Synchrony-Contingent Neurostimulators for Treatment of Drug-Resistant Epilepsy," Invited Plenary Talk, 2016 Anne & Max Tanenbaum Symposium on The Frontiers of Science "Listening and Responding to the Brain: Neuroengineering and Epilepsy," University of Toronto, Faculty of Medicine, November 2, 2016.

"Energy-Efficient Computational Light Transport Parsing: Imaging Device Design," Progress Meeting, Washington, DC, September 14, 2016.

"Electronic Microsystems for Intracranial Monitoring, Diagnostics and Treatment of Neurological Disorders," Seminar, Department of Electrical and Electronic Engineering, Imperial College London, September 5, 2016.

"Integrated Circuits for Electrochemical Sensing: Microsystems and Applications," Seminar, Department of Electrical and Electronic Engineering, Imperial College London, August 26, 2016.

"Brain Synchrony-Contingent Neurostimulators for Treatment of Drug-resistant Epilepsy," Invited Talk on New Medical Devices and Neuromodulation, 13th EILAT Conference on New Antiepileptic Drugs and Devices, June 29, 2016.

"Trade-offs Between Wireless Communication and Computation in Closed-loop Implantable Devices," Invited Talk on Brain Interfaces, IEEE Int. Symp. on Circuits and Systems, May 23, 2016.

"Microsystems for Intracranial Monitoring, Diagnostics and Treatment of Neurological Disorders," Seminar, Department of Biomedical Engineering, Florida International University, April 13, 2016.

"Multi-sensor Integrated Circuits: Biomedical Microsystems and Applications," Seminar, Departments of Electrical and Biomedical Engineering, Columbia University, December 15, 2015.

"SSC/CAS Societies Members Brain-Related Research Activities Overview," IEEE Brain Initiative Workshop, New York, December 14, 2015.

"Multi-sensor Integrated Circuits: Microsystems and Biomedical Applications," Seminar, Department

of Electrical Engineering, Princeton University, December 11, 2015.

"Multi-sensor Integrated Circuits: Materials, Systems and Applications," Seminar, Brockhouse Institute for Materials Research, McMaster University, November 2, 2015.

"Implantable Wireless Closed-Loop Neurostimulators for the Treatment of Intractable Epilepsy," IEEE International Symposium on Circuits and Systems, John Choma Commemorative Session, Lisbon, Portugal, May 25, 2015.

"Wireless Microelectronic Implants for the Treatment of Intractable Epilepsy," Ontario Brain Institute, EpLink Workshop, Toronto, ON, February 28, 2015.

"Implantable Electronic Microchips for Automated Monitoring, Diagnostics, and Treatment of Neurological Disorders," Sunnybrook Health Sciences Centre, Brain Sciences Program and Department of Otolaryngology, Toronto, ON, January 29, 2015.

"Sensory Biomedical Electronics: Implantable, Wearable and Disposable Integrated Circuits," Douglas Mental Health University Institute and McGill University, Montreal, QC, June 14, 2013.

"Sensory Biomedical Electronics: Implantable, Wearable and Disposable Integrated Circuits," Department of Electrical and Computer Engineering, McGill University, June 17, 2013.

"CMOS Intelligent Sensory Microsystems for Biomedical Applications," Georgia Institute of Technology, Atlanta, GA, June 21, 2011.

"Implantable Integrated Circuits for Monitoring, Diagnostics and Treatment of Neurological Disorders," Research Institute for Neurosciences and Mental Health, The Hospital for Sick Children, Toronto, ON, March 16, 2011.

"Amperometric Neurochemical Microarrays: Electronic Chips that Image Neurotransmitters," Toronto Western Hospital, Cell and Molecular Neurobiology Lab, Toronto, ON, January 19, 2011.

"Towards Wireless Brain Activity Monitoring and Modulation," CMC Microsystems Sensor Network Workshop, Ottawa, ON, October 6, 2010.

"Amperometric Neurochemical and DNA Microarrays," CMC Microsystems Annual Symposium, Ottawa, ON, October 5, 2010.

"Electronic Microchips for Recording and Modulating Neural Activity," Beyond Brain Machine Interface: From Senses to Cognition Workshop, Long Beach, CA, June 20, 2010.

"Intelligent Sensory Microsystems for Biomedical Applications," IMEC, Leuven, Belgium, May 28, 2010.

"CMOS Luminescence Contact Imaging Microsystems," CMC CMOS Imagers Workshop, Montreal, QC, November 5, 2009.

"Intelligent Sensory Microsystems," CMC Microsystems, Kingston, ON, October 22, 2009.

"Intelligent Sensory Microsystems for Biomedical Applications," Department of Bioengineering, University of California, San Diego, CA, August 10, 2009.

"Intelligent Sensory Microsystems" Max Planck Institute for Metals Research, Stuttgart, Germany, May 7, 2009.

"Intelligent Sensory Microsystems: Signal Processing," Max Planck Institute for Biological Cybernetics, Tubingen, Germany, May 5, 2009.

"Intelligent Sensory Microsystems: Information Acquisition," Max Planck Institute for Biological Cybernetics, Tubingen, Germany, May 4, 2009.

"Hybrid Intelligent Sensory Microsystems," CMC Hybrid Integration Workshop, Toronto, ON, January 14, 2009.

"Electro-Chemical Integrated Neural Interfaces," National Research Council (NRC) of Canada, Neurochip Development Initiative - Strategic Meeting, Invited Talk, Ottawa, ON, November 2006.

"Electro-Chemical Integrated Neural Interfaces," National Research Council (NRC) of Canada, Institute for Biological Sciences, Invited Seminar, Ottawa, ON, October 2006.

"Kerneltron: Massively Parallel Mixed-Signal VLSI Pattern Recognition Processor," Centre for Vision Research, York University, Toronto, ON, March 11, 2005.

"Kerneltron: Massively Parallel Mixed-Signal VLSI Pattern Recognition Processor," IEEE EDS/CAS

Western New York Conference, Invited Plenary Talk, Rochester, NY, Nov. 3, 2004.

"A 1GMACS/mW Mixed-Signal Differential-Charge CID/DRAM Processor," IEEE Int. Conf. on Circuits and Systems for Communications (ICCSC'04), Invited Plenary Talk, Moscow, Russia, June 30 - July 2, 2004.

"Kerneltron: Massively Parallel Mixed-Signal VLSI Pattern Recognition Processor," Invited Seminar, Rochester Institute of Technology, Rochester, NY, Apr. 30, 2004.

"Kerneltron: Support Vector 'Machine' in Silicon," VLSI Seminar Series, School of Electrical and Computer Engineering, Cornell University, Ithaca, NY, Nov.13, 2003.

PROFESSIONAL ACTIVITIES

Associate Editor:

IEEE Transactions on Biomedical Circuits and Systems, 2006-present.
IEEE Transactions on Circuits and Systems-II: Express Briefs, 2010-2012.
IEEE Signal Processing Letters, 2008-2010.

Guest Associate Editor:

IEEE Journal of Solid-State Circuits, Special Issue on papers from the International Solid-State Circuits Conference (ISSCC), 2016.
IEEE Transactions on Biomedical Circuits and Systems, Special Issue/Section on papers from the International Solid-State Circuits Conference (ISSCC), 2014-2024.

International Technical Program Committee Member, IEEE Solid-State Circuits Conference (ISSCC):

Member of Imagers, MEMS, Medical, and Displays (IMMD) Subcommittee, 2013-2016.
Member of Forum Committee: "Circuit, Systems and Data Processing for Next Generation Wearable and Implantable Medical Devices," 2015-2016.
Member of Demonstrations Subcommittee, 2013-2014.

Technical Program Committee Member, IEEE European Solid-State Circuits Conference (ESSCIRC):

Member of Sensors, Imagers and Biomedical Subcommittee, 2019.

Technical Program Committee Member:

IEEE International Symposium on Circuits and Systems (ISCAS), 2016, 2020, 2027.
IEEE Biomedical Circuits and Systems Conference (BioCAS), 2007, 2008, 2011, 2019, 2023.
IEEE Northeast Workshop on Circuits and Systems (NEWCAS), 2006, 2007, 2008, 2009, 2016.
IEEE Midwest Symposium on Circuits and Systems (MWSCAS, joint with NEWCAS), 2007.
IEEE 6th Electro/Information Technology Conference, 2006.
SPIE Bioengineered and Bioinspired Systems Conference, 2003, 2005.
ACM Great Lakes Symposium on VLSI (GLSVLSI), 2003.

Steering Committee Member:

IEEE Brain Initiative, Conferences Sub-committee, 2015-2016.

Scientific Review Panel Member:

National Institutes of Health (NIH), National Institute of Neurological Disorders and Stroke (NINDS), the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) initiative, 2014-2017.
National Sciences and Engineering Research Council of Canada (NSERC) Strategic Projects Selection Panel, 2008-2009.
CMC Microelectronics, National IC Fabrication Allocation Committee, 2009-2011.

Technical Program Co-chair:

IEEE Biomedical Circuits and Systems Conference (BioCAS), 2007.

Tutorials Committee Co-chair:

IEEE Biomedical Circuits and Systems Conference (BioCAS), 2011.
IEEE Biomedical Circuits and Systems Conference (BioCAS), 2019.

Track Chair/Co-chair:

IEEE International Conference of the Engineering in Medicine and Biology Society (EMBC), Neural Microsystems and Instrumentation Track Co-chair, 2006.
IEEE Latin American Symposium on Circuits and Systems (LASCAS), Sensor Circuits and Systems Track Co-Chair, 2023.

Special Sessions Committee Co-chair:
IEEE Northeast Workshop on Circuits and Systems (NEWCAS), 2016.
IEEE International Symposium on Circuits and Systems (ISCAS), 2020.

External Advisory Board Member:
Department of Electrical Engineering, Rochester Institute of Technology, 2004-2010.

Professional Society Member:
Institute of Electrical and Electronic Engineers (IEEE).
Circuits and Systems (CAS) Society.
Solid-State Circuits (SSC) Society.
Engineering in Medicine and Biology (EMB) Society.

Technical Committee Member:
Analog Signal Processing TC of IEEE CAS Society.
Neural Systems and Applications TC of IEEE CAS Society.
Biomedical Circuits and Systems TC of IEEE CAS Society.
Sensory Systems TC of IEEE CAS Society.

Session Organizer/Co-organizer:
"Smart Optogenetic Bio-electronic Interfaces," Special Invited Session (BioCAS), 2015.
"Electrochemical Sensory Microsystems," Special Invited Session (BioCAS), 2007.
"Integrated Neural Implants," Special Invited Session (ISCAS), 2007.
"Integrated Neural Interfaces," Special Invited Session (ISCAS), 2006.

International Liaison:
IEEE Solid-State Circuits Society, Liaison to professional societies the fields of Medicine and Biology, 2015-2019.
IEEE Biomedical Circuits and Systems Conference (BioCAS), 2016.
IEEE 4th International Symposium on Electronic Design, Test and Applications, 2008.

Conference Review Committee Member:
Review Committee, IEEE International Symposium on Circuits and Systems (ISCAS), 2003-2009.

Industry and Exhibitions Co-chair:
IEEE International Symposium on Circuits and Systems (ISCAS), 2016.

Conference Session Chair/Co-chair:
IEEE International Symposium Circuits and Systems (ISCAS): "Self-Correcting ADC," 2002; "Neural Systems and Applications," 2004; "Neural Computation," "Neural Classifiers," 2005; "Medical Interfacing System," "Integrated Neural Interfaces" (Special Session), "Switched Capacitor Circuits," "Analog Filtering & Signal Processing," 2006; "Integrated Neural Implants" (Special Session), 2007; "Biomedical Circuits and Systems for Neural Recording," 2009.
IEEE Biomedical Circuits and Systems Conference (BioCAS), "Electrochemical Sensory Microsystems," "Bio-Signal Processing," 2007.
SPIE International Symposium on Microtechnologies, Bioengineered and Bioinspired Systems, "Biosensors," 2003.

Canadian Microelectronics Corporation / CMC Microsystems, Representative from the University of Toronto, 2010-current.

University/Department Committees Member:
Electronics Group, Chair, 2015-2017.
Graduate Matters Committee, 2014-2017.
Examinations Committee, Faculty of Engineering, 2018-2021.
Awards Committee, Department of Electrical and Computer Engineering, 2012-2013, 2015-2016.

OGS Panel Member, University of Toronto, 2009-2010, 2011-2012.
Graduate Coordinator, Electronics Group, Department of Electrical and Computer Engineering, 2008-2010, 2011-2014.
Awards and Scholarships Committee, Faculty of Applied Science and Engineering, 2007-2010.
Curriculum Matters Committee, Department of Electrical and Computer Engineering, 2005-2010, 2011-2013, 2019-2021.
PTR Committee, Department of Electrical and Computer Engineering, 2020-2022.

BOOK CHAPTERS

[BC7] M. Ahsan Kaleem, J. Cai, Y. F. Chang, R. Genov and A. Amirsoleimani, "Non-Idealities in Memristor Devices and Methods of Mitigating Them," Memristors - The Fourth Fundamental Circuit Element - Theory, Device, and Applications, Intechopen, June 2024.

[BC6] B. Walters, C. Lammie, J. Eshraghian, C. Yakopcic, T. Taha, R. Genov, M.V. Jacob, A. Amirsoleimani, M. R. Azghadi, "Memristive Devices for Neuromorphic and Deep Learning Applications," in "Advanced Memory Technology: Functional Materials and Devices," Royal Society of Chemistry, 2023.

[BC5] H. Kassiri, R. Genov, "Implantable Brain-Computer Interfaces for Monitoring and Treatment of Neurological Disorders," Handbook of Biochips, Springer, 2022.

[BC4] A. Amirsoleimani, T. Liu, F. Alibart, S. Ecoffey, Y. F. Chang, D. Drouin and R. Genov, "Mitigating State-Drift in Memristor Crossbar Arrays for Vector Matrix Multiplication," in "Memristor-An Emerging Device for Post-Moore's Computing and Applications," IntechOpen, 2021.

[BC3] D. Ho, O. Noor, U. Krull, G. Gulak, R. Genov, "CMOS Spectrally-Multiplexed FRET Contact Imaging Microsystem for DNA Analysis," in "Handbook of Bioelectronics: Directly Interfacing Electronics and Biological Systems," edited by S. Carrara and K. Iniewski, Cambridge University Press, 2015.

[BC2] H. Bidhendi, H. Jafari, R. Genov, "Ultra-Wideband Imaging Systems for Breast Cancer Detection," in "Ultra-Wideband and 60 GHz Communications for Biomedical Applications," edited by M. R.Yuce, Springer, pp. 83-103, 2014.

[BC1] A. Olyaei, R. Genov, "CMOS Focal-Plane Spatially-Oversampling Computational Image Sensor," in "Circuits at the Nanoscale: Communications, Imaging, and Sensing," edited by K. Iniewski, CRC Press, pp. 521-538, 2008.

REFEREED JOURNAL PUBLICATIONS

SUBMITTED

[J77] J. Xu, A. Amirsoleimani, R. Genov, "Analog Integrated Circuits for Neuroelectronic Interfaces – Part I: Circuit-Level Design Considerations and Techniques," subm., *IEEE Transactions on Biomedical Circuits and Systems,* 2024.

[J76] J. Xu, A. Amirsoleimani, R. Genov, "Analog Integrated Circuits for Neuroelectronic Interfaces – Part II: System-Level Design Considerations and Techniques," subm., *IEEE Transactions on Biomedical Circuits and Systems,* 2024.

[J75] R. Gulve, R. Rangel, A. Barman, D. Nguyen, M. Wei, M. A. Sakr, X. Sun, D. B. Lindell, K. N. Kutulakos, and R. Genov, "RFDC: Regression-Based Flux-to-Digital Converter - High-Dynamic-Range Quantizer for Image Sensors," subm., *IEEE Journal of Solid-State Circuits,* 2024.

[J74] R. Gulve, N. Sarhangnejad, H. Ke, Z. Xia, N. Gusev, N. Katic, K. N. Kutulakos, R. Genov, "Scene-Aware Pixelwise-Adaptive Coded-Exposure HDR Imaging with Reduced Motion Artifact," subm., *IEEE Transactions on Circuits and Systems-I,* 2023.

[J73] J. Sales Filho, Jose, M. ElAnsary, J. Xu; L. Long, C. Tejeiro, A. Shoukry, J. Zariffa, "CMOS

Peripheral Nerve Active Probe and Microstimulator for Fascicle-Selective Neural Recording and Stimulation," subm., *IEEE Transactions on Biomedical Circuits and Systems,* 2023.

PUBLISHED / ACCEPTED

[J72] G. O'Leary, J. Koerner, M. Kanchwala, J. Sales Filho, J. Xu, T. Valiante, R. Genov, "BrainForest: Neuromorphic Multiplier-Less Bit-Serial Weight-Memory-Optimized 1024-Tree Brain-State Classification Processor," *IEEE Transactions on Biomedical Circuits and Systems,* 2024.

[J71] X. Dong, B. Chen, R. Genov, M. R. Azghadi, A. Amirsoleimani, "SITU: Stochastic Input Encoding and Weight Update Thresholding for Efficient Memristive Neural Network In-Situ Training," *Neurocomputing,* Vol. 605, Nov. 2024.

[J70] B. Walters, H. Rahimian Kalatehbali, Z. Cai, R. Genov, J. Eshraghian, A. Amirsoleimani, M. R. Azghaid, "Efficient Sparse Spiking Auto-Encoder for Reconstruction, Denoising and Classification", subm. *IOP Neuromorphic Computing and Engineering,*Vol. 4, No. 3, pp. 1-16, Aug. 2024.

[J69] Y. E. Hwang, R. Genov, J. Zariffa, "Resource-efficient Neural Network Architectures for Classifying Nerve Cuff Recordings on Implantable Devices," *IEEE Transactions on Biomedical Engineering,* Vol. 71, No. 2, pp. 631-639, Feb. 2024.

[J68] Y. E. Hwang, L. Long, J. Sales Filho, R. Genov, J. Zariffa, "Closed-Loop Control of Functional Electrical Stimulation Using a Selectively Recording and Bidirectional Nerve Cuff Interface," *IEEE Transactions on Neural Systems and Rehabilitation Engineering,* Vol. 32, pp. 504-5013, Jan. 2024.

[J67] X. Dong, A. Amirsoleimani, M. R. Azghadi, R. Genov, "WALLAX: A Memristor-based Random Number Generator," *Neurocomputing,* Vol. 566, pp. 1-12, Jan. 2024.

[J66] Z. Cai, H. R. Kalatehbali, B. Walters, M. R. Azghadi, A. Amirsoleimani, R. Genov, "Spike Timing Dependent Gradient for Direct Training of Fast and Efficient Binarized Spiking Neural Networks," *IEEE Journal on Emerging and Selected Topics in Circuits and Systems,* Vol. 13, No. 4, pp. 1083-1093, Dec. 2023.

[J65] J. Xu, J. S. Filho, S. Nag, L. Long, C. Tejeiro, E. Hwang, G. O'Leary, Y. Huang, M. Kanchwala, M. Abdolrazaghi, C. Tang, P. Liu, Y. Sui, X. Liu, J. Zariffa, R. Genov, "Fascicle-Selective Ultrasound-Powered Bidirectional Wireless Peripheral Nerve Interface IC," *IEEE Transactions on Biomedical Circuits and Systems,* Vol. 17, No. 6, Dec. 2023.

[J64] R. Gulve, N. Sarhangnejad, G. Dutta, M. Sakr, D. Nguyen, R. Rangel, W. Chen, Z. Xia, M. Wei, N. Gusev, E. Lin, X. Sun, L. Hanxu, N. Katic, A. Abdelhadi, A. Moshovos, K. N. Kutulakos, R. Genov, "39,000 Subexposures/s Dual-ADC CMOS Image Sensor with Dual-tap Coded-exposure Pixels for Single-Shot HDR and 3D Computational Imaging," *IEEE Journal of Solid-State Circuits,* Vol. 58, No. 11, Nov. 2023.

[J63] X. Dong, L. Primeau, R. Genov, M. Rahimi Azghadi, A. Amirsoleimani, "Efficient Memristive Stochastic Differential Equation Solver," *Advanced Intelligent Systems,* Vol. 5, No. 8, pp. 1-16, Aug. 2023.

[J62] H. You, A. Amirsoleimani, J. Xu, M. Rahimi Azghadi, R. Genov, "A Subranging Nonuniform Sampling Memristive Neural Network-Based Analog-To-Digital Converter," *Memories - Materials, Devices, Circuits and Systems,* Vol. 4, pp. 1-7, July 2023.

[J61] T. Zhang, C. Lammie, M. R. Azghadi, A. Amirsoleimani, R. Genov, "Spike sorting algorithms and their efficient hardware implementation: A comprehensive survey," *Journal of Neural Engineering,* Vol. 20, No. 2, Apr. 2023.

[J60] C. Li, C. Lammie, A. Amirsoleimani, M. R. Azghadi, R. Genov, "Simulation of Memristive Crossbar Arrays for Seizure Detection and Prediction Using Parallel Convolutional Neural Networks," *Software Impacts,* Vol. 15, pp. 100473, Mar. 2023.

[J59] H. Jafari, X. Liu, R. Genov, "Synergistic Distributed Thermal Regulation for On-CMOS High-Throughput Multi-Modal Amperometric DNA-Array Analysis," *IEEE Open Journal of Solid-State Circuits,* Vol. 3, pp. 89-102, Jan. 2023.

[J58] N. Soltani, H. Jafari, K. Abdelhalim, H. Kassiri, X. Liu, R. Genov, "A 21.3%-Efficiency Clipped-Sinusoid UWB Impulse Radio with Simultaneous Inductive Powering and Data Transmission," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 16, No. 6, pp.1228-1238, Dec. 2022.

[J57] M. R. Pazhouhandeh, A. Amirsoleimani, I. Weisspapir, P. Carlen, R. Genov, "Adaptively Clock-boosted Auto-ranging Neural-interface for Emerging Neuromodulation Applications," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 16, No. 6, pp. 1138-1152, Dec. 2022.

[J56] C. Li, C. Lammie, X. Dong, A. Amirsoleimani, M. Rahimi Azghadi, and R. Genov, "Seizure Detection and Prediction by Parallel Memristive Convolutional Neural Networks," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 16, No. 4, pp. 609-625, Aug. 2022.

[J55] T. Liu, A. Amirsoleimani, J. Xu, F. Alibart, Y. Beilliard, S. Ecoffey, D. Drouin, and R. Genov, "CODEX: Stochastic Encoding Method to Relax Resistive Crossbar Accelerator Design Requirements," *IEEE Transactions on Circuits and Systems-II: Express Briefs*, Vol. 69, No. 6, 3356-3360, Aug. 2022.

[J54] N. Soltani, M. ElAnsary, J. Sales, J. Xu, R. Genov, "Safety-optimized Inductive Powering of Implantable Medical Devices: A Tutorial and Comprehensive Design Guide," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 15, No. 6, pp. 1354-1367, Dec. 2021.

[J53] M. ElAnsary, J. Xu, J. S. Filho, G. Dutta, L. Long, A. Shoukry, C. Tejeiro, C. Tang, E. Kilinc, J. Joshi, P. Sabetian, S. Unger, J. Zariffa, P. Yoo, R. Genov, "Bidirectional Peripheral Nerve Interface with 64 2nd-order Opamp-less ΔΣ ADCs and Fully-integrated Wireless Power/Data Transmission," *IEEE Journal of Solid-State Circuits*, Vol. 56, No. 11, pp. 3247-3262, Nov. 2021.

[J52] M. R. Pazhouhandeh, H. Kassiri, I. Weisspapir, A. Shoukry, P. Carlen, R. Genov, "Opamp-less Sub-μW/Channel Δ-modulated Neural-ADC with Super-GΩ Input Impedance," *IEEE Journal of Solid-State Circuits*, Vol. 56, No. 5, pp. 1565-1575, May 2021.

[J51] T. Liu, A. Amirsoleimani, F. Alibart, S. Ecoffey, D. Drouin, R. Genov, "AIDX: Adaptive Inference Scheme to Mitigate State-Drift in Memristive VMM Accelerators," *IEEE Transactions on Circuits and Systems-II: Express Briefs*, Vol. 68, No. 4, pp. 1128-1132, Apr. 2021.

[J50] A. Amirsoleimani, F. Alibart, V. Yon, J. Xu, M. Pazhouhandeh, S. Ecoffey, Y. Beilliard, R. Genov, D. Drouin, "In-Memory Vector-Matrix Multiplication in Monolithic CMOS-Memristor Integrated Circuits: Design Choices, Challenges and Perspectives," *Advanced Intelligent Systems*, Wiley, Vol. 2, No. 11, pp. 1-23, Nov. 2020.

[J49] M. R. Pazhouhandeh, M. Chang, I. Weisspapir, T. Valiante, P. Carlen, R. Genov, "Track-and-Zoom Neural Analog-to-Digital Converter with Blind Stimulation-Artifact Rejection," *IEEE Journal of Solid-State Circuits*, Vol. 55, No. 7, pp. 1984-1997, July 2020.

[J48] M. ElAnsary, N. Soltani, H. Kassiri, R. Machadoa, S. Dufour, P. Carlen, M. Thompson, R. Genov, "50nW Opamp-less ΔΣ-modulated Bioimpedance Spectrum Analyzer for Electrochemical Brain Interfacing," *IEEE Journal of Solid-State Circuits*, Vol. 55, No. 7, pp. 1971-1983, July 2020.

[J47] N. Guo, S. Wang, R. Genov, L. Wang, D. Ho, "Asynchronous Event-driven Encoder with Simultaneous Temporal Envelope and Phase Extraction for Cochlear Implants," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 14, No. 3, pp. 620-630, June 2020.

[J46] N. Ghoroghchian, D. M. Groppe, R. Genov, T. A. Valiante, and S. C. Draper, "Node-Centric Graph Learning from Data for Brain State Identification," *IEEE Transactions on Signal and Information Processing over Networks*, Vol. 6, pp. 120-132, Jan. 2020.

[J45] N. Sarhangnejad, N. Katic, Z. Xia, M. Wei, N. Gusev, G. Dutta, R. Gulve, P. Li, H. Ke, H. Haim, M. Monero-Garcia, D. Stoppa, K. Kutulakos, R. Genov, "Dual-tap Computational Photography Image Sensor with Per-pixel Pipelined Digital Memory for Intra-frame Coded Multi-exposure," *IEEE Journal of Solid-State Circuits*, Vol. 54, No. 11, pp. 3191-3202, Nov. 2019.

[J44] H. Kassiri, F. D. Chen, M. T. Salam, M. Chang, B. Vatankhahghadim, P. Carlen, T. A. Valiante, R. Genov, "Arbitrary-Waveform Electro-Optical Intracranial Neurostimulator with Load-Adaptive High-Voltage Compliance," *IEEE Transactions on Neural Systems & Rehabilitation Engineering*, Vol. 27, No. 4, pp. 582-593, Apr. 2019.

[J43] G. O'Leary, D. Groppe, T. Valiante, N. Verma, R. Genov, "NURIP: Neural Interface Processor for Brain State Classification and Programmable-Waveform Neurostimulation," *IEEE Journal of Solid-State Circuits,* Vol. 53, No. 11, pp. 3150-3162, Nov. 2018. **(Invited, special issue on best papers of IEEE ISSCC'18 Conference)**

[J42] W. Liu, A. Feyzi, N. Sarhangnejad, G. Gulak, R. Genov, "Super-resolution Line Scan Image Sensor for Multimodal Microscopy," *IEEE Transactions on Biomedical Circuits and Systems,* Vol. 12, No. 5, pp. 1165-1176, Oct. 2018.

[J41] H. Kassiri, M. T. Salam, M. R. Pazhouhandeh, N. Soltani, J. L. Perez Velazquez, P. L. Carlen, R. Genov, "Rail-to-Rail-Input Dual-Radio 64-channel Closed-Loop Neurostimulator," *IEEE Journal of Solid-State Circuits,* Vol. 52, No. 11, pp. 2793 - 2810, Oct. 2017. **(Invited, special issue on best papers of IEEE ISSCC'17 Conference)**

[J40] H. Kassiri, S. Tonekaboni, M. T. Salam, N. Soltani, K. Abdelhalim, J. L. Perez Velazquez, R. Genov, "Closed-Loop Neurostimulators: A Survey and a Seizure-Predicting Design Example for Intractable Epilepsy Treatment," *IEEE Transactions on Biomedical Circuits and Systems,* Vol. 11, No. 5, pp. 1026-1040, Oct. 2017. **(Invited, special issue on best papers of IEEE ISCAS'16 Conference)**

[J39] M. T. Salam, G. Montandon, R. Genov, J. L. Perez Velazquez, O. Dedvinsky, M. Del Campo, P. L. Carlen, "Mortality with Brainstem Seizures from Focal 4-AP Induced Recurrent Hippocampal Seizures," *Epilepsia,* Vol. 58, No. 9, pp. 1637-1644, Sep. 2017.

[J38] T. C. Millar, N. Sarhangnejad, N. Katic, K. N. Kutulakos, R. Genov, "The Effect of Pinned-Photodiode Shape on Time-of-Flight Demodulation Contrast," *IEEE Transactions on Electron Devices,* Vol. 64, No. 5, pp. 2244-2250, Mar. 2017.

[J37] H. Kassiri, M. T. Salam, J. L. Perez Velazquez, R. Genov, "Brain Synchrony-Contingent Neurostimulator for Treatment of Drug-Resistant Epilepsy," in "Seizure detection and neuromodulation: A summary of data presented at the XIII conference on new antiepileptic drug and devices (EILAT XIII)," edited by M. Bialer, et. al., *Epilepsy Research,* Vol. 130, pp. 34-36, Feb. 2017. **(Invited)**

[J36] H. Kassiri, A. Chemparathy, M. T. Salam, R. Boyce, A. Adamantidis, R. Genov, "Electronic Sleep Stage Classifiers: A Survey and VLSI Design Methodology," *IEEE Transactions on Biomedical Circuits and Systems,* Vol. 11, No. 1, pp. 177-188, Feb. 2017.

[J35] A. Bagheri, M. T. Salam, J. L. Perez Velazquez, R. Genov, "Low-frequency Noise and Offset Rejection in DC-Coupled Neural Amplifiers: A Review and Digitally-Assisted Design Tutorial," *IEEE Transactions on Biomedical Circuits and Systems,* Vol. 11, No. 1, pp. 161-176, Feb. 2017.

[J34] H. Li, X. Liu, L. Li, X. Mu, R. Genov, A. J. Mason, "CMOS Electrochemical Instrumentation for Biosensor Microsystems: A Review," *Sensors,* MDPI, Vol. 17, No. 1, Jan. 2017.

[J33] R. Machadoa, N. Soltani, S. Dufour, M. T. Salam, P. Carlen, R. Genov, M. Thompson, "Biofouling-Resistant Impedimetric Sensor for Array High-Resolution Extracellular Potassium Monitoring in the Brain," *Biosensors,* MDPI, Vol. 6, No. 4, Oct. 2016.

[J32] N. Soltani, M. S. Aliroteh, M. T. Salam, J. L. Perez Velazquez, R. Genov, "Low-Radiation Cellular Inductive Powering of Rodent Wireless Brain Interfaces: Methodology and Design Guide," *IEEE Transactions on Biomedical Circuits and Systems,* Vol. 10, No. 4, pp. 920-932, Aug. 2016.

[J31] M. T. Salam, J. L. Perez Velazquez, R. Genov, "Seizure Suppression Efficacy of Closed-loop Versus Open-loop Deep Brain Stimulation in a Rodent Model of Epilepsy," *IEEE Transactions on Neural Systems & Rehabilitation Engineering,* Vol. 24, No. 6, pp. 710-719, June 2016.

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