

## 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 or disposable sensory microsystems, energy-efficient sensory signal processors and wireless sensors, including brain-chip interfaces, neuro-stimulators, image sensors, optical and electro-chemical DNA microarrays, and other 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 Learning.

**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**

- Best Paper Award, IEEE Transactions on Biomedical Circuits and Systems (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**

- 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.
- 1<sup>st</sup> 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 Competition (with A. Bagheri and S. Gabran, prize \$3,000), 2012.
- Brian L. Barge Award for Excellence in Microsystems Integration, the winner of CMC TEXPO National Student Research Competition (with H. Jafari, \$3,500 prize), 2008 and (with H. Kassiri and N. Soltani, \$3,500 prize), 2012.
- DALSA Corporation Award for Excellence in Microsystems Innovation, the winner of a CMC TEXPO National Student Research 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**

- Connaught Innovation Award (for the development of promising technology) (\$75,000), 2016.
- 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
“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.	\$60,000	\$180,000
“Artificially Intelligent Neurostimulators for Drug-Resistant Epilepsy,” PI, Canadian Institutes of Health Research (CIHR), Project Grant, 4/2017-3/2022.	\$127,200	\$636,000
“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

David Groppe, Post-Doctoral Fellow / Research Scientist, 09/2016-current (co-supervised with Prof. Valiante, 50%).

Zhengfan Xia, Post-Doctoral Fellow, 10/2017-current (co-supervised with Prof. Kutulakos, 50%).

### PhD Students

Navid Sarhangnejad, Candidate for Ph.D. Degree, 09/2014-current.

Maged ElAnsary, Candidate for Ph.D. Degree, 09/2015-current.

Reza Pazhouhandeh, Candidate for Ph.D. Degree, 09/2015-current.

Rahul Gulve, Candidate for Ph.D. Degree, 09/2017-current.

Bahador Valizadeh, Candidate for Ph.D. Degree, 09/2017-current.

Gerard O’Leary, Candidate for Ph.D. Degree, 09/2017-current.

**MASc Students**

Gerard O'Leary, Candidate for M.A.Sc. Degree, 09/2015-current.

Gairik Dutta, Candidate for M.A.Sc. Degree, 07/2016-current.

Nikita Gusev, Candidate for M.A.Sc. Degree, 09/2017-current.

**MEng Students**

Xu Jianxiong, Candidate for M.Eng. Degree, 4/2017-current.

Srinidhi Balasubrahmanya, Candidate for M.Eng. Degree, 6/2017-current.

**FORMER GRADUATE RESEARCH ADVISEES****Post-Doctoral Fellows**

Tariq Salam, 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

Previously: Vice-President of Technology at Avertus, Toronto

Currently: Bioelectronics R&D Engineer at GlaxoSmithKline, Stevenage, UK

Hyunjoong Lee, Post-Doctoral Fellow, 09/2014-01/2016 (co-supervised with Prof. Kutulakos, 50%).

Project: CMOS Structured-Light Computational Imagers

Enver Kilinc, Post-Doctoral Fellow, 03/2015-02/2016 (co-supervised with Prof. Gulak, 50%).

Project: Implantable Transceiver and Antenna Design

Nikola Katic, Post-Doctoral Fellow, 04/2016-06/2017 (co-supervised with Prof. Kutulakos, 50%).

Project: Transport-aware Image Sensors

**PhD Students**

Karim Abdelhalim, Ph.D. Degree, 09/2007-01/2013.

Thesis: Wireless Neural Recording and Stimulation SoCs for Monitoring and Treatment of Intractable Epilepsy

Previously: 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).

Thesis: CMOS Imager Design Optimizations for DNA Fluorescence Biosensing

Currently: Assistant 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

Previously: 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

Currently: 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

Currently: Analog and Mixed-Signal Design Engineer at Synopsis, Toronto

**MASc Students**

Ashkan Olyaei, M.A.Sc. Degree, 09/2003-04/2006.

Thesis: ViPro: Focal-Plane CMOS Spatially-Oversampling Computational Image Sensor

Currently: 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

Previously: Analog IC Design Engineer at Synopsis, Snowbush, Toronto

Currently: 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

Previously: 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

Previously: 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

Previously: 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

Previously: 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

Currently: 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

Previously: 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

Previously: 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

Currently: 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

Currently: PhD Degree Applicant

### **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: Computational 3-D Camera Design

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 of a Neurostimulation Implant

Veronica Li, M.Eng. Degree, 4/2017-08/2017.

Project: Low-noise Microelectronic Interface for Microelectrode Arrays

Naba Siddiqui, M.Eng. Degree, 01/2017-08/2017.

Project: 3D Graphical User Interface for Localizing Intracranial Electrode Locations

### UNDERGRADUATE DESIGN PROJECT AND THESIS ADVISEES

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

	Visnuthanan Siritharan	(design project)
	John Sison	(design project)
	Darshan Thothiraling	(design project)
	Wen Jie Yan	(design project)
	Xin Yun Zhang	(design project)
	Zhao Yuan Zheng	(design project)
	Miaad Seyed Aliroteh	(undergraduate thesis)
2011-2012	Adam Shier	(design project)
	Nikita Tarakanov	(design project)
2012-2013	Siddharth Kaul	(design project)
	Chan Hu Ngen	(design project)
	Junaid Ikram	(design project)
	Sheraz Qadeer	(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	(design project)
	Chi-Chun Tien	(design project)
2016-2017	Peter Zhi Xuan Li	(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 student)
	Chengzhi (Winston) Liu	(summer student)
	Terrence Cole Millar	(summer 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	(volunteer research student)
	Kamyar Ghofrani	(volunteer research student from U. of Waterloo)
	R. Andrei Romero Alvarez	(volunteer research student from Department of CS)
	Ji Tong (Michael) Yin	(volunteer research student, from Department of EngSci)
	Terrence Cole Millar	(summer intern)
	Nikita Gusev	(NSERC USRA summer student)
	Winston Liu	(volunteer research student)
	Vincent Lo	(volunteer research student)
	Nafis Ahabab	(volunteer research student)
	Anas Ahmed	(volunteer research student)
	Sanjana Seerala	(volunteer 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)

## 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), 09/2016-12/2016 (48 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).
- “Electronics,” ECE360 09/2011-12/2011 (73 students), 09/2012-12/2012 (78 students), 09/2013-12/2013 (64 students), 09/2015-12/2015 (49 students), 09/2016-12/2016 (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).

### 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

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

“Pixel-programmable Structured-Light CMOS Imagers,” Annual Meeting, Orlando, FL, March 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, Tübingen, Germany, May 5, 2009.
- “Intelligent Sensory Microsystems: Information Acquisition,” Max Planck Institute for Biological Cybernetics, Tübingen, 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), 2014-2017.

International Technical Program Committee Member, 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.

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 Co-chair:

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

Track Chair/Co-chair:

IEEE International Conference of the Engineering in Medicine and Biology Society (EMBC), “Neural Microsystems and Instrumentation” Track Co-chair, 2006.

Special Sessions Co-chair:

IEEE Northeast Workshop on Circuits and Systems (NEWCAS), 2016.

External Advisory Board Member:

Department of Electrical Engineering, Rochester Institute of Technology, 2004-2010.

Technical Program Committee Member:

IEEE International Symposium on Circuits and Systems (ISCAS), 2016.

IEEE Biomedical Circuits and Systems Conference (BioCAS), 2007, 2008, 2011.

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 6<sup>th</sup> Electro/Information Technology Conference, 2006.

SPIE Bioengineered and Bioinspired Systems Conference, 2003, 2005.

ACM Great Lakes Symposium on VLSI (GLSVLSI), 2003.

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, 2015-2017.

IEEE Biomedical Circuits and Systems Conference (BioCAS), 2016.

IEEE 4<sup>th</sup> 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.

University/Department Committees Member:

Electronics Group, Chair, 2015-2017.

Graduate Matters Committee, 2014-2017.

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.

## BOOK CHAPTERS

[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

- [J42] W. Liu, A. Feyzi, N. Sarhangnejad, G. Gulak, R. Genov, “Lens-free Super-resolution Multimodal Scanning Contact Microscope,” *subm. IEEE Transactions on Biomedical Circuits and Systems*, 2017.
- [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*, Oct. 2017. **(Invited, special issue on best biomedical 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. Alirotoeh, 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.

- [J30] H. Kassiri, A. Bagheri, N. Soltani, K. Abdelhalim, H. Jafari, M. T. Salam, J. L. Perez Velazquez and R. Genov, "Battery-Less Tri-Band-Radio Neuro-Monitor and Responsive Neuro-Stimulator for Diagnostics and Treatment of Neurological Disorders," *IEEE Journal of Solid-State Circuits*, Vol. 51, No. 5, pp. 1274-1289, May 2016.
- [J29] M. T. Salam, H. Kassiri, R. Genov, J. L. Perez Velazquez, "Rapid Brief Feedback Intracerebral Stimulation Based on Real-time Desynchronization Detection Preceding Seizures Stops the Generation of Convulsive Paroxysms," Vol. 56, No. 8, pp. 1227-1238, *Epilepsia*, Aug. 2015.
- [J28] R. Shulyzki, K. Abdelhalim, A. Bagheri, M. T. Salam, C. M. Florez, J. L. Perez Velazquez, P. L. Carlen, R. Genov, "320-Channel Active Probe for High-Resolution Neuromonitoring and Responsive Neurostimulation," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 9, No. 1, pp. 34-49, Feb. 2015. (**IEEE Transactions on Biomedical Circuits and Systems Best Paper Award**).
- [J27] S. R. I. Gabran, M. T. Salam, J. Dian, Y. El-Hayek, J. L. Perez Velazquez, P. L. Carlen, R. Genov, M. M. A. Salama, R. R. Mansour, "3-D Flexible Nano-Textured High-Density Microelectrode Arrays for High-Performance Neuro-Monitoring and Neuro-Stimulation," *IEEE Transactions on Neural Systems & Rehabilitation Engineering*, Vol. 22, No. 5, pp. 1072-1082, Sept. 2014.
- [J26] H. Jafari, L. Soleymani, K. Abdelhalim, E. H. Sargent, S. O. Kelley, R. Genov, "Nanostructured CMOS Wireless Ultra-Wideband Label-Free PCR-Free DNA Analysis SoC," *IEEE Journal of Solid-State Circuits*, Vol. 49, No. 5, pp. 1223-1241, May 2014.
- [J25] S. R. I. Gabran, M. T. Salam, J. Dian, Y. El-Hayek, J. L. Perez Velazquez, R. Genov, P. L. Carlen, M. M. A. Salama, R. R. Mansour, "High-Density Intracortical Microelectrode Arrays With Multiple Metallization Layers for Fine-Resolution Neuromonitoring and Neurostimulation," *IEEE Transactions on Neural Systems & Rehabilitation Engineering*, Vol. 21, No. 6, pp. 869-879, Nov. 2013.
- [J24] D. Ho, G. Gulak, R. Genov, "CMOS Tunable-Wavelength Multi-Color Photogate Sensor," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 7, No. 6, pp. 805-819, Dec. 2013.
- [J23] D. Ho, O. Noor, U. Krull, G. Gulak, R. Genov, "CMOS Spectrally-multiplexed FRET-on-a-chip for DNA Analysis," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 7, No. 5, pp. 643-654, Oct. 2013.
- [J22] A. Bagheri, S. R. I. Gabran, M. T. Salam, J. L. Perez Velazquez, R. R. Mansour, M. M. A. Salama, R. Genov, "Massively-Parallel Neuromonitoring and Neurostimulation Rodent Headset with Nanotextured Flexible Microelectrodes," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 7, No. 5, pp. 601-609, Oct. 2013. (**Invited, special issue on best papers of IEEE BioCAS'12 Conference**)
- [J21] K. Abdelhalim, H. Jafari, L. Kokarovtseva, J. L. Perez Velazquez, R. Genov, "64-channel UWB Wireless Neural Vector Analyzer SOC with a Closed-Loop Phase Synchrony-Triggered Neurostimulator," *IEEE Journal of Solid-State Circuits*, Vol. 48, No. 10, pp. 2494-2510, Oct. 2013.
- [J20] K. Abdelhalim, L. Kokarovtseva, J. L. Perez Velazquez, R. Genov, "915-MHz FSK/OOK Wireless Neural Recording SoC with 64 Mixed-Signal FIR Filters," *IEEE Journal of Solid-State Circuits*, Vol. 48, No. 10, 2478-2493, Oct. 2013.
- [J19] H. Jafari, R. Genov, "Chopper-Stabilized Bidirectional Current Acquisition Circuits for Electrochemical Amperometric Biosensors," *IEEE Transactions on Circuits and Systems – I*, Vol. 60, No. 5, pp. 1149-1157, May 2013. (**Invited, special issue of IEEE TCAS-I on best papers of IEEE ISCAS'12**)
- [J18] D. Ho, O. Noor, U. Krull, G. Gulak, R. Genov, "CMOS Tunable-Color Image Sensor with Dual-ADC Shot-Noise-Aware Dynamic Range Extension," *IEEE Transactions on Circuits and Systems – I*, Vol. 60, No. 8, pp. 2116-2129, Aug. 2013.
- [J17] M. Nazari, H. Jafari, L. Leng, A. Guenther, R. Genov, "CMOS Neurotransmitter Microarray: 96-Channel Integrated Potentiostat with On-die Microsensors," *IEEE Transactions on Biomedical*

- Circuits and Systems*, Vol. 7, No. 3, pp. 338-348, June 2013. **(Also invited to special section of IEEE TCAS-I on best papers of IEEE CICC'10)**
- [J16] H. Jafari, L. Soleymani, R. Genov, "16-Channel CMOS Impedance Spectroscopy DNA Analyzer with Dual-Slope Multiplying ADCs," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 6, No. 5, pp. 468-478, 2012. **(Invited, special issue on best papers of IEEE BioCAS'11 Conference)**
- [J15] R. Singh, L. Leng, A. Guenther, R. Genov, "A CMOS-Microfluidic Chemiluminescence Contact Imaging Microsystem," *IEEE Journal of Solid-State Circuits*, Vol. 47, No. 11, pp. 2822-2833, 2012.
- [J14] R. Karakiewicz, R. Genov, G. Cauwenberghs, "1.1 TMACS/mW Fine-Grained Stochastic Resonant Charge-Recycling Array Processor," *IEEE Sensors Journal*, Vol. 12, No. 4, pp. 785-792, 2012. **(Special issue on design methods for low power arrays)**
- [J13] K. Abdelhalim, V. Smolyakov, R. Genov, "A Phase-Synchronization Epileptic Seizure Detector VLSI Architecture," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 5, No. 5, pp. 430-438, 2011. **(Invited, special issue on best papers of IEEE BioCAS'10 Conference)**
- [J12] F. Shahrokhi, K. Abdelhalim, D. Serletis, P. Carlen, R. Genov, "128-Channel Fully Differential Digital Integrated Neural Recording and Stimulation Interface," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 4, No. 3, pp. 149-161, 2010. **(Invited, special issue on best papers of IEEE ISCAS'09)**
- [J11] R. Singh, D. Ho, A. Nilchi, G. Gulak, P. Yau, R. Genov, "A CMOS/Thin-Film Fluorescence Contact Imaging Microsystem for DNA Analysis," *IEEE Transactions on Circuits and Systems I: Regular Papers*, Vol. 57, No. 5, pp. 1029-1038, May 2010. **(Invited, special issue on best papers of IEEE ISCAS'09)**
- [J10] A. Nilchi, J. Aziz, R. Genov, "Focal-Plane Algorithmically-Multiplying CMOS Computational Image Sensor," *IEEE Journal of Solid-State Circuits*, Vol. 44, No. 6, pp. 1829-1839, June 2009. **(Also invited to IEEE TCAS-I special issue on best papers of IEEE ISCAS'09)**
- [J9] J. Aziz, K. Abdelhalim, R. Shulyzki, R. Genov, B. Bardakjian, M. Derchansky, D. Serletis, P. Carlen, "256-Channel Neural Recording and Delta Compression Microsystem with 3D Electrodes," *IEEE Journal of Solid-State Circuits*, Vol. 44, No. 3, pp. 995-1005, March 2009.
- [J8] R. Karakiewicz, R. Genov, G. Cauwenberghs, "480-GMACS/mW Resonant Adiabatic Mixed-Signal Processor Array for Charge-Based Pattern Recognition," *IEEE Journal of Solid-State Circuits*, Vol. 42, No. 11, pp. 2573-2584, Nov. 2007.
- [J7] J. Aziz, R. Genov, B. Bardakjian, M. Derchansky, P. Carlen, "Brain-Silicon Interface for High-Resolution In Vitro Neural Recording," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 1, No. 1, pp. 56-62, March 2007.
- [J6] A. Olyaei, R. Genov, "Focal-Plane Spatially-Oversampling CMOS Image Compression Sensor," *IEEE Transactions on Circuits and Systems I: Regular Papers*, Vol. 54, No. 1, pp. 26-34, Jan. 2007.
- [J5] R. Genov, M. Stanacevic, M. Naware, G. Cauwenberghs, N. Thakor, "16-Channel Integrated Potentiostat for Distributed Neurochemical Sensing," *IEEE Transactions on Circuits and Systems I: Regular Papers*, Vol. 53, No. 11, pp. 2371-2376, Nov. 2006. **(Special issue on advances in life science systems and applications)**
- [J4] R. Genov, G. Cauwenberghs, "Dynamic MOS Sigmoid Array Folding Analog-to-Digital Conversion," *IEEE Transactions on Circuits and Systems I: Regular Papers*, Vol. 51, No. 1, pp. 182-186, Jan. 2004. **(Special issue on advances on analog-to-digital and digital-to-analog converters)**
- [J3] R. Genov, S. Chakrabarty, G. Cauwenberghs, "Silicon Support Vector Machine with On-Line Learning," *International Journal of Pattern Recognition and Artificial Intelligence*, Vol. 17, No. 3, pp. 385-404, 2003. **(Invited, special issue on best papers of SVM'02)**
- [J2] R. Genov, G. Cauwenberghs, "Kerneltron: Support Vector 'Machine' in Silicon," *IEEE Transactions on Neural Networks*, Vol. 14, No. 5, pp. 1426-1434, Sept. 2003. **(Special issue on neural networks hardware implementations)**



- [J1] R. Genov, G. Cauwenberghs, “Charge-Mode Parallel Architecture for Matrix-Vector Multiplication,” *IEEE Transactions on Circuits and Systems II: Analog and Digital Signal Processing*, Vol. 48, No. 10, pp. 930-936, Oct. 2001. **(Invited, special section on best student paper awards of IEEE MWSCAS'00)**

## REFEREED CONFERENCE PUBLICATIONS

- [C74] G. O’Leary, M. R. Pazhouhandeh, D. Groppe, T. Valiante, N. Verma, R. Genov, “A Recursive-memory Brain State Classifier with 32-Channel Track-and-Zoom  $\Delta\Sigma$  ADC and Charge-balanced Programmable-waveform Neurostimulators,” *IEEE International Solid-State Circuits Conference (ISSCC'2018)*, Feb. 2018.
- [C73] M. ElAnsary, N. Soltani, H. Kassiri, R. Machadoa, S. Dufour, P. Carlen, M. Thompson, R. Genov, “50nW 5kHz-BW Opamp-less  $\Delta\Sigma$  Impedance Analyzer for Brain Neurochemistry Monitoring,” *IEEE International Solid-State Circuits Conference (ISSCC'2018)*, Feb. 2018.
- [C72] G. O’Leary, A. Abraham, A. Kamath, D. Groppe, T. Valiante, R. Genov, “Machine Learning Microserver for Neuromodulation Device Training,” *IEEE Biomedical Circuits and Systems Conference (BioCAS'2017)*, Turin, Oct. 2017.
- [C71] J. Albericio, A. Delmás, P. Judd, S. Sharify, G. O’Leary, R. Genov, A. Moshovos, “Bit-pragmatic Deep Neural Network Computing,” *50th Annual IEEE/ACM International Symposium on Microarchitecture*, Boston, Oct. 2017.
- [C70] G. O’Leary, T. Valiante, R. Genov, “Low-latency VLSI Architecture for Neural Cross-frequency Coupling Analysis,” *IEEE Engineering in Medicine and Biology Conference (EMBC'2017)*, Jeju Island, July 2017.
- [C69] N. Sarhangnejad, H. Lee, N. Katic, M. O’Toole, K. N. Kutulakos and R. Genov, “Primal-Dual-Coding CMOS Image Sensor Architecture,” *International Image Sensor Workshop*, Hiroshima, May 2017.
- [C68] M. R. Pazhouhandeh, O. Shoaie, R. Genov, “Two-electrode Impedance-sensing Cardiac Rhythm Monitor for Charge-Aware Shock Delivery in Cardiac Arrest,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2017)*, May 2017.
- [C67] H. Kassiri, M. R. Pazhouhandeh, M. T. Salam, J. L. P. Velazquez, R. Genov, “All-Wireless 64-channel  $0.013\text{mm}^2/\text{ch}$  Closed-Loop Neurostimulator with Rail-to-Rail DC Offset Removal,” *IEEE International Solid-State Circuits Conference (ISSCC'2017)*, Feb. 2017.
- [C66] H. Kassiri, G. Dutta, N. Soltani, C. Liu, Y. Hu, R. Genov, “An Impedance-Tracking Battery-less Arbitrary-Waveform Neurostimulator with Load-Adaptive 20V Voltage Compliance,” *IEEE European Solid-State Circuits Conference (ESSCIRC'2016)*, Sept. 2016.
- [C65] H. Kassiri, N. Soltani, M. T. Salam, J. L. P. Velazquez, R. Genov, “Battery-Less Modular Responsive Neurostimulator for Prediction and Abortion of Epileptic Seizures,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2016)*, Montreal, May 2016. **(IEEE Biomedical Circuits and Systems Technical Committee Best Paper Award).**
- [C64] P. Z. X. Li, H. Kassiri, R. Genov, “A Compact Low-Power VLSI Architecture for Real-Time Sleep Stage Classification,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2016)*, Montreal, May 2016.
- [C63] M. T. Salam, H. Kassiri, N. Soltani, H. He, J. L. P. Velazquez, R. Genov, “Tradeoffs Between Wireless Communication and Computation in Closed-Loop Implantable Devices,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2016)*, Montreal, May 2016.
- [C62] H. Kassiri, M. T. Salam, F. D. Chen, B. Vatankhah, N. Soltani, M. Chang, P. Carlen, T. A. Valiante, R. Genov, “Inductively Powered Arbitrary-waveform Adaptive-supply Electro-optical Neurostimulator,” *IEEE Biomedical Circuits and Systems Conference (BioCAS'2015)*, Atlanta, Oct. 2015.
- [C61] M. T. Salam, J. L. Perez Velazquez, R. Genov, “Comparative Analysis of Seizure Control

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## PATENTS / IP DISCLOSURES

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## **EXAMINATION COMMITTEE CHAIRING / MEMBERSHIP**

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Eric Wei-Tse Hu (Supervisor: Prof. Phang), 2005  
Jose Zariffa (Supervisor: Prof. Bardakjian), 2004  
David Halupka (Supervisor: Prof. Sheikholeslami), 2004  
Robert Wang (Supervisors: Prof. Martin and Prof. Johns), 2004  
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Sean Nicolson (Supervisor: Prof. Phang), 2004

Wai Sum Wong (Supervisor: Prof. Zhu), 2004

Duy Phuc Ngueyen (Supervisors: Prof. Sheikholeslami and Prof. Aarabi), 2003

Nebu John Mathai (M.Eng., Supervisors: Prof. Sheikholeslami and Prof. Kundur), 2003

Igor Arsovski (Supervisor: Prof. Sheikholeslami), 2003

Trevis Chandler (Supervisor: Prof. Sheikholeslami), 2003