|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | |
| **Roman Genov** | | | | | | | |
|  | | | | | | | |
| The Edward S. Rogers Sr.  Department of Electrical and Computer Engineering  10 King's College Road  Toronto, Ontario M5S 3G4 Canada | | | | | *URL*: http://www.eecg.utoronto.ca/~roman  *Email*: roman@eecg.utoronto.ca  *Phone*: (416) 946-8666  *Fax*: (416) 971-2286 | | |
| RESEARCH INTERESTS | | | | | | | |
|  | Analog and digital VLSI circuits, systems and algorithms for energy-efficient signal processing with applications to electrical, chemical and photonic sensory information acquisition, biosensor arrays, neural interfaces, parallel signal processing, adaptive computing, and implantable and wearable biomedical electronics. | | | | | | |
| 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, AI Lab/CBCL, Cambridge, MA, 1/1999-8/1999.  **The Johns Hopkins University**, M.S.E., Electrical and Computer Engineering, Baltimore, MD, 1998.  GPA 4.00/4.00  **Rochester Institute of Technology**, B.S., Electrical Engineering, Rochester,NY, 1996.  GPA 4.00/4.00 | | | | | | |
| ACADEMIC AND INDUSTRIAL POSITIONS | | | | | | | |
|  | **University of Toronto,** Toronto, ON, 7/2008-Present.  *Associate Professor*, Electronics Group, Department of Electrical and Computer Engineering.  **University of Toronto,** Toronto, ON, 9/2002-6/2008.  *Assistant Professor*, Electronics Group, Department of Electrical and Computer Engineering.  **The Johns Hopkins University**, Baltimore, MD, 9/96-8/2002.  *Research Assistant*, Adaptive Microsystems Lab, Department of Electrical and Computer Engineering.  **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 | | | | | | | |
|  | The MEMSCAP Microsystems Design Award (with A. Bagheri and S. Gabran, prize $3,000), 2012.  Brian L. Barge Award for Excellence in Microsystems Integration (with H. Kassiri and N. Soltani, prize $3,500), 2012.  Best Paper Award at IEEE Biomedical Circuits and Systems Conference, BioCAS (with H. Jafari, the best paper overall, 199 submitted papers), 2011.  Best Student Paper Award nomination at IEEE Biomedical Circuits and Systems Conference, BioCAS (with K. Abdelhalim, top seven student papers), 2010.  AMD/CICC Student Scholarship Award at IEEE Custom Integrated Circuits Conference, CICC (with M. Nazari, one of the highest ranked student papers, $200 prize), 2010.  Best Student Paper Award, IEEE International Symposium on Circuits and Systems, ISCAS (with A. Nilchi, $400 prize, 783 regular papers), 2009.  Best Paper Award, by Sensory Systems Technical Committee of IEEE Circuits and Systems Society, IEEE International Symposium on Circuits and Systems, ISCAS (the top paper), 2009.  Best Student Paper Contest Finalist, IEEE International Symposium on Circuits and Systems (with F. Shahrokhi, top 9 student papers out of 783 regular papers), ISCAS 2009.  Undergraduate Teaching Award for teaching excellence, University of Toronto Students Union (five awards across the university), 2008-2009.  Brian L. Barge Award for Excellence in Microsystems Integration (with H. Jafari, $3,500 prize), 2008.  DALSA Corporation Award for excellence in microsystems innovation (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 and two others, $2,000 prize), 2005. | | | | | | |
| RESEARCH GRANTS AND CONTRACTS Annual Total | | | | | | | |
|  | | | | | | | |
|  | “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.  “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.  “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  Short-term contract, PI, Industrial Partner, 2/2008-3/2008.  “Electro-Optical Microsystem for DNA Detection,” PI, Ontario Centres of Excellence, Centre for Photonics, 1/2008-9/2008.  “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.  “Integrated Neural Interfaces for Epileptic Seizure Monitoring“, Co-I, subcontract from Prof. P. Carlen, University Health Network, University of Toronto, 9/2006-8/2008.  “Hybrid Integration Technologies for Optical DNA Detection,” peer-reviewed Hybrid Integration project, PI, Canadian Microelectronics Corporation, 1/2008-12/2008.  “Smart Sensory Microsystems,” PI, Natural Sciences and Engineering Council of Canada (NSERC), Discovery Award, 05/2007-04/2012.  NSERC Industrial Postgraduate Scholarship (recipient: M.A.Sc. student Farzaneh Shahrokhi), Medtrode Corporation, 9/2006-8/2008.  “Hybrid Integration Technologies for Brain-Chip Interfaces,” Hybrid Integration project, PI, Canadian Microelectronics Corporation, 2006.  Infrastructure Operating Fund Award, PI, Canada Foundation for Innovation (CFI), 4/2006-3/2010.  “Intelligent Sensory Integrated Systems,” PI, New Opportunities Award, Canada Foundation for Innovation (CFI), 11/2005-3/2008.  “Intelligent Sensory Integrated Systems,” PI, Ontario Research Fund, 11/2005-3/2008.  “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.  “Autonomous Integrated Vision Systems,” PI, Natural Sciences and Engineering Council of Canada (NSERC), Discovery Award, 05/2003-04/2007.  “Mixed-Signal VLSI Circuits and Systems,” PI, Connaught Foundation, 10/2002.  “Mixed-Signal VLSI Circuits and Systems,” PI, University of Toronto, ECE Dept., 10/2002. | | | | | $60,833  $75,150  $78,240    $13,250  $22,500  $6,000  $7,517  $33,408  $33,408  $17,225  $20,850 | $182,500  $225,450  $234,720  $10,000  $30,000  ­  $8,000  $26,500  $14,000  $112,500  $12,000  $5,000  $30,068  $100,226  $100,226  $34,450  $83,400  $10,000  $100,000 |
| GRADUATE RESEARCH ADVISEES | | | | | | | |
|  | Ashkan Olyaei, M.A.Sc. Degree, 09/2003-04/2006.  Thesis: ViPro: Focal-Plane CMOS Spatially-Oversampling Computational Image Sensor  Grade: A+  Currently at: IC 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  Grade: A+  Currently at: IC design engineer at Vsemi, 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  Grade: A+  Currently at: IC design engineer Broadcom Corporation, Irvine, CA  Alireza Nilchi, M.A.Sc. Degree, 09/2005-11/2007.  Thesis: Focal-Plane CMOS Algorithmically-Multiplying Computational Image Sensor  Grade: A+  Currently: PhD student at University of Toronto, Electronics Group  Meisam Nazari, M.A.Sc. Degree, 01/2006-06/2008.  Thesis: CMOS Wide-Dynamic-Range High-Throughput Potentiostat  Grade: A+  Currently: PhD student at California Institute of Technology  Ritu Raj Singh, M.A.Sc. Degree, 09/2006-11/2008.  Thesis: Luminescence Contact Imaging Microsystems  Grade: A+  Currently: PhD student at University of Texas, Austin  Farzaneh Shahrokhi, M.A.Sc. Degree, 09/2006-01/2009.  Thesis: Multi-Channel Fully Differential Digital Integrated Neural Recording and Stimulation Interfaces  Grade: A+  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  Grade: A+  Currently: IC design engineer at Ignis Innovation Inc, Waterloo, Canada  Karim Abdelhalim, Candidate for Ph.D. Degree, 09/2007-current.  Hamed Jafari, Candidate for Ph.D. Degree, 09/2007-current.  Derek Ho, Candidate for Ph.D. Degree, 09/2007-current (co-supervised with Prof. G. Gulak).  Arezu Bagheri, Candidate for M.A.Sc. Degree, 09/2010-current.  Hossein Kassiri, Candidate for Ph.D. Degree, 02/2011-current.  Nima Soltani, Candidate for Ph.D. Degree, 09/2011-current.  Arshya Feyzi, Candidate for M.A.Sc. Degree, 09/2011-current (co-supervised with Prof. G. Gulak).  Tariq Salam, Post-Doctoral Fellow, 03/2012-current (co-supervised with Prof. Perez Velazquez). | | | | | | |
| UNDERGRADUATE DESIGN PROJECT AND THESIS ADVISEES | | | | | | | |
|  | 2003-2004  2004-2005  2005-2006  2006-2007  2007-2008  2008-2009  2009-2010  2011-2012  2012-2013 | King Sun (Francis) Tam  T.K. Chan  Po-Yu Liu  Mustafa Alam  Ahmad Attia  Ajmal Khan  Taha Sheikh  Houman Akbari  Negar Habibi  Yasaman Faghih  John Tan  Colin Li  Chuan Qin  Ruslana Gelman  Angie Mehta  Khaled Qasmieh  Khalil Oudah  Tina Tahmoures-Zadeh  Jon Perras  Natasha Baker  Brian Choi  David Wu  Kim Liu  Eric Pai  Ryan Payogo  Fady Akladios  Benny Tu  David Crockett  Vadim Smolyakov  Chi Kin Chong  Muhammad Farhandar  Robert Gunabalendra  Horia Popovici  Visnuthanan Siritharan  John Sison  Darshan Thothiraling  Wen Jie Yan  Xin Yun Zhang  Zhao Yuan Zheng  Miaad Seyedaliroteh  Adam Shier  Nikita Tarakanov  Siddharth Kaul  Chan Hu Ngen  Junaid Ikram  Sheraz Qadeer | (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project, co-supervised with Prof. B. Bardakjian)  (design project, co-supervised with Prof. B. Bardakjian)  (design project, co-supervised with Prof. B. Bardakjian)  (design project)  (design project)  (design project)  (design project)  (design project)  (undergraduate thesis)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (undergraduate thesis)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project)  (undergraduate thesis)  (design project)  (design project)  (design project)  (design project)  (design project)  (design project) | | | | |
| UNDERGRADUATE SUMMER RESEARCH ADVISEES | | | | | | | |
|  | 2004  2005  2006 | Alborz Jooyaie  John Tan  Hsiang-Hua (Andy) Hung  Ruslana Gelman  Jasper Chan  Gaurav Jain  Stephen Chin  Khalil Oudah | | (NSERC summer student)  (NSERC summer student)  (NSERC summer student)  (NSERC summer student)  (NSERC summer student)  (NSERC summer student)  (NSERC summer student)  (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).  “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,” 1/2012-4/2012 (97 students).  “Electronics,” ECE360 09/2011-12/2011 (73 students), 09/2012-12/2012 (78 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). |

|  |  |
| --- | --- |
| SHORT COURSES/TUTORIALS | |
|  | “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 | |
|  | “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.  External Advisory Board Member: Department of Electrical Engineering, Rochester Institute of Technology, 2004-present.  Panel Member: National Sciences and Engineering Research Council of Canada (NSERC) Strategic Projects Selection Panel, 2008-2009.  Panel Member: 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).  Organizer/Co-organizer: “Integrated Neural Interfaces,” Special Invited Session (ISCAS’2006); “Integrated Neural Implants,” Special Invited Session (ISCAS’2007); “Electrochemical Sensory Microsystems,” Special Invited Session (BioCAS’2007).  International Liaison: IEEE 4th International Symposium on Electronic Design, Test and Applications 2008.  Society Membership:  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 Membership:  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.  Technical Program Committee Membership:  ACM Great Lakes Symposium on VLSI (GLSVLSI’2003).  SPIE Bioengineered and Bioinspired Systems Conference (Bio’2003, 2005).  IEEE 6th Electro/Information Technology Conference (2006).  IEEE Northeast Workshop on Circuits and Systems (NEWCAS’2006, 2007, 2008, 2009).  IEEE Midwest Symposium on Circuits and Systems (MWSCAS’2007) (joint with NEWCAS’2007).  IEEE Biomedical Circuits and Systems Conference (BioCAS’2007, 2008).  Conference Review Committee Membership:  Review Committee, IEEE Int. Symp. Circuits and Systems (ISCAS’2003-2009).  Conference Track Chair/Co-chair:  IEEE Int. Conf. of the Engineering in Medicine and Biology Society, “Neural Microsystems and Instrumentation” Track Co-chair, (EMBC’2006).  Conference Session Chair/Co-chair:  IEEE Int. Symp. Circuits and Systems, “Self-Correcting ADC,” (ISCAS’2002); “Neural Systems and Applications,” (ISCAS’2004); “Neural Computation,” “Neural Classifiers,” (ISCAS’2005); “Medical Interfacing System,” “Integrated Neural Interfaces” (Special Session), “Switched Capacitor Circuits,” “Analog Filtering & Signal Processing,” (ISCAS'2006); “Integrated Neural Implants,” (Special Session, ISCAS’2007); “Biomedical Circuits and Systems for Neural Recording,” (ISCAS’2009).  IEEE Biomedical Circuits and Systems Conference, “Electrochemical Sensory Microsystems,” (BioCAS’2007); “Bio-Signal Processing,” (BioCAS’2007).  SPIE Int. Symp. Microtechnologies, Bioengineered and Bioinspired Systems2003, “Biosensors.”  Journal and Conference Reviews:  Journal of Solid-State Circuits (JSSC); IEEE Transactions on Circuits and Systems I&II (TCAS-I&II); IEEE Transactions on Neural Networks (TNN); IEEE Int. Symp. on Circuits and Systems (ISCAS); Great Lakes Symposium on VLSI (GLSVLSI); Neural Information Processing Systems Conference (NIPS).  University/Department Committees Membership:  OGS Panel Member, University of Toronto (2009-2010, 2011-2012).  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).  Graduate Coordinator, Electronics Group, Department of Electrical and Computer Engineering (2008-2010, 2011-2013). |

|  |  |
| --- | --- |
| BOOK CHAPTERS | |
|  | [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, 2008. |
|  | |

|  |  |
| --- | --- |
| REFEREED JOURNAL PUBLICATIONS | |
|  | [J23] H. Jafari, R. Genov, Chopper-Stabilized Bidirectional Current Acquisition Circuits for Electrochemical Amperometric Biosensors,” subm. *IEEE Transactions on Circuits and Systems – I,* 2012. **(Special issue of IEEE TCAS-I on best IEEE ISCAS’12 papers, invited)**  [J22] D. Ho, G. Gulak, R. Genov, “CMOS Low-Power Digital Pixel Sensor with In-Pixel Shared Comparator,” submitted to *IEEE Transactions on Circuits and Systems - II: Express Briefs,* 2012.  [J21] K. Abdelhalim, L. Kokarovtseva, J. L. Perez Velazquez, R. Genov, “915-MHz FSK/OOK Wireless Neural Recording SoC with 64 Mixed-Signal FIR Filters," submitted to *IEEE Journal of Solid-State Circuits,* 2012.  [J20] D. Ho, O. Noor, U. Krull, G. Gulak, R. Genov, “CMOS Color Image Sensor with Dual-ADC Dynamic Range Extension,” accepted with minor revisions *IEEE Transactions on Circuits and Systems – I,* 2012.  [J19] D. Ho, O. Noor, U. Krull, G. Gulak, R. Genov, “CMOS Spectrally-Multiplexed DNA Analysis Microsystem with Fluorescence Black Hole Quenchers,” accepted with minor revisions *IEEE Transactions on Biomedical Circuits and Systems,* 2012.  [J18] D. Ho, G. Gulak, R. Genov, “CMOS Color Photogate Sensor,” accepted with major revisions *IEEE Transactions on Biomedical Circuits and Systems,* 2012.  [J17] H. Jafari, L. Soleymani, R. Genov, “16-Channel CMOS Impedance Spectroscopy DNA Analyzer with Dual-Slope Multiplying ADCs,” to appear *IEEE Transactions on Biomedical Circuits and Systems,* 2012. **(Special issue on 2011 IEEE BioCAS Conference best papers, invited)**  [J16] M. Nazari, H. Jafari, L. Leng, A. Guenther, R. Genov, “CMOS Neurotransmitter Microarray: 96-Channel Integrated Potentiostat with On-die Microsensors,” to appear *IEEE Transactions on Biomedical Circuits and Systems*, 2012. **(Also invited to special section of IEEE TCAS-I on best IEEE CICC’10 papers)**  [J15] R. Singh, L. Leng, A. Guenther, R. Genov, “A CMOS-Microfluidic Chemiluminescence Contact Imaging Microsystem,” to appear *IEEE Journal of Solid-State Circuits,* 2012.  [J14] K. Abdelhalim, V. Smolyakov, R. Genov, “A Phase-Synchronization Epileptic Seizure Detector VLSI Architecture,” *IEEE Transactions on Biomedical Circuits and Systems,* 2011.**(Special issue on best IEEE BioCAS’10 Conference papers, invited)**  [J13] R. Karakiewicz, R. Genov, G. Cauwenberghs, “1.1 TMACS/mW Fine-Grained Stochastic Resonant Charge-Recycling Array Processor,” *IEEE Sensors Journal,* 2011. (**Special issue on design methods for low power arrays**)  [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, June 2010.**(Special issue on best IEEE ISCAS’09 papers, invited)**  [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. **(Special issue on best IEEE ISCAS’09 papers, invited)**  [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 IEEE ISCAS’09 papers)**  [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, March2009.  [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. Chakrabartty, 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. **(Special issue on best papers from SVM’2002, invited)**  [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. (**Special section on IEEE MWSCAS'2000 best student paper awards, invited**) |

|  |  |
| --- | --- |
| REFEREED CONFERENCE PUBLICATIONS | |
|  | [C54] A. Vidwans, K. Abdelhalim, R. Genov, “Similarity-Index Early Seizure Detector VLSI Architecture,” subm. *IEEE Int. Symp. on Circuits and Systems (ISCAS'2013)*, 2013.  [C53] M. Aliroteh, N. Soltani, R. Genov, “Cellular Inductive Powering System for Weakly-Linked Resonant Rodent Implants,” subm. *IEEE Int. Symp. on Circuits and Systems (ISCAS'2013)*, 2013.  [C52] A. Bagheri, S. R. I. Gabran, M. T. Salam, J. L. Perez Velazquez, R. R. Mansour, M. M. A. Salama, R. Genov, "1024-Channel-Scalable Wireless Neuromonitoring and Neurostimulation Rodent Headset with Nanotextured Flexible Microelectrodes," *IEEE Biomedical Circuits and Systems Conference (BioCAS’2012),* Nov.2012.  [C51] K. Abdelhalim, H. Jafari,L. Kokarovtseva, J. L. Perez Velazquez, R. Genov, "64-Channel UWB Wireless Neural Vector Analyzer and Phase Synchrony-Triggered Stimulator SoC," *IEEE European Solid-State Circuits Conference (ESSCIRC’2012),* Sept. 2012.  [C50] H. Jafari, L. Soleymani, K. Abdelhalim, E. Sargent, S. Kelley and R. Genov, “Nanostructured CMOS Wireless Ultra-Wideband Label-free DNA Analysis SoC,” *IEEE Symposium on VLSI Circuits, June 2012.*  [C49] K. Abdelhalim, R. Genov, ”Compact Chopper-Stabilized Neural Amplifier with Low-Distortion High-Pass Filter in 0.13μm CMOS,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2012)*, 2012.  [C48] H. Jafari, R. Genov, ”Bidirectional Current Conveyer with Chopper Stabilization and Dynamic Element Matching,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2012)*, 2012.  [C47] D. Ho, M. O. Noor, U. J. Krull, G. Gulak, R. Genov, ”Single-Filter Multi-Color CMOS Fluorescent Contact Sensing Microsystem,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2012)*, 2012.  [C46] D. Ho, G. Gulak, R. Genov, ”CMOS 3-T Digital Pixel Sensor with In-Pixel Shared Comparator,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2012)*, 2012.  [C45] H. Jafari, R. Genov, ”CMOS Impedance Spectrum Analyzer with Dual-Slope Multiplying ADC,” *IEEE Biomedical Circuits and Systems Conference (BioCAS’2011),* San Diego, Nov.2011 **(Best Paper Award, one conference-wide award).**  [C44] K. Abdelhalim, R. Genov, “915-MHz Wireless 64-Channel Neural Recording SoC with Programmable Mixed-Signal FIR Filters,” *IEEE European Solid-State Circuits Conference (ESSCIRC’2011),* Sept. 2011.  [C43] D. Ho, G. Gulak, R. Genov, “CMOS Electric Field-Modulated Color Sensor,” *IEEE Custom Integrated Circuits Conference (CICC’2011)*, Sept. 2011.  [C42] R. Shulyzki, K. Abdelhalim, A. Bagheri, C.M. Florez, P.L. Carlen, R. Genov, “256-site Active Neural Probe and 64-channel Responsive Cortical Stimulator,” *IEEE Custom Integrated Circuits Conference (CICC’2011)*, Sept. 2011.  [C41] K. Abdelhalim, R. Genov, “An Area and Power-Efficient Stimulator for Integrated Neural Recording and Stimulation Arrays,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2011)*, May 2011.  [C40] K. Abdelhalim, V. Smolyakov, R. Shulyzki, J. Aziz, D. Serletis, P. Carlen, R. Genov, “VLSI Multivariate Phase Synchronization Epileptic Seizure Detector,” *IEEE Conf. on Neural Engineering,* Apr. 2011.  [C39] K. Abdelhalim, V. Smolyakov, R. Genov, “A Phase Synchronization and Magnitude Processor VLSI Architecture for Adaptive Neural Stimulation,” *IEEE Biomedical Circuits and Systems Conference (BioCAS’2010),* Paphos, Cyprus, Nov. 2010 **(Best Student Paper Award finalist).**  [C38] R. Singh, K. Abdelhalim, R. Genov, “A Compact Parasitic-Insensitive Dual-Frequency Delta-Sigma Modulated CMOS Capacitive Sensor,” *IEEE Biomedical Circuits and Systems Conference (BioCAS’2010),* Paphos, Cyprus, Nov. 2010.  [C37] M. Nazari, H. Jafari, L. Leng, A. Guenther, R. Genov, "192-Channel CMOS Neurochemical Microarray,” *IEEE Custom Integrated Circuits Conference (CICC’2010)*, Sept. 2010. **(AMD/CICC Student Scholarship Award, one of the highest ranked student papers)**  [C36] R. Shulyzki, K. Abdelhalim, R. Genov, “CMOS Current-Copying Neural Stimulator with OTA Sharing,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2010)*, May 2010.  [C35] R. Singh, L. Leng, A. Guenther, R. Genov, “A Hybrid CMOS-Microfluidic Contact Imaging Microsystem,” *SPIE Optics and Photonics* Aug. 1-6, 2009. **(invited)**  [C34] A. Nilchi, J. Aziz, R. Genov, “CMOS Image Compression Sensor with Algorithmically-Multiplying ADCs,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2009)*, pp. 1497-1500, May 2009. **(Best Paper on Sensory Systems, and Best Student Paper Awards)**  [C33] F. Shahrokhi, K. Abdelhalim, R. Genov, “128-Channel Fully Differential Digital Neural Recording and Stimulation Interface,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2009)*, pp. 1249-1252, May 2009. **(Best Student Paper Contest Finalist)**  [C32] R. Singh, D. Ho, A. Nilchi, R. Genov, G. Gulak, “A Hybrid Thin-Film/CMOS Fluorescence Contact Imager,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2009)*, pp. 2437-2440, May 2009.  [C31] M. Nazari, R. Genov, “A Fully Differential CMOS Potentiostat,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2009)*, pp. 2177-2180, May 2009.  [C30] R. Singh, R. Genov, R. Kotamraju, B. Mazhari, “Multi-Step Binary-Weighted Capacitive Digital-to-Analog Converter Architecture,” *IEEE Midwest Symposium on Circuits and Systems (MWSCAS’08)*, Knoxville, Tennessee, Aug. 10-13, 2008.  [C29] R. Karakiewicz, R. Genov, G. Cauwenberghs, “1.1 TMACS/mW Load-Balanced Resonant Charge-Recycling Array Processor,” *IEEE Custom Integrated Circuits Conference (CICC’2007)*, Sept. 2007.  [C28] J. Aziz, R. Karakiewicz, R. Genov, A. W. L. Chiu, B. L. Bardakjian, M. Derchansky, P. L. Carlen, “In Vitro Epileptic Seizure Prediction Microsystem,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2007)*, May 2007.  [C27] J. Aziz, R. Genov, M. Derchansky, B. Bardakjian, P. Carlen, “256-Channel Neural Recording Microsystem with On-Chip 3D Electrodes,” *IEEE* *International Solid-State Circuits Conference* (*ISSCC’2007*), Feb. 2007.  [C26] A. Olyaei, R. Genov, “ViPro: Focal-Plane Spatially-Oversampling CMOS Image Compression Sensor,” *IEEE Custom Integrated Circuits Conference (CICC’2006)*, Sept. 2006.  [C25] J. N. Y. Aziz, R. Karakiewicz, R. Genov, B. L. Bardakjian, M. Derchansky, P. L. Carlen, “Towards Real-Time In-Implant Epileptic Seizure Prediction,” *IEEE Engineering in Medicine and Biology Conference (EMBC’2006)*, Sept. 2006.  [C24] R. Karakiewicz, R. Genov, G. Cauwenberghs, “175 GMACS/mW Charge-Mode Adiabatic Mixed-Signal Array Processor,” *IEEE Symposium on VLSI Circuits,* June 2006*.*  [C23] J. N. Y. Aziz, R. Karakiewicz, R. Genov, B. L. Bardakjian, M. Derchansky, P. L. Carlen, “Real-Time Seizure Monitoring and Spectral Analysis Microsystem,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2006)*, May 2006.  [C22] J. N. Y. Aziz, R. Genov, B. L. Bardakjian, M. Derchansky, P. L. Carlen, “256-Channel Integrated Neural Interface and Spatio-Temporal Signal Processor,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2006)*, May 2006.  [C21] J. N. Y. Aziz, R. Genov, “Electro-Chemical Multi-Channel Integrated Neural Interface Technologies,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2006)*, May 2006.  [C20] A. Olyaei, R. Genov, “Algorithmic Delta-Sigma Modulated FIR Filter,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2006)*, May 2006.  [C19] J. Aziz, R. Genov, “Multi-Channel Integrated Neural Interfaces for Distributed Electro-Chemical Sensing,” *IEEE Midwest Symposium on Circuits and Systems (MWSCAS’05)*, Cincinnati, Ohio, Aug. 7-10, 2005.  [C18] A. Olyaei, R. Genov, “Focal-Plane CMOS Wavelet Feature Extraction for Real-Time Pattern Recognition,” *SPIE Photonics North*, Toronto, Canada, Sept. 12-14, 2005.  [C17] A. Olyaei, R. Genov, “Mixed-Signal CMOS Haar Wavelet Compression Imager Architecture,” *IEEE Midwest Symposium on Circuits and Systems (MWSCAS’05)*, Cincinnati, Ohio, Aug. 7-10, 2005.  [C16] R. Karakiewicz, R. Genov, “Minimal Activity Mixed-Signal VLSI Architecture for Real-Time Linear Transforms in Video,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2005)*, Kobe, Japan, May 23-26, 2005.  [C15] M. Naware, A. Rege, R. Genov, M. Stanacevic, G. Cauwenberghs, N. Thakor, “Integrated Multi-Electrode Fluidic Nitric-Oxide Sensor and VLSI Potentiostat Array,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2004)*, Vancouver, Canada, May 26-29, 2004.  [C14] R. Genov, M. Stanacevic, M. Naware, G. Cauwenberghs, N. Thakor, “VLSI Multi-Channel Track-and-Hold Potentiostat,” *Microtechnologies for the New Millennium, Bioengineered and Bioinspired Systems*, Proc. SPIE vol. 5119, May 2003.  [C13] R. Genov, G. Cauwenberghs, “Algorithmic Partial Analog-to-Digital Conversion in Mixed-Signal Array Processors,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2003)*, Bangkok, Thailand, May 25-28, 2003.  [C12] R. Genov, G. Cauwenberghs, G. Mulliken, F. Adil, “A 5.9mW 6.5GMACS CID/DRAM Array Processor,” *IEEE European Solid-State Circuits Conference (ESSCIRC’2002),* Florence, Italy, Sept. 24-26, 2002.  [C11] R. Genov, G. Cauwenberghs, “Kerneltron: Support Vector ‘Machine’ in Silicon,” *SVM’2002,* Lecture Notes in Computer Science, Niagara Falls, ON, Aug. 10, 2002.  [C10] G. Mulliken, F. Adil, G. Cauwenberghs, R. Genov, “Delta-Sigma Algorithmic Analog-to-Digital Conversion,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2002)*, Phoenix, AZ, May 26-29, 2002.  [C9] R. Genov, G. Cauwenberghs, “Charge-Based MOS Correlated Double Sampling Comparator and Folding Circuit,” *IEEE Int. Symp. on Circuits and Systems (ISCAS'2002)*, Phoenix, AZ, May 26-29, 2002.  [C8] G. Cauwenberghs, R. T. Edwards, Y. Deng, R. Genov, D. Lemonds, “Neuromorphic Processor for Real-Time Biosonar Object Detection,” *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP’2002),* Orlando, FL, May 13-17, 2002.  [C7] R. Genov, G. Cauwenberghs, “Stochastic Mixed-Signal VLSI Architecture for High-Dimensional Kernel Machines,” *Advances in Neural Information Processing Systems (NIPS'2001)*, Cambridge, MA: MIT Press, vol. 14, 2002.  [C6] R. Genov, G. Cauwenberghs, “CID/DRAM Mixed-Signal Parallel Distributed Array Processor,” *IEEE 14th International ASIC/SOC Conference (ASIC/SOC'2001)*, Washington, DC, Sept. 12-15, 2001.  [C5] R. Genov, G. Cauwenberghs, “Massively Parallel Inner-Product Array Processor,” *IEEE Int. Joint Conference on Neural Networks (IJCNN'2001)*, Washington, DC, July 15-19, 2001.  [C4] R. Genov, G. Cauwenberghs, “Analog Array Processor with Digital Resolution Enhancement and Offset Compensation,” *Conference on Information Sciences and Systems (CISS'2001)*, Baltimore, MD, March 21-23, 2001.  [C3] R. Genov, G. Cauwenberghs, “Charge-Mode Parallel Architecture for Matrix-Vector Multiplication,” *43rd IEEE Midwest Symposium on Circuits and Systems (MWSCAS'2000)*, Lansing, MI, Aug. 8-11, 2000. **(Best Student Paper Award)**  [C2] R. Genov, S. Madhavapeddi, G. Cauwenberghs, “Learning to Navigate from Limited Sensory Input: Experiments with the Khepera Microrobot,” *IEEE International Joint Conference on Neural Networks (IJCNN'99)*, Washington, DC, vol. 3, pp. 2061-2064, 1999. **(Best Presentation Award)**  [C1] R. Genov, G. Cauwenberghs, “16-Channel Single-Chip Current-Mode Track-and-Hold Acquisition System with 100 dB Dynamic Range,” *IEEE International Symposium on Circuits and Systems (ISCAS'99)*, Orlando, FL, vol. 6, pp. 350-353, 1999. **(Best Student Paper Contest Finalist)** |

|  |  |
| --- | --- |
| NON-REFEREED CONFERENCE AND WORKSHOP PUBLICATIONS | |
|  | [NC3] A. Olyaei, R. Genov, “CMOS Wavelet Compression Imager Architecture,” *IEEE CAS Emerging Technologies Workshop*, St. Petersburg, Russia, June 23-24, 2005.  [NC2] R. Genov, “A 1GMACS/mW Mixed-Signal Differential-Charge CID/DRAM Processor,” *IEEE Int. Conf. on Circuits and Systems for Communications (ICCSC’2004),* Moscow, Russia, June 30 - July 2, 2004 (invited).  [NC1] R. Genov, G. Cauwenberghs, “Embedded Dynamic Memory and Charge-Mode Logic for Parallel Array Processing,” *5th World Multi-Conference on Systemics, Cybernetics and Informatics (SCI'2001)*, Orlando, FL, July 22-25, 2001. |
| OTHER PUBLICATIONS | |
|  | [O1] R. Genov, “Massively Parallel Mixed-Signal VLSI Kernel Machines,” Ph.D. Dissertation, Department of Electrical and Computer Engineering, The Johns Hopkins University, May 2003. |
| MEDIA | |
|  | [M3] “Electronic brain implants for treatment of neurological disorders,” Canadian Broadcasting Corporation, CBC/Radio-Canada, technology and culture radio show *Spark,* March 2011.  [M2] “Pushing the Evolution of the Machine-Human Interface,” *Skulematters Alumni Magazine*, Fall, 2007. The article features our work on integrated brain-chip interfaces.  [M1] D. Hawaleshka, “The Race to Build a Better Brain: A New Computer Chip Pushes the Machine-Human Interface,” *Maclean’s Magazine*, Vol. 120, No. 10, March 19, 2007. The article features our work on integrated brain-chip interfaces. |
| PATENTS | |
|  | [P4] R. Genov, M. Nazari, “Wyde-dynamic-range high-throughput integrated potentiostat,” US provisional patent number 61/173,531, filed 04/28/2009.  [P3] B.L. Bardakjian, A. Chiu, T.T. Le, R. Genov, P.L. Carlen, M. Derchansky, “An implantable intelligent neural activity acquisition, processing and stimulation system,” US Provisional Patent, 06/08/2005.  [P2] R. Genov, “Multi-site sensory signal acquisition, processing and classification and electronic method thereof,” US provisional patent number 60/682.821, filed 05/20/2005.  [P1] R. Genov, G. Cauwenberghs, “High- precision matrix-vector multiplication on a charge-mode array with embedded dynamic memory and stochastic method thereof,” US Patent application number 10/726,753, filed 12/04/2003. |