

# RICHARD G. BARANIUK

Rice University  
Department of Electrical and Computer Engineering  
Houston, TX 77005, USA  
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May 1, 2019

## RESEARCH INTERESTS

Machine learning; signal and image processing theory and applications, sparsity and compressive sensing; open-source learning; learning analytics, personalized learning

## EDUCATION

1993	Ecole Normale Supérieure de Lyon	Postdoctoral Fellow in Signal Processing
1992	University of Illinois–Urbana	Ph.D. in Electrical and Computer Engineering
1988	University of Wisconsin–Madison	M.Sc. in Electrical and Computer Engineering
1987	University of Manitoba	B.Sc. in Electrical Engineering (with distinction)

## POSITIONS

2012–present	OpenStax	Director/Founder
2004–present	Rice University	Victor E. Cameron Professor
2000–2004	Rice University	Professor
1999–2012	Connexions	Director/Founder
1998	Isaac Newton Institute, Cambridge University	Rosenbaum Fellow
1996–2000	Rice University	Associate Professor
1993–1996	Rice University	Assistant Professor
1992–1993	Ecole Normale Supérieure de Lyon (France)	Postdoctoral Fellow
1988–1992	University of Illinois–Urbana	Research Assistant
1987–1988	University of Wisconsin–Madison	Graduate Fellow
1987	National Research Council of Canada	Research Assistant
1986	Omron Tateishi Electronics (Kyoto, Japan)	R&D Engineer

Sabbatical 2001–2002 Ecole Nationale Supérieure de Télécommunications (Paris, France)  
Ecole Polytechnique Fédérale de Lausanne (Switzerland)

## AWARDS and HONORS

2018 Faculty Award for Excellence in Research, Teaching, and Service (Rice)  
2018 Clarivate Analytics Highly Cited Researcher (previously Thomson Reuters)  
2017 Vannevar Bush Faculty Fellow (National Security Science and Engineering Faculty Fellow)  
2017 Fellow of the American Academy of Arts and Sciences  
2017 Hershel M. Rich Invention Award (Rice)  
2016 Fellow of the National Academy of Inventors  
2016 Thomson Reuters’ Highly Cited Researcher  
2016 Person of Impact, University of Wisconsin-Madison

- 2016 Hershel M. Rich Invention Award (Rice)
- 2015 IEEE James H. Mulligan, Jr. Education Medal
- 2015 IEEE Signal Processing Society Best Paper Award
- 2015 Thomson Reuters' Highly Cited Researcher
- 2015  $(T + R)^2$ : Excellence in Teaching and Research Award (Rice)
- 2014 IEEE Signal Processing Society Technical Achievement Award
- 2014 Thomson Reuters' Highly Cited Researcher
- 2014 Presidential Mentoring Award (Rice)
- 2012 SPIE Compressive Sampling Pioneer Award
- 2011 WISE Education Award for Connexions (Qatar Foundation)
- 2011 Padovani Lecture, IEEE Information Theory Society
- 2010 IEEE Signal Processing Society Education Award
- 2009 Fellow of the American Association for the Advancement of Science (AAAS)
- 2009 IEEE Signal Processing Society Magazine Column Award
- 2009 World Technology Award for Education
- 2008 Internet Pioneer Award, Berkman Center for Internet and Society at Harvard Law School
- 2008 SPIE Wavelet Pioneer Award
- 2007 Edutopia Magazine's "Daring Dozen" Education Innovators
- 2007 MIT Technology Review TR10 Top 10 Emerging Technology for the Rice Single-Pixel Camera
- 2007 Hershel M. Rich Invention Award (Rice)
- 2006 Tech Museum of Innovation Laureate for Connexions
- 2006 George R. Brown Award for Superior Teaching (Rice)
- 2003 Co-Author on Passive and Active Measurement Workshop Student Paper Award  
(with V. Ribeiro, R. Riedi, J. Navratil, and L. Cottrell)
- 2003 George R. Brown Award for Superior Teaching (Rice)
- 2002 Fellow of the Institute of Electrical and Electronic Engineers (IEEE)
- 2001 Co-Author on IEEE Signal Processing Society Junior Paper Award (with M. Crouse and R. Nowak)
- 2001 IEEE NORSIG Best Paper Award (with E. Monsen, J. Odegard, H. Choi, J. Romberg)
- 2001 George R. Brown Award for Superior Teaching (Rice)
- 2000 University of Illinois ECE Young Alumni Achievement Award
- 2000 Charles Duncan Junior Faculty Achievement Award (Rice)
- 1999 C. Holmes MacDonald National Outstanding Teaching Award (Eta Kappa Nu)
- 1998 Rosenbaum Fellowship, Isaac Newton Institute, Cambridge University
- 1995 ONR Young Investigator Award
- 1994 NSF National Young Investigator Award
- 1992 National Sciences and Engineering Research Council of Canada NATO Postdoctoral  
Fellowship
- 1987 Wisconsin Alumni Research Foundation Fellowship  
Bacon Scholarship (U. Wisconsin)  
Eta Kappa Nu Award for Second-Ranked Graduating Electrical Engineer (U. Manitoba)  
IEEE Award for Best Undergraduate Thesis Defense (U. Manitoba)
- 1986 E. P. Fetherstonhaugh Scholarship (U. Manitoba)
- 1977 Top Project at the University of Winnipeg Science Symposium (Provincial Science Fair)

## RESEARCH SUPPORT

- 2019 DARPA *ENIGMA: A Visual Sensor for Privacy Preserving Machine Learning* (STTR, co-PI)

2018–2022	ONR	<i>Randomized Numerical Linear Algebra for Large-Scale Learning and Inference (Basic Research Challenge)</i>	
2018–2022	NSF	<i>Theory and Practice of Randomized Algorithms for Ultra-Large-Scale Signal Processing (BIGDATA)</i>	(co-PI)
2018–2021	AFOSR	<i>A Spline Theory of Deep Learning</i>	
2018	Amazon	<i>Scaling-up Machine Learning via Probabilistic Hashing</i>	(co-PI)
2017–2022	DOD	<i>Vannevar Bush Faculty Fellow (National Security Science and Engineering Faculty Fellow)</i>	
2017–2020	DARPA	<i>IBIS: Implantable Bioluminescence Imaging System</i>	(co-PI)
2017–2020	ONR	<i>Human-In-The-Loop Machine Learning</i>	
2017–2018	Bill and Melinda Gates Foundation	<i>An Open Assessment Network (AN) to Catalyze Improvement of Digital Courseware</i>	
2017–2018	Open Society Foundations	<i>AP US History Courseware</i>	
2016–2019	NSF	<i>Operationalizing Students’ Textbook Annotations to Improve Comprehension and Long-Term Retention</i>	(co-PI)
2016–2020	DARPA	<i>OMNISCIENT (REVEAL Program)</i>	(co-PI)
2016–2017	IBM	<i>Open Collaborative Research Award</i>	
2016–2017	IARPA	<i>MICrONS: Reverse Engineering Neocortical Intelligence</i>	(co-PI)
2016–2017	Texas Education Agency	<i>Advanced Placement OpenStax Textbook Development</i>	
2016–2017	Beneficus Foundation	<i>OpenStax Tutor V2</i>	
2016–2017	Maxfield Foundation	<i>OpenStax Tutor V2</i>	
2016–2017	Sick Foundation	<i>OpenStax Tutor V2</i>	
2016–2017	Katalyst Foundation	<i>OpenStax Internationalization</i>	
2016	Hewlett Foundation	<i>OpenStax Community Outreach</i>	
2015–2018	ARO	<i>Information Processing and Fusion via Sparse Factorization</i>	
2015–2018	NSF	<i>Lens-Free Imaging: Can Signal Processing Replace Lenses?</i>	
2015–2018	AFOSR	<i>Sparse Factor Analysis for Information Extraction and Fusion</i>	
2015–2017	ONR	<i>(NCoM) Nanophotonic Compressive iMaging: On-chip Compressive Lensless, Light-field and Hyper-spectral Sensors</i>	
2015–2016	NSF	<i>EAGER: Fabrication of Thin, Lens-Free Cameras for Visible and SWIR Imaging</i>	(co-PI)
2015–2016	NGA	<i>Fast Algorithms for Sparsity, Dictionary Learning and Detection from Compressed Data</i>	(co-PI)
2014–2017	Bill and Melinda Gates Foundation	<i>OpenStax Courseware</i>	
2014–2016	Laura and John Arnold Foundation	<i>OpenStax Tutor Prototype</i>	
2014–2016	AFOSR	<i>Millimeter-Wave Hyper-Spectral Three-Dimensional Imaging using Coherent</i>	

		<i>Sub-Picosecond Pulses</i>	(co-PI)
2013–2016	ONR	<i>Image Optimization for Small Focal Plane Arrays</i>	(co-PI)
2013–2015	Beneficus Foundation	<i>OpenStax College Phase 3</i>	
2013–2015	Laura and John Arnold Foundation	<i>OpenStax College Phase 3</i>	
2013–2014	Hewlett Foundation	<i>OpenStax College Phase 3</i>	
2013–2014	Laura and John Arnold Foundation	<i>OpenStax College Phase 2</i>	
2012–2013	Hewlett Foundation	<i>OpenStax College Phase 2</i>	
2012–2013	Hewlett Foundation	<i>Connexions Platform Redesign</i>	
2012–2013	Open Society Foundations	<i>Connexions Platform Redesign</i>	
2012–2013	Google	<i>Connexions Platform Redesign</i>	
2012–2014	ONR	<i>Image Feature Articulation Manifolds for Advanced Situational Awareness</i>	
2012–2013	ONR	<i>DURIP: Semiconductor Implementation of Compressive Data Acquisition Systems</i>	(co-PI)
2011–2015	NSF	<i>A Personalized Cyberlearning System Based on Cognitive Science</i>	
2011–2014	ONR	<i>Compressive Sensing for Image Understanding: Human Activity Analysis</i>	(co-PI)
2011–2014	TI	<i>Texas Instruments Leadership University Program</i>	(co-PI)
2011–2014	ONR	<i>Mathematics of Low-Dimensional Representations for Design (Basic Research Challenge)</i>	(co-PI)
2011–2014	NSF	<i>Computational Tools for Visual Inference of Complex Materials</i>	(co-PI)
2011–2014	ONR	<i>Compressive Sensing for Image Understanding</i>	
2011–2013	Hewlett Foundation	<i>OpenStax College Phase 1</i>	
2011–2013	Gates Foundation	<i>OpenStax College Phase 1</i>	
2011–2013	20MM Foundation	<i>OpenStax College Phase 1</i>	
2011–2012	Google	<i>Personalized Learning via Machine Learning</i>	
2010–2014	ONR	<i>Biologically-Inspired Routes to Sense-and-Response in Adaptive, Intelligent Metamaterials (Basic Research Challenge)</i>	(co-PI)
2010–2014	NSF	<i>CI-TEAM: The Signal Processing Education Network</i>	
2010–2014	DARPA	<i>Knowledge-Enhanced Compressive Active Radar Arrays</i>	(co-PI)
2010–2014	DARPA	<i>Knowledge Enhanced Compressive Measurement</i>	(co-PI)
2010–2011	LLNL	<i>New Compression Techniques for High-Resolution Airborne Sensors</i>	
2010–2011	NGA	<i>Multiscale Compression of Point Cloud Data</i>	
2009–2014	ARO	<i>MURI: Opportunistic Sensing for Object and Activity Recognition from Multi-Modal, Multi-Platform Data (Project Director)</i>	
2009–2014	NSF	<i>Expeditions in Computing: Customizable Domain-Specific Computing</i>	(co-PI)
2009–2012	AFOSR	<i>New Theory and Algorithms for Scalable Data Fusion</i>	

2009–2010	ONR	<i>Compressive Video Acquisition, Fusion, and Processing</i>	
2008–2011	DARPA	<i>Information Scalable Analog-to-Information Receivers</i>	
2008–2010	Hewlett Foundation	<i>Connexions Project Core Support</i>	(co-PI)
2008–2012	ONR	<i>Theory and Methods for Model-Based Compressive Sensing</i>	
2008–2011	TI	<i>Texas Instruments Leadership University Program</i>	(co-PI)
2008–2009	ONR	<i>Efficient Collaborative Inference in Networks of Sensors</i>	
2008–2009	ONR	<i>Compressive Imaging via Randomized Multiplexing</i>	
2008–2009	ONR	<i>DURIP: Multidimensional Compressive Data Acquisition System</i>	
2007–2008	Hewlett Foundation	<i>Connexions Project Bridge Support</i>	
2007–2010	NSF	<i>Collaborative Research: Design and Analysis of Compressed Sensing DNA Microarrays</i>	(co-PI)
2007–2010	ARO	<i>MURI: Model Classes, Approximation, and Metrics for Dynamic Processing of Urban Terrain Data</i>	(co-PI)
2007–2010	ONR	<i>Universal Sensing and Processing using Compressive Sensing</i>	
2007–2010	AFOSR	<i>Compressive Signal Processing</i>	
2006–2007	Hewlett Foundation	<i>Connexions Project Core Support</i>	
2006–2009	NSF	<i>Building Communities and Sharing Knowledge in Engineering Education: A University/Industry Partnership (with National Instruments)</i>	(co-PI)
2006–2007	TI	<i>Compressive Sensing for Vision Applications</i>	
2006–2007	ONR	<i>New Theory and Algorithms for Compressive Sensing</i>	
2006–2007	ONR	<i>Manifold-based Image Understanding</i>	
2006–2007	DARPA	<i>Compressive Optical Imaging Systems — Theory, Devices, and Implementation</i>	
2006–2007	DARPA	<i>Theory and Practice of Analog-to-Information Conversion</i>	
2005–2008	NSF	<i>Adaptivity in Sensor Networks for Optimized Distributed Sensing and Signal Processing</i>	
2005–2008	ONR	<i>Higher-Dimensional Signal Processing via Multiscale Geometric Analysis</i>	
2005–2008	AFRL	<i>Multisensor Registration via Multiscale Geometric Analysis</i>	(co-PI)
2004–2007	NSF	<i>Multiscale Geometric Analysis for Higher-Dimensional Signal Processing</i>	
2004–2007	NSF	<i>Multiscale Sensor Network Architecture for Distributed Data Processing</i>	
2004–2006	Hewlett Foundation	<i>Connexions – Sharing Knowledge and Building Communities</i>	
2004–2007	AFOSR	<i>Multiscale Analysis, Modeling, and Processing of High-Dimensional Geometric Data</i>	
2004	NSF	<i>WAMA 2004: Wavelets And Multifractal Analysis Workshop (workshop support)</i>	
2003–2006	NSF	<i>Safari: A Scalable Architecture for Ad Hoc Networking</i>	

		<i>and Services</i>	(co-PI)
2002-2004	DARPA	<i>Integrated Sensing and Processing in Missile Systems (with Raytheon)</i>	
2002-2004	Hewlett Foundation	<i>Connexions – Education for a Networked World</i>	
1999-2004	TI	<i>Texas Instruments Leadership University Program</i>	(co-PI)
2002-2004	ONR	<i>Coherent Multiscale Statistical Modeling using Complex Wavelets</i>	
2001-2004	DOE	<i>INCITE: Edge-based Traffic Processing and Service Inference for High-Performance Networks</i>	
2001-2004	NSF	<i>Internet Control and Inference from the Edge</i>	(co-PI)
2000-2004	DARPA	<i>Multiscale Traffic Processing Techniques for Network Inference and Control</i>	
2001-2003	AFOSR	<i>Multiscale Statistical Models for Signal and Image Processing</i>	
1999-2001	Nokia	<i>Development of a High-Speed Wireless LAN</i>	(co-PI)
1999-2001	Texas	<i>High-Speed Wireless Local Area Network</i>	(co-PI)
1999-2002	NSF	<i>Wireless Technology: Seamless Multitier Wireless Networks for Multimedia Applications</i>	(co-PI)
1999-2002	NSF	<i>Multiscale Signal and Image Processing using Singularity Grammars</i>	
1999-2001	ONR	<i>Model-based Multiscale Signal and Image Processing</i>	
1999	NSF	<i>Acquisition of a High Performance Computer System for the Center for Computational Geophysics</i>	(co-PI)
1998-2000		<i>Rice Consortium for Computational Seismic Interpretation</i> Sponsors: Amerada-Hess, Arco, Conoco, Elf Aquitaine, Halliburton, Mobil, Schlumberger	
1998-2001	EPA	<i>Development of a New Gas Sensing System based on Terahertz Time-Domain Spectroscopy</i>	(co-PI)
1997-2000	DARPA	<i>Wavelet-based Detection Algorithms for ATD/R</i>	(co-PI)
1996	NSF	<i>CISE Research Instrumentation: A Medium Scale, Tightly Coupled, Shared Memory Multiprocessor</i>	(co-PI)
1995-1998	ONR	<i>Operator-Based Approaches for Matching Signal Processing Tools to Data</i> (Young Investigator Award)	
1994-2000	NSF	<i>Signal Analysis and Processing in Matched Coordinate Systems</i> (National Young Investigator Award)	
1995-1997	NATO	<i>Information Theoretic Time-Frequency and Time-Scale Signal Analysis</i>	
1994-1996	Texas	<i>New Data Compression Technology based on Time-Varying Wavelets</i>	

Industrial sponsors have included: Texas Instruments, National Instruments, Nokia, Nortel, SBC Raytheon, Northrop-Grumman, Shell Research, Conoco-Phillips Exxon, Mobil, Arco, Elf Aquitaine, Amerada Hess, Schlumberger

## STUDENTS

- Postdocs: Hamid Javadi (PhD from Stanford University)
- PhD students: Randall Balestrieri, CJ Barberan (NDSEG, NSF, GEM, Intel Foundation Fellow), Daniel LeJeune, Pavan Kota (NIH NLM Fellow), Lorenzo Luzi (NSF Fellow), Indu Manickam, Tan Minh Nguyen (NSF IGERT, NSF Fellow), Shashank Sonkar, Jasper Tan, Jack Wang
- Postdoc alums: Gautam Dasarathy (Asst. Prof., Arizona State University), 2016–2018  
Salman Asif (Asst. Prof., University of California, Riverside) 2014–2016  
Ankit Patel (Asst. Prof., Baylor College of Medicine) 2013–2015  
Phillip Grimaldi (Research Director at OpenStax) 2013–2015  
Eric Chi (Asst. Prof., North Carolina State University, NSF CAREER Award) 2013–2015  
Mohammad Golbabaee (Postdoc, University of Edinburgh) 2013–2015  
Divyanshu Vats (Two Sigma, New York) 2012–2014  
Tom Goldstein (Asst. Prof., University of Maryland, Sloan Fellow, DARPA Young Faculty Award) 2012–2014  
Jianing Shi (Varian Medical Systems) 2011–2013  
Christoph Studer (Asst. Prof., Cornell, NSF CAREER Award) 2011–2013  
Aswin Sankaranarayanan (Asst. Prof., CMU, NSF CAREER Award) 2009–2012  
Arian Maleki (Asst. Prof., Columbia University) 2010–2012  
Jarvis Haupt (Assoc. Prof., U. Minnesota, DARPA Young Faculty Award) 2009–2010  
Volkan Cevher (Assoc. Prof., EPFL, EU ERC Award, IEEE SPS Best Paper Award) 2007–2009  
Petros Boufounos (Mitsubishi Electric Research Lab, MERL) 2006–2008  
Christopher Rozell (Assoc. Prof., Georgia Institute of Technology, NSF CAREER Award, Sigma Xi Young Faculty Research Award) 2006  
Dror Baron (Assoc. Prof., NCSU) 2003–2006  
Veronique Delouille (Royal Observatory of Belgium) 2003–2004  
Rutger van Spaendonck (Shell Research, Netherlands) 2002–2003  
Xin Wang (Bell Labs) 2001–2002  
Maarten Jansen (Assoc. Prof., Tech. Universit Libre de Bruxelles, Belgium) 2000–2001  
Vidya Venkatachalam (MathSoft, Seattle) 2000  
Mark Coates (Assoc. Prof., McGill University) 1999–2002  
Hyeokho Choi (Asst. Prof., North Carolina State University) 1998–2000  
Ivan Magrin-Chagnolleau (INRIA, Lyon, France) 1998–1999  
Rolf Riedi (Assoc. Prof. of Statistics, Rice, now Professor at U. Applied Sciences of Western Switzerland) 1997–1999  
Philippe Steeghs (Department Manager, TNO, Netherlands) 1997–1999  
Jan Odegard (Executive Director, K2I, Rice) 1996–1997  
Robert Nowak (McFarland-Bascom Professor, University of Wisconsin, NSF CAREER Award, ARO YIP Award, ONR YIP Award, IEEE Baker Paper Award, IEEE SPS Young Author Best Paper Award, IEEE SPS Best Paper Award, ASPRS Talbert Abrams Paper Award, GE Genius of Invention Award, IEEE Fellow) 1995–1996  
Paulo Gonçalves (Director de Recherche, Ecole Normale Supérieure, Lyon, France) 1994–1996
- PhD student Christopher Metzler (2018, now postdoc at Stanford University, NDSEG, NSF,

and K2I Fellow)

alums: Ali Mousavi (2018, now in Google AI Residency Program, Schlumberger Fellow)  
 Amirali Aghazadeh (2017, now postdoc at Stanford University, Hershel Rich Invention Award)  
 Andrew Lan (2016, postdoc at Princeton University and OpenStax, now Asst. Prof. at U. Mass-Amherst)  
 Eva Dyer (2014, NSF Graduate Fellow, postdoc at Northwestern University, now Asst. Prof. at Georgia Tech, Allen Institute Next Generation Leader Award, Sloan Fellow)  
 Andrew Waters (2014, H. Butler Award, now Machine Learning Lead at OpenStax)  
 Chinmay Hegde (2012, Budd award for best engineering thesis, postdoc at MIT, now Asst. Prof. at Iowa State University, NSF CISE Research Initiation Initiative (CRII) Award, NSF CAREER Award)  
 Jason Laska (2012, Herschel Rich Invention Award, Computer Vision Lead at Dropcam/Nest, now at Clara Labs)  
 Mona Sheikh (2010, now postdoc at Whitehead Institute for Biomedical Research, MIT)  
 Mark Davenport, (2010, Hershel Rich Invention Award, Budd Award for best engineering thesis, NSF Math Sciences postdoc fellow at Stanford, now Assoc. Prof. at Georgia Tech, NSF CAREER Award, AFOSR YIP Award, Sloan Fellow)  
 Marco Duarte (2009, Hershel Rich Invention Award, NSF IPAM postdoc fellow at Princeton/Duke, IEEE SPS Best Overview Paper Award, now Assoc. Prof. at U. Mass-Amherst)  
 Shriram Sarvotham (2008, now at Apple)  
 Raymond Wagner (2007, now at NASA Johnson Space Center)  
 Michael Wakin (2006, NSF Graduate Fellow, Hershel Rich Invention Award, NSF Math Sciences postdoc fellow at Caltech, Asst. Prof. at U. Michigan, now Assoc. Prof. at Colorado School of Mines, NSF CAREER Award, DARPA Young Faculty Award)  
 Vinay Ribeiro (2005, now Assoc. Prof. at IIT-Delhi)  
 Nadeem Ahmed (2004, now VP at AxilPartners)  
 Justin Romberg (2003, now Prof. at Georgia Tech, ONR YIP, PECASE, Packard Fellowship, Rice Outstanding Young Engineering Alumnus)  
 Ramesh Neelamani (2003, now at ExxonMobil Research, SEG Karcher Award)  
 Tim Dorney (2001, now at Texas Instruments)  
 Rohit Gaikwad (2000, Herschel Rich Invention Award, Budd award for best engineering thesis, now Broadcom Fellow)  
 Roger Claypoole (1999, Prof. at Air Force Institute of Technology, now at TASC)  
 Matthew Crouse (1999, Budd award for best engineering thesis, IEEE Signal Processing Society Best Student Paper Award, now hedge fund manager)

MS student  
 alums: Dante Soares (2014, now at OpenStax)  
 Stephen Schnelle (2011, NSF and NDSEG Graduate Fellow, now at Northrop-Grumman)  
 Sriram Nagaraj (2011, now at Indian Institute of Sciences)  
 Manjari Narayan (2011, Google Anita Borg Scholarship)  
 Ryan King (2007, now at WesternGeco)  
 William Chan (2006, now at CGGVeritas)  
 Shridar Lavu (2004, now at NVIDIA)  
 Brent Hendricks (2000, Systems Architect, Connexions, Rice)  
 Metin Bayram (1996, now at TrellisWare)



Undergrad alums: Venkat Chandrasekaran (2005, PhD from MIT, postdoc at UC-Berkeley, now Prof. at Caltech)  
 Laura Balzano (2002, PhD from U. Wisconsin, now Asst. Prof. at U. Michigan)  
 Shannon Hughes (1999, PhD from Princeton, now Asst. Prof. at UC-Boulder)  
 Maya Gupta (1997, PhD from Stanford, now Assoc. Prof. at U. Washington, NSF Graduate Fellow, ONR Young Investigator Award, PECASE Award)

External theses: Marwa El Halabi (EPFL, Switzerland)  
 Nicolas Ducros (University of Lyon, France)  
 Suman Maji (University of Bordeaux, France)  
 Graeme Pope (ETH, Switzerland)  
 Yaser Eftekhari (Carleton, Canada)  
 Mohammad Golbabaee (EPFL, Switzerland)  
 Ali Hormati (EPFL, Switzerland)  
 Vladan Velisavljevic (EPFL, Switzerland)  
 Felix Friedrich (Technical Universitat Munchen, Germany)  
 Rosa Figueras Ventura (EPFL, Switzerland)  
 James Carson (Baylor College of Medicine)  
 Antoine Roueff (Ecole Nationale Supérieure d'Ingénieurs Electriciens, Grenoble)  
 Pier Luigi Dragotti (EPFL, Switzerland)  
 Minh Do (EPFL, Switzerland)  
 Pierre Chenais (ENS-Lyon, France)  
 Rutger van Spaendonck (Delft University of Technology, Netherlands)  
 Eric Chassande-Motin (ENS-Lyon, France)  
 Philippe Steeghs (Delft University of Technology, Netherlands)  
 Dominique Devedeux (Université de Technologie de Compiègne, France)

## ACTIVITIES OUTSIDE RICE UNIVERSITY

Editorial Board: *SIAM Journal on Imaging Sciences* (2019–2022)  
*IEEE Journal on Selected Areas in Information Theory* (2019–present)  
*Applied and Computational Harmonic Analysis* (1999–present)  
*IEEE Journal of Selected Topics in Signal Processing* (2011–2014)  
*ACM Transactions on Sensor Networks* (2006–2010)

Advisory Board: Duke University ECE External Advisory Board (2012)

Planning Committee: Center for Neuroengineering (Rice, BCM, UTHSC-H, UH)

Guest Editor: *PNAS* special issue on the Science of Deep Learning, 2019  
*Information and Inference* special issue on the Theory of Deep Learning, 2019  
*The Leading Edge*, special issue on Machine Learning for Geophysics, 2019  
*IEEE Journal of Selected Topics in Signal Processing*, special issue on Signal Processing and Machine Learning for Education and Human Learning at Scale, 2016  
*IEEE Signal Processing Magazine* special issue on Computational Photography and Displays, 2016  
*Proceedings of the IEEE* special issue on Sparsity in Signal Processing, 2009  
*IEEE Journal of Selected Topics in Signal Processing* special issue on Compressive Sensing, 2009

*IEEE Signal Processing Magazine* special issue on Compressive Sampling, 2008 (lead)

*Proceedings of the IEEE* special issue on Educational Technology, 2008

*IEEE Signal Processing Magazine* special issue on Signal Processing in Networking, 2002

Co-organizer:

KDD Workshop on *Deep Learning for Education (DL4Ed)*, 2019

NIPS Workshops on *Integration of Deep Learning Theories and Machine Learning for Geophysical and Geochemical Signals*, 2018

SIAM Imaging Science Workshop on *Computational and Compressive Imaging Technology and Applications*, 2016, 2018

*Math+X Symposium on Data Science and Inverse Problems in Geophysics*, 2018

NIPS Workshop on *Advances in Modeling and Learning Interactions from Complex Data*, 2017

KDD Workshop on *Advancing Data with Education*, 2017

NIPS Workshop on *Machine Learning for Education*, 2016

ICML Workshop on *Machine Learning for Digital Education and Assessment*, 2016

ICML Workshop on *Machine Learning for Education*, 2015

IPAM Workshop on *Computational Photography and Intelligent Cameras*, 2015

NIPS Workshop on *Human Propelled Machine Learning*, 2014

IMA Workshop on *High Dimensional Phenomena*, 2011

Invited session on *Signal Processing* at First EU-US Frontiers of Engineering Symposium (NAE), 2010

NIPS Workshop on *Manifolds, Sparsity, and Structured Models: When Can Low-Dimensional Geometry Really Help?*, 2009

IPAM Workshop on *Mathematical Challenges and Opportunities in Sensor Networking*, 2007

*Wavelet And Multifractal Analysis Summer School (WAMA)*, Institut d'Études Scientifiques de Cargèse, Corsica, France, 2004

*Knowledge Held Hostage — Fair Use and IP Workshop*, 2004

Numerous special sessions at ICASSP, ICIP, SPIE, Asilomar

Program Committee:

*Educational Data Mining (EDM)*, 2019

AISTATS, 2018, 2019

*Neural Information Processing Systems (NIPS)*, 2016–2018

*IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018

*ACM/SIGKDD Conf. on Knowledge Discovery and Data Mining (KDD)*, 2017

*SIAM Imaging Science Conference, Compressive Imaging Workshop*, 2016

*International Conference on Machine Learning (ICML)*, 2015

*IEEE International Conference on Computational Photography (ICCP)*, 2015

*European Conference on Computer Vision (ECCV)*, 2014

*NATO SET-213 Specialist Meeting on Compressive Sensing for Radar and IR Imaging*, 2014

*SPARC Open Access Meeting*, 2014

*SPARS*, 2013, 2015

*IEEE International Symposium on Information Theory (ISIT)*, 2012, 2009

*AAAI Symposium on Manifold Learning and its Applications*, 2010

*SPIE Photonics West Conference on Emerging DLP Chip-Based Systems and Applications*, 2008

Co-Technical Program Chair, *IEEE Statistical Signal Processing Workshop*,  
Madison, 2007  
*Information Processing in Sensor Networks (IPSN)*, 2005, 2006, 2008  
*SPIE Conference on Intelligent Integrated Microsystems*, 2006  
*International Conference on Mathematical Knowledge Management*, 2005  
*International Conference on Computational Harmonic Analysis*, 2004  
*SPIE Wavelet Applications in Signal and Image Processing Annual Conference*,  
1998–2008  
*IEEE-SP International Symposium on Time-Frequency and Time-Scale Analysis*,  
1998

Chair: IEEE Signal Processing Society, Houston Chapter, 1994–2015

Member: IEEE Richard W. Hamming Medal Committee, 2018  
IEEE Signal Processing Society Education Technical Committee, 2010–2014  
Lensing Oversight Committee for IEEE Signal Processing Society / Connexions  
joint project, 2007–2009  
UNESCO Consultative Committee on Open Educational Resources, 2007  
IEEE Signal Processing Society Technical Committee on Signal Processing  
Theory and Methods, 1998–2004  
Jury, Eta Kappa Nu C. Holmes MacDonald Outstanding Teaching Award, 2004

Gov't panels: Delegate to International Seminar on “Scientific Publication: Where, Why, How”  
organized by Russian Academy of Sciences, US Embassy, and US National  
Academy of Sciences, Moscow, 2017  
DOE Technical Working Group, Higher Education National Educational  
Technology Plan, 2016  
NOAA Science Advisory Board, 2015  
White House Symposium on Innovation in Higher Education, 2014  
Irish National Academy for Integration of Research, Teaching and Learning  
(NAIRTL) International Advisory Board, 2010–present  
DARPA Information Science And Technology Study Group (ISAT), 2008–2011  
State of Washington House Higher Education Committee on Open Textbooks, 2009  
Open Education Subcommittee of the Virginia Joint Commission on Science  
and Technology, 2008  
Advisory Committee on Student Financial Assistance, US Congress, 2007

Invited Participant: National Academies Keck Futures Initiative (NAKFI) Conference on *The Informed  
Brain in a Digital World*, 2012  
Atlantic Magazine *Washington Ideas Forum* Working Summit on America’s  
Culture of Innovation, 2010  
*Cape Town Declaration* Framing Workshop, South Africa, 2007  
European Commission Workshop on *Knowledge Anywhere Anytime*, 2004  
NAE Workshop on *IT-Enabled Educational Materials*, 2002  
Numerous NSF review panels

Reviewer: *Science*, *Nature*, *PNAS*, various *IEEE Transactions*, etc.

## ACTIVITIES WITHIN RICE UNIVERSITY

2017 Founder, ML@RICE workshop

2016–2018 Faculty Search Committee, ECE (Chair)  
 2016–present Data Science Programming and Search Committee  
 2015–present Digital Education Advisory Committee  
 2015 K2I Internal Review Committee  
 2014–2015 Faculty Search Committee, Computer Science  
 2013–2014 Organizing Committee for 2014 Delange Conference on *Teaching in the Research University of Tomorrow*  
 2013–present Personalized Learning Workshop (Founder, Co-Organizer)  
 2011–present Member of Scientia  
 2010 Organizing Committee for 2012 Delange Conference on *The Future of the Research University in a Global Setting*  
 2009–present Rice Center for Engineering Leadership (RCEL), Internal Advisory Committee  
 2008–2012 Co-Chair, ECE Faculty Search Committee  
 2006–present Chair, Texas Instruments Visiting Professor Committee  
 2004–2008 ECE Industrial Affiliates Committee  
 2004–2008 Cain Project Faculty Advisory Committee  
 2000 Rice Web Steering Committee  
 2000 Committee on the Digital Environment at Rice  
 1999 *DSP30 Celebration* Organization Committee (Chair)  
 1997 Dean’s Committee on Departmental Structure  
 1996–2004 Chair, ECE Graduate Committee  
 1996–present Texas Instruments Graduate Fellowship Committee  
 1996–2000 University Committee on Admission and Student Financial Aid  
 1994–2008 KTRU Radio DJ  
 1994–2008 Faculty Associate and Divisional Advisor, Hanszen College  
 (Outstanding Associate 1995–1997)  
 1994–1996 ECE Graduate Committee  
 1994–1996 IEEE Student Branch Faculty Advisor  
 1994–1995 Faculty Mentor, Minority Student and “Posse” Programs  
 1993–1994 ECE Curriculum Committee  
 1993–present ECE Graduate Committee

## TEACHING

ELEC 475/575 Learning from Sensor Data (developed)  
 ELEC 301x Discrete Time Signals and Systems (MOOC developed for edX, 2014)  
 ELEC 301 Signals, Systems, and Learning  
 ELEC 431 Digital Signal Processing (developed)  
 ELEC 532 Spectral Analysis (developed)  
 ELEC 539 Image Processing  
 ELEC 631 Advanced Digital Signal Processing: Wavelets, Graphical Models, Compressive Sensing  
 Manifolds in Signal Processing, Document Analysis, Reinforcement Learning  
 Instructor: Dean’s Teaching Workshop for New Faculty/TAs, 1997–2001, 2004–2007  
 James Baker Society, 2004  
 School of Continuing Studies, 2004, 2007, 2008  
 Alumni College, 1999  
 Science Academy of South Texas, 1999

## PRESS

Recent press available at <http://goo.gl/vLVHZP>

- 2006–present on Compressive Sensing and the Single-Pixel Camera: *MIT Technology Review TR10 Emerging Technologies for 2007*, *The Economist*, *Business Week*, *Scientific American*, *Nature Photonics*, *BBC News*, *BBC Digital Planet*, *MIT Technology Review* (twice), *USA Today*, *The Times*, *The Guardian*, *SIAM Review*, *EE Times*, *New Scientist* (twice), *IEEE Signal Processing Magazine*, *IEEE Spectrum*, *La Recherche (France)*, *MSN.com*, *TechRadar*, *Mechanical Engineering Magazine*, *Economic Times (India)*, *NAE Radio Series on Engineering*, *Houston Chronicle*, *Washington Post*, *Slashdot* (twice), *Digital Camera Info*, *Cellular News*
- 2003–present on *Connexions*: *Wall Street Journal*, *New York Times* (five times), *BusinessWeek*, *CNN.com*, *Nature*, *Newsweek*, *The Chronicle of Higher Education* (six times), *Inside Higher Ed* (eleven times), *Scientific American*, *Times Higher Education*, *Financial Times Higher Education (FHE)*, *US News and World Report*, *Forbes* (three times), *Washington Post*, *Wired* (twice), *The Guardian*, *Le Monde*, *International Herald Tribune*, *ASEE Prism* (twice), *eSchool News* (twice), *Campus Technology*, *San Francisco Chronicle*, *San Jose Mercury News*, *Los Angeles Times* (twice), *Ottawa Citizen*, *Edu-topia* (twice), *The Book Standard*, *Wired News*, *Campus Technology* (twice), *The TakeAway* (BBC, NY Times, WGBH), *SURF (Netherlands)*, *EducationViews*, *Linux Insider*, *Linux Electrons*, *Houston Chronicle* (twice), *Houston Business Journal*, *KIKK Radio (CNN)*, featured on Intel’s “What’s Inside You?” website
- 2012–present on *OpenStax*: *New York Times*, *Forbes*, *TIME*, *Chronicle of Higher Education* (five times), *Inside Higher Education* (ten times), *Publishers Weekly*, *Campus Technology*, *San Jose Mercury News*, *Information Weekly*, *Kiplinger Finance*, *University Business*, *Voice of America News*, *KUHF*
- 2008 on the Cape Town Declaration on Open Education: *San Francisco Chronicle*, *Inside Higher Ed*, *The Chronicle of Higher Education*, *Newsweek*, *eSchool News*, *Mlada Fronta Dnes (Czech Republic)*, *Die Welt (Germany)*, *Kerdos (Greece)*, *Diena (Latvia)*, *Kronika (Romania)*, *Vedomosti (Russia)*, *El Pais (Spain)*, *Tagesanzeiger (Switzerland)*, *L’Agefi (Switzerland)*, *Norgesuniversitetet (Norway)*, *Today’s Zaman (Turkey)*, *Clarín (Argentina)*, *Los Tiepos (Bolivia)*, *Valor (Brazil)*, *TioSam (Brazil)*, *La Tercera (Chile)*, *El Tiempo (Colombia)*, *Stabroek News (Guyana)*, *El Universal (Nicaragua)*, *El Neuvo Diario (Nicaragua)*, *La Prensa (Panama)*, *The Australian (Australia)*, *South China Morning Post (Hong Kong)*, *The Nation (Thailand)*, *The Japan Times (Japan)*, *The Korean Herald (Korea)*, *Macau Daily Times (Macau)*, *The Press (New Zealand)*, *The Timaru Herald (New Zealand)*, *Daily Times (Pakistan)*, *Daily Enquirer (Philippines)*, *Taipei Times (Taiwan)*, *The Nation (Thailand)*, *Al Jarida (Kuwait)*, *Al Arab (Qatar)*, *Le Quotodien d’Oran (Algeria)*, *Mmegi (Botswana)*, *Daily Star (Egypt)*, *Les Nouvelles (Madagascar)*, *Les Echos (Mali)*, *Standard Times (Sierra Leone)*

## PRESENTATIONS

### Keynote and Plenary Lectures

- 2019 “The Geometry of Deep Learning,” *Wavelets and Beyond – A Celebration for Alexandre Grossmann and Yves Meyer*, Orsay, France, June 2019
- “Deep Inverse,” *NATO Science and Technology Organization Specialists Meeting*, Salamanca, Spain, May 2019
- “Machine Learning using Generative Models,” *Machine Learning in Solid Earth Geoscience*, Santa Fe, NM, March 2019

- 2018 “Deep Optimization,” *15th Workshop on Optimization and Inverse Problems in Electromagnetism (OIFE)*, Innsbruck, Austria, September 2018
- “Going Off the Deep End with Deep Learning,” *Miller Institute Interdisciplinary Symposium*, UC-Berkeley, June 2018
- “Going Off the Deep End with Deep Learning,” *Information Theory and Applications Workshop (ITA)*, San Diego, February 2018
- 2017 “Open Access Personalized Learning,” *Yidan Prize Summit*, Hong Kong, December 2017
- “Sparse Signal Processing,” *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, Houston, October 2017
- “A Probabilistic Theory of Deep Learning,” *National Conference on Communications (NCC)*, Madras, India, March 2017
- “Cape Town+10 Keynote Panel,” *OpenEd Global*, Cape Town, South Africa, March 2017
- “A Probabilistic Theory of Deep Learning,” *Coordinated Science Laboratory Student Conference*, University of Illinois at Urbana-Champaign, February 2017
- 2016 “OpenStax: An Open Education Case Study,” *Education 20/20: Innovative Teaching and Learning at a Distance*, University of Houston, November 2016
- “Going off the Deep End with Deep Learning,” *ExxonMobil Cognitive Computing Conference*, March 2016
- “Computational Nonsensing,” *Conference on Computational Imaging and Vision (CIV)*, KAUST, Saudi Arabia, March 2016
- 2015 “A Probabilistic Theory of Deep Learning,” *Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Cancun, Mexico, December 2015
- “Personalized Education,” *Xconomy Houston 2035*, May 2015
- “Progress on Sparse Signal Processing,” *Sampling Theory and Applications (SampTA)*, Washington, DC, May 2015
- “Scaling Up Quality Education,” *Blended Learning in the Liberal Arts Conference*, Bryn Mawr College, May 2015
- “Open Education: Challenges and Opportunities in Signal Processing,” *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Brisbane, Australia, April 2015
- “Compressive Nonsensing,” Norbert Wiener Colloquium, Department of Mathematics, University of Maryland, College Park, February 2015
- 2014 “Open Education - A Disruptive Force in Education,” *UBTech*, Las Vegas, July 2014
- “Compressive Nonsensing,” *ATO SET-213 Specialist Meeting on Compressive Sensing for Radar/SAR and EO/IR Imaging*, Tallinn, Estonia, May 2014
- “Sparse Signal Processing,” *Technion Computer Engineering (TCE) Center Conference*, Technion, Haifa, Israel, May 2014
- “Open Source = Open to You: Online Publishing,” 10th Annual Innovations in Health Science Education, Austin, February 2014
- “OpenStax College — Modern Textbooks,” Panel on The Next Edition of Digital Textbooks and Courseware, TransformingEDU Summit, *Consumer Electronics Show*, Las Vegas, January 2014
- “Keypoint Articulation Manifolds for Image Analysis in High Dimensions,” *French-German Conference on Mathematical Image Analysis*, Paris, France, January 2014

- 2013 “Video Compressive Sensing,” *Matheon Workshop on Compressed Sensing and its Applications*, Berlin, December 2013
- “Learning Near-Isometric Linear Embeddings,” *IEEE GlobalSIP*, Austin, TX, December 2013
- “Intellectual Infrastructure for Lifelong Learning,” *OKMD Knowledge Festival*, Bangkok, Thailand, December 2013
- “Open E-Courses: New Ways to Develop and Share,” *11th Seminar on E-Learning*, King Khalid University, Abha, Saudi Arabia, October 2013
- “A Perfect Storm for Open Education,” *UW Annual Conference on Distance Teaching and Education*, University of Wisconsin, August 2013
- “Learning Near-Isometric Linear Embeddings,” *SPARS Workshop*, EPFL, Lausanne, Switzerland, July 2013
- “Personalized Learning Systems — Worthy of the Hype?” *SXSWedu*, Austin, TX, March 2013
- “Video Compressive Sensing,” *BASP Frontiers Workshop*, Switzerland, January 2013
- 2012 “Disruptive Innovation via Open Educational Resources,” Distinguished Lecture, Department of Electrical and Computer Engineering, Duke University, November 2012
- “A Perfect Storm for Open Education,” *Telefonica TIC Forum*, Santiago, Chile, November 2012
- “Compressive Sensing: 8 Years Later,” *46th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, November 2012
- “A Perfect Storm for Open Education,” *FLASH Annual Conference*, Orlando, November 2012
- “A Perfect Storm for Open Education,” *Frontiers of Engineering Education*, National Academy of Engineering, Irvine, CA, October 2012
- “Optimization based Sparse Signal Recovery,” *21st International Symposium on Mathematical Programming (ISMP 2012)*, Berlin, August 2012
- “Compressive Signal Processing,” *Center for Advanced Signal and Image Science (CASIS) Workshop*, Lawrence Livermore National Laboratory, May 2012
- “Compressive Signal Processing,” *Mohammed Dahleh Distinguished Lecture*, UCSB, May 2012
- “Open Education: A Disruptive Force in Education,” *California Community College Association for Occupational Education (CCCAOE) Spring Conference*, San Francisco, March 2012
- 2011 “Open Technology / Open Education,” *IASTED International Conference on Technology and Education (TE 2011)*, Dallas
- “Open Source Education,” *Pearson Technology Summit*, Denver
- “The Open Education (R)Evolution,” National Council for Workforce Education and National Council for Continuing Education and Training joint summit on *Growing the Workforce for a New American Economy*, St. Louis
- “Randomized Dimensionality Reduction and Compressive Sampling,” *Padovani Lecture, Information Theory School*, IEEE Information Theory Society
- “Compressive Sensing and Signal Processing,” *University of Delaware Distinguished Lecture Series*
- “The Past, Present, and Future of Open Education Resources: Implications for Campus Stores” *Campus Market Expo (CAMEX)*, Houston
- “Open Education: Past, Progress, and Challenges,” *EDUCAUSE Learning Initiative Conference*, Washington, DC

- 2010 “The Open Education Revolution,” *Irish National Academy for Integration of Research, Teaching and Learning (NAIRTL)* and *Learning Innovation Network (LIN)* joint annual conference, Dublin
- “Open Education: A New Avenue for Educational Innovation,” *Romania Education Forum*, Bucharest
- “Open Education: Past, Present, and Future,” *UNESCO Brazil OER Workshop*, Brasilia
- 2009 “The Open Education Revolution,” *De Onderwijsdagen 2009 (Education Days)*, Utrecht, Netherlands
- “The Open Education Revolution,” *Brazilian Workshop on Challenges and Perspectives of Open Educational Resources*, Sao Paulo
- “From Open Education to Textbooks of the Future,” *International Society for the Scholarship of Teaching and Learning*, Bloomington.
- “Connexions: Building Communities and Sharing Knowledge,” *Maryland Association of Boards of Education Annual Conference*, Ocean City.
- “Open Education in the Western World,” *The Guardian Activate Summit*, London, UK.
- “Randomized Dimensionality Reduction: A New Framework for Signal Processing and Communications,” *IEEE International Symposium on Information Theory (ISIT)*, Seoul, Korea.
- “Open Education Unleashed,” *Canadian eLearning Conference*, Vancouver.
- “Open Access Learning,” *Canadian Learning Commons Conference*, Saskatoon, Saskatchewan.
- “The Open Education Revolution,” *Making Opportunity Affordable Opportunity Grant Program Academy*, Denver.
- “Open Educational Resources: A Modern Approach to Teaching and Learning,” *Republic of Poland Parliament Special Conference on Open Education*, Warsaw.
- “The Emerging Economics of Open Access Education,” *eTech Ohio*, Columbus
- 2008 “Compressive Sensing Theory and Applications,” *IMA (UK) Conference on Mathematics of Signal Processing VIII*, Cirencester, UK.
- “Exploiting Sparsity through Compressive Sampling,” *Workshop on Sparsity and its Application to Large Inverse Problems*, Robinson College, Cambridge University.
- “Open Access Textbooks,” *Online Educa Berlin 2008*, Berlin
- “Open Access Education — Building Communities and Sharing Knowledge,” *AACE E-Learn Conference*, Las Vegas
- “Open Access Education — Building Communities and Sharing Knowledge,” *National School Boards Association Annual Meeting*, Seattle.
- “The Open Education Movement: Transforming the Economics and Ecology of Education,” *Distinguished Lecture Series of the Texas Language Technology Center (TLTC)*, University of Texas, Austin
- “Open Access Education: Building Communities and Sharing Knowledge,” *National Education Computing Conference*, San Antonio, TX
- “Distributed Compressive Sensing,” *Sensor, Signal, and Information Processing Workshop*, Sedona, AZ.
- “Open Access Education: Building Communities and Sharing Knowledge,” *Innovations in Online Learning Conference*, Austin.
- “An Introduction to Compressive Sensing,” *DARPA IPTO Retreat*, Annapolis, MD.



- “Compressive Sensing, Wavelets, and Sparsity,” *SPIE Defense + Security* (acceptance speech for SPIE Wavelet Pioneer Award), Orlando.
- “Connexions and Open Access Textbooks,” *Teaching and Learning with Technology Conference*, University of North Carolina, Raleigh.
- “Compressive Signal Processing,” *42nd Conference on Information Sciences and Systems (CISS)*, Princeton.
- “The Open Access Textbook Revolution,” *Independent College Bookstore Association Annual Meeting*, Destin, FL.
- “A Single-Pixel Camera based on TI DLP Technology,” Keynote Demo at the *Texas Instruments Developers Conference*, Dallas (with Kevin Kelly).
- “Connexions — Education for a Networked World,” *The UP Experience*, Houston.
- “Compressive Signal Processing,” *IAM-PIMS-MITACS Distinguished Colloquium Series*, UBC, Vancouver.
- 2007 “Compressive Sensing: A New Framework for Computational Data Acquisition,” *CAMSAP (Computational Advances in Multi-Sensor Adaptive Processing)*, St. Thomas, Virgin Islands.
- “Connexions and the Open Access Educational Publishing Revolution,” *EdNET Conference*, Chicago.
- “Compressive Imaging for Vision Applications,” *National Instruments Vision Summit*, Austin.
- “Compressive Detection and Estimation via Smashed Filtering,” *AMS 2007 von Neumann Symposium on Sparse Representation and High-Dimensional Geometry*, Snowbird.
- “Compressive Imaging,” *International Imaging Industry Association (I3A) 61st Annual Conference*, Denver.
- “Connexions – Building Sustainable, Global Educational Communities,” *Innovations in Education for India, China, and America*, Emory University, Atlanta.
- “Connexions: An Open-Access Education Case Study,” *Educause Annual Meeting*, Atlanta.
- 2006 “Connexions: Open Access Engineering Curricula,” *ASEE Global Colloquium on Engineering Education*, Rio de Janeiro, Brazil
- “Collaborative and Distributed Signal Processing in Sensor Networks,” *IEEE Digital Signal Processing Workshop*, Jackson Lake Lodge Grand Teton National Park.
- “Multiscale Compressive Sensing of Image Ensembles,” *EPFL Bernoulli Center Workshop on Wavelets and Applications*, Lausanne, Switzerland.
- “Connexions and the Open-Access Education Revolution,” *TED – Technology, Entertainment, and Design*, Monterey. (1 million views as of May 2018)
- 2005 “Connexions – Building Communities and Sharing Knowledge in Educational Leadership,” *National Council of Professors of Educational Administration 59th Annual Conference*, Washington, DC.
- “Open-Access Publishing in Education — Building Communities and Sharing Knowledge,” *Maricopa Community Colleges Ocotillo Retreat*, Phoenix.
- “COMPASS: A Multiscale Sensor Network Architecture for Distributed Data Processing,” *IEEE Sensor, Signal and Information Processing Workshop*, Tempe.
- 2002 “Connexions – Education for a Networked World,” *IEEE Digital Signal Processing Workshop*, Callaway Gardens.

- 2001 “Traitement des Images Multiechelle,” *Symposium GRETSI '01 sur le Traitement du Signal et des Images*, Toulouse, France.
- “Connexions and Educational Leadership,” *National Council of Professors of Educational Administration 55th Annual Conference*, Houston.
- “Besov, Bayes, and Plato,” *Nonlinear Estimation and Classification Workshop*, Mathematical Sciences Research Institute (MSRI), University of California-Berkeley
- 1996 “Modern Time-Frequency Analysis,” *Dynamics Days*, Lyon, France.
- “Linear and Quadratic Time-Frequency Representations,” *IEEE-SP International Symposium on Time-Frequency and Time-Scale Analysis*, Paris, France.

### **Invited Lectures**

- 2019 Arizona State University
- 2018 Royal Society Workshop on Light Transport and Imaging through Complex Media; Simons Foundation Math + X Symposium on Seismology and Inverse Problems; Harvard Data Science Initiative; Columbia University Data Science Initiative; SPE GCS Data Science Convention; EPFL (2); Google Multimodal Machine Learning Workshop
- 2017 National Technical University of Athens, Greece; Future of Signal Processing Workshop, MIT; Simons Foundation Math+Stats+X Conference, Stanford; Analog Devices; Milestone Integration Platform Symposium; University of Manitoba; Schlumberger
- 2016 Learning Summit, Stanford University; Stanford Center for Image Systems Engineering
- 2015 Caltech; UC-Berkeley; IPAM Workshop on Computational Photography and Intelligent Cameras (UCLA); ICDM Workshop on Data Mining for Educational Assessment and Feedback (ASSESS 2015); NIPS Workshop on Multiresolution Methods for Large Scale Learning; NIPS Workshop on BigNeuro 2015: Making Sense of Big Neural Data
- 2014 SPARC Open Access Meeting; University of Houston Image Analysis Seminar; Educause, special session on Adaptive Learning
- 2013 Rice CEVE Seminar Series
- 2012 Consortium for School Networking (CoSN) Annual Conference, Washington, DC; Shell Research
- 2011 Workshop on Sparse Statistics, Optimization and Machine Learning, Banff International Research Station, Canada; Workshop on Sparse and Low Rank Approximation, Banff International Research Station, Canada; Learning Workshop (aka “Snowbird Workshop”), Fort Lauderdale; Panelist on “Innovative Content: The Future is Here Today,” at Council of Chief State School Officers *National Conference on Student Assessment*, Orlando; Rice Education Entrepreneurship Program (REEP) Summer Institute; Panelist at Academy of Management “Exploratory Caucus Session on Open Education,” San Diego; SEG Workshop on Compressive Sensing, San Antonio; Open Language Summit, UT-Austin; UCLA
- 2010 ExxonMobil Upstream Research; NASA Johnson Space Center; University of Houston; Lawrence Livermore National Laboratory; M. D. Anderson Cancer Center; Computing Research Association annual meeting on “Peer Review and the Computing Sciences”; Park City Mathematics Institute (Institute for Advanced Study, Princeton University); Rice Alliance – Austin Chapter Distinguished Professor Lecture; Association of American Publishers Annual Conference Oxford Debate on Intellectual Property (thrown under the bus by Lawrence Lessig against William Strong and Allan Adler)
- 2009 Invited panelist at SPARC-ACRL Forum on the transformative potential of Open Educational Resources

- 2008 U. British Columbia; Microsoft Research; IMA (U. Minnesota); Invited tutorial at *EUSIPCO*, Lausanne; Joint ICML, UAI, and COLT workshops, Helsinki, Finland; *Azriel Rosenfeld Distinguished Lecture Series in Vision and Graphics*, University of Maryland; Tutorial on “Compressive Sensing Theory and Applications” at *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Las Vegas; Short course on “Compressive Sampling: Theory and Applications” at *SPIE Defense+Security*, Orlando; Invited panelist on “Textbooks of the Future: Free and Collaborative!” at *South-by-Southwest*, Austin; Short course on “Compressive Sampling” at UCSD Workshop on *Information Theory and its Applications (ITA)*, San Diego
- 2007 UCSD Workshop on Information Theory and its Applications; International Congress on Industrial and Applied Mathematics (Zurich); Southern Regional Education Board Educational Technology Cooperative; UIUC; Wolfram Research, National Science Teachers Association; Ukrainian Library Conference; IMA short course on “Compressive Sampling and Frontiers in Signal Processing” with E. Candes and R. DeVore
- 2006 IMA (U. Minnesota); TI Developers Conference; Google Michigan State; Boston U.; U. Toledo; Los Alamos National Laboratory; AMD Global Vision Conference; Tutorial on “Compressed Sensing: A New Framework for Sparse DSP” at *IEEE International Conference on Image Processing (ICIP)*, Atlanta; Connexions workshops in Hanoi and Ho Chi Minh City, Vietnam
- 2005 IMA (U. Minnesota); Fashion Institute of Technology; CMU; UC-Berkeley UCB MSRI; TI Developers Conference; ExxonMobil; NLII Conference; USC Annenberg Center; ConocoPhillips; Texas Instruments
- 2004 MIT; UCLA IPAM; UC-Berkeley; UBC; BCcampus; U. Wisconsin; UNC SAMSI; TI Developers Conference; *Open Knowledge and Social Research Networks Workshop*, Stanford Humanities Center; IHP Summer School on *Multiscale Geometric Data Representation – Complexity, Analysis and Applications*, ETH-Zurich; *Wavelet and Multiscale Methods Workshop*, Oberwolfach, Germany; *Second International Conference on Computational Harmonic Analysis*, Vanderbilt University; *Multiscale Geometric Analysis Workshop*, University of Arkansas
- 2003 Princeton; U. Minnesota; U. Washington; Botanical Research Institute of Texas; TI; National Instruments; IBM Watson; Microsoft Research; NAS/Carnegie Workshop on *Transforming the Humanities; Applied Inverse Problems: Theoretical and Computational Aspects Workshop*; UCLA IPAM, Lake Arrowhead; *FNRS Wavelets and Applications Workshop*, Esneux, Belgium; *Wavelets and Statistics Workshop*, Grenoble, France; *Applicable Harmonic Analysis Workshop*, Banff International Research Station, Canada
- 2002 MIT; Caltech; INRIA Sophia-Antipolis (France); U. Cambridge; ETH Zurich; UC-Louvain-la-Neuve (Belgium); UNESCO; *Semester in Harmonic Analysis*, CEMRACS, Marseille, France
- 2001 Polytechnic; U. Manitoba; Dalhousie; ENST (Paris); U. Pierre et Marie Curie (Paris VI); Stavanger College (Norway); INRIA-Rennes (France); *Department of Communications Summer Research Institute*, EPFL, Switzerland; *Ideal Data Representation Workshop*, Institute for Mathematics and Applications (IMA), University of Minnesota; *Workshop on Analysis with Wavelets, Signals, and Geometry*, Center for Discrete Mathematics and Computer Science (DIMACS), Rutgers University
- 2000 U. Illinois; Princeton; Microsoft Research; Lucent Bell Labs; Houston Area Chapter of the American Statistical Association; Society of Rice University Women; Rice Graduate Student Association Teaching Workshop; *Wavelet Applications in Signal Processing Mini-Symposium, Third European Congress of Mathematics*, Barcelona
- 1999 Hong Kong U. Science and Technology; Beijing U.; Tsinghua; Stanford; U. South Carolina; Ricoh Silicon Valley Research Center; Houston Area Chapter of the American Statistical Association; *Wavelets*

*and Multiresolution Workshop*, Foundations of Computational Mathematics, City University of Hong Kong

- 1998 U. Edinburgh; Imperial College; U. Bristol; Cambridge; Nortel Networks (Harlow, UK); Schlumberger (Cambridge, UK); Picometrix; Nortel Networks; SBC Communications; Western Geophysical; Rice School of Continuing Studies; *Data Analysis Workshop*, Isaac Newton Institute, Cambridge University; *Swiss Science Foundation Wavelets and Applications Workshop*, Centro Stefano Franscini, Monte Verità, Ticino, Switzerland; *EC Summer School on Bayesian Signal Processing*, Isaac Newton Institute, Cambridge University; *International Conference on Wavelets and Multiscale Methods*, Tangers, Morocco
- 1997 INRIA Rocquencourt (France); Shell Research
- 1996 Michigan State; U. Houston; Technical University of Delft; U. Colorado; Halliburton Geophysics; Rockwell Euclid Laboratories; Texas Instruments; Mobil; Exxon; *NSF/ONR Workshop on Signal Processing for Manufacturing and Machine Monitoring*
- 1995 Schlumberger; Exxon; Western Geophysical; SRI International; Lawrence Livermore National Laboratory
- 1994 U. Michigan; *Thematic Days on Time-Frequency, Multiresolution, and Wavelets*, INSA Lyon, France
- 1993 U. Manitoba; U. Texas at Arlington; Telecom Paris; Technical University of Vienna; Western Atlas
- 1992 U. Wisconsin; Johns Hopkins; U. Utah; Ohio State

## **PATENTS**

28 US and 6 foreign patents in signal processing and acquisition. Siemens has licensed 6 patents to support the integration of compressive sensing into their MRI scanners to radically speed up data acquisition in cardiac MRI and beyond. Startup InView has licensed 12 patents that form the foundation of their infrared imaging approach.

“Methods and Systems for Video Compressive Sensing for Dynamic Imaging,” US patent 9,552,658, issued 24 January 2017.

“Apparatus and Method for Compressive Imaging and Sensing Through Multiplexed Modulation,” US patent 9,124,755, issued 1 September 2015.

“Hot Spot Correction in a Compressive Imaging System,” US Patent 8,922,688, issued 30 December 2014.

“Method and Apparatus for Compressive Domain Filtering and Interference Cancellation,” US Patent 8,725,784, issued 13 May 2014.

“Adaptive Search for Atypical Regions in Incident Light Field and Spectral Classification of Light in the Atypical Regions,” US Patent 8,717,551, issued 6 May 2014.

“Dual-Port Measurements of Light Reflected from Micromirror Array,” US Patent 8,717,466, issued 6 May 2014.

“Method and Apparatus for On-Line Compressed Sensing,” US Patent 8,687,689, issued 1 April 2014.

“Low-Pass Filtering of Compressive Imaging Measurements to Infer Light Level Variation,” US Patent 8,570,406, issued 29 October 2013.

“Determining Light Level Variation in Compressive Imaging by Injecting Calibration Patterns into Pattern Sequence,” US Patent 8,570,405, issued 29 October 2013.

- “Method And Apparatus For Signal Detection, Classification And Estimation From Compressive Measurements,” US Patent 8,483,492, issued 9 July 2013.
- “Method and Apparatus for Signal Reconstruction from Saturated Measurements,” US Patent 8,456,345, issued 4 June 2013.
- “Method and Apparatus for Compressive Imaging Device,” US Patent 8,199,244, issued 12 June 2012; US Patent 8,848,091, issued 30 September 2014; European Patent 1,880,524 issued 30 October 2013.
- “Apparatus and Method for Compressive Sensing Radar Imaging,” US Patent 7,928,893, issued 19 April 2011.
- “Method And Apparatus For Automatic Gain Control For Nonzero Saturation Rates,” US Patent 8,487,796, issued 23 February 2011.
- “Method And Apparatus For Compressive Parameter Estimation And Tracking,” US Patent 8,566,053, issued 22 October 2010.
- “Analog System for Computing Sparse Codes,” US Patent 7,783,459, issued 24 August 2010.
- “Throughput Maximization in Wireless Communication Systems,” US Patent 7,522,657, issued 21 April 2009.
- “Method and Apparatus for Distributed Compressed Sensing,” US Patent 7,271,747, issued 18 September 2007. US Patent 7,511,643, issued 31 March 2009.
- “Signaling Techniques in Channels With Asymmetric Powers and Capacities,” US Patent 7,035,400, issued 25 April 2006.
- “Spectral Optimization for Communication under a Peak Frequency-Domain Power Constraint,” US Patent 6,839,429 issued 4 January 2005.
- “Spectral Optimization and Joint Signaling Techniques with Multi-line Separation in the Presence of Crosstalk,” US Patent 6,317,495 issued 13 November 2001.
- “Spectral Optimization and Joint Signaling Techniques with Upstream / Downstream Separation for Communication in the Presence of Crosstalk,” US Patent 6,292,559 issued 18 September 2001.

## JOURNAL PUBLICATIONS

Google Scholar citation statistics: <http://scholar.google.com/citations?user=N-BBA20AAAAJ>  
(H-index = 104, 54,500 citations as of April 2019)

Ranking of US/World Computer Scientists by H-index: <http://www.guide2research.com/scientists/US>  
(#65 in US and #89 in World as of March 2019)

- E. L. Dyer, T. Goldstein, R. J. Patel, K. Kording, and R. G. Baraniuk, “Self-Expressive Decompositions for Matrix Approximation and Clustering,” submitted to *IEEE Transactions on Signal Processing*, 2015.
- C. Studer, T. Goldstein, W. Yin, and R. G. Baraniuk, “Democratic Representations,” submitted to *Applied and Computational Harmonic Analysis (ACHA)*, 2015.
- R. Balestriero and R. G. Baraniuk, “Mad Max: Affine Spline Insights into Deep Learning,” *IMA Information and Inference*, special issue on Theory of Deep Learning, 2019 (arXiv: 1805.06576).
- P. Grimaldi, D. Basu Mallick, A. E. Waters, and R. G. Baraniuk, “Do Open Educational Resources Improve Student Learning? Implications of the Access Hypothesis,” *PLOS ONE*, 2019.

- J. Tan, L. Niu, J. K. Adams, V. Boominathan, J. T. Robinson, R. G. Baraniuk, and A. Veeraraghavan, "Face Detection and Verification Using Lensless Cameras with Application to the Internet of Things," *IEEE Transactions on Computational Imaging*, 2019.
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- A. Mousavi, G. Dasarathy, and R. G. Baraniuk, "A Data-Driven and Distributed Approach to Sparse Signal Representation and Recovery," *International Conference on Learning Representations (ICLR)*, New Orleans, May 2019.
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- J. Haupt, R. Castro, R. D. Nowak, and R. G. Baraniuk, "Sequentially Designed Compressed Sensing" *IEEE Statistical Signal Processing Workshop*, Ann Arbor, August 2012.
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- J. Shi, A. Sankaranarayanan, C. Studer, R. G. Baraniuk, "Video Compressive Sensing for Dynamic MRI," *Computational Neuroscience Symposium – CNS*, Atlanta, July 2012.
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- A. E. Waters, A. Lan, C. Studer, and R. G. Baraniuk, "Sparse Factor Analysis for Cognitive Tutoring," *Learning Workshop*, Snowbird, UT, April 2012.

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- A. Sankaranarayanan, C. Studer, and R. G. Baraniuk, "CS-MUVI: Video Compressive Sensing for Spatial-Multiplexing Cameras," *IEEE International Conference on Computational Photography (ICCP)*, Seattle, April 2012.
- S. R. Schnelle, J. P. Slavinsky, P. Boufounos, M. A. Davenport, and R. G. Baraniuk, "A Compressive Phase Locked Loop," *IEEE International Conference on Acoustics, Speech and Signal Processing – ICASSP'12*, Kyoto, Japan, March 2012.
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- C. Studer and R. G. Baraniuk, "Dictionary Learning from Sparsely Corrupted of Compressed Signals" *IEEE International Conference on Acoustics, Speech and Signal Processing – ICASSP'12*, Kyoto, Japan, March 2012.
- A. Waters, and R. G. Baraniuk, "SpaRCS: Recovering Low-Rank and Sparse Matrices from Compressive Measurements," *Neural Information Processing Systems (NIPS)*, Granada, Spain, December 2011.
- J. N. Laska, J. P. Slavinsky, and R. G. Baraniuk, "The Polyphase Random Demodulator for Wideband Compressive Sensing," *45rd Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, November 2011.
- A. Maleki, M. Narayan, and R. G. Baraniuk, "Suboptimality of Nonlocal Means on Images with Sharp Edges," *Allerton Conference on Communication, Control, and Computing*, Allerton, IL, September 2011.
- A. C. Sankaranarayanan, C. Hegde, S. Narayan, and R. G. Baraniuk, "Go with the Flow: Optical Flow-based Transport Operators for Image Manifolds," *Allerton Conference on Communication, Control, and Computing*, Allerton, IL, September 2011.
- C. Studer and R. G. Baraniuk, "Recovery Guarantees for Restoration and Separation of Approximately Sparse Signals," *Allerton Conference on Communication, Control, and Computing*, Allerton, IL, September 2011.
- A. Maleki and R. G. Baraniuk, "Least Favorable Compressed Sensing Problems for First Order Methods," *IEEE International Symposium on Information Theory (ISIT)*, St. Petersburg, Russia, August, 2011.
- M. F. Duarte and R. G. Baraniuk, "Compressive Sensing with Biorthogonal Wavelets via Structured Sparsity," *SPARS*, Edinburgh, July 2011.
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- J. R. Treichler, M. F. Davenport, J. N. Laska, and R. G. Baraniuk, "Dynamic Range and Compressive Sensing Signal Acquisition Receivers," *Defense Applications of Signal Processing (DASP)*, Coolum, Australia, July 2011.
- J. P. Slavinsky, J. Laska, and R. G. Baraniuk, "The Compressive Muxlexer for Multi-Channel Compressive Sensing," *IEEE International Conference on Acoustics, Speech and Signal Processing – ICASSP'11*, Prague, May 2011.
- J. Haupt and R. G. Baraniuk, "Robust Support Recovery Using Sparse Compressive Sensing Matrices," *Conference on Information Sciences and Systems (CISS)*, Johns Hopkins University, March 2011.

- M. A. Davenport, C. Hegde, M. A. Duarte, and R. G. Baraniuk, "High-Dimensional Data Fusion via Joint Manifold Learning," *AAAI Symposium on Manifold Learning*, Arlington, VA, November 2010.
- M. A. Davenport, S. R. Schnelle, J. P. Slavinsky, R. G. Baraniuk, M. B. Wakin, and P. T. Boufounos, "A Wideband Compressive Radio Receiver," *Military Communications Conference (MILCOM)*, November 2010.
- M. F. Duarte and R. G. Baraniuk, "Recovery of Frequency-Sparse Signals from Compressive Measurements," *Allerton Conference on Communication, Control, and Computing*, Allerton, IL, September 2010.
- A. C. Sankaranarayanan, P. K. Turaga, R. G. Baraniuk, and R. Chellappa, "Compressive Acquisition of Dynamic Scenes," *European Conference on Computer Vision (ECCV)*, Crete, Greece, September 2010.
- E. Dyer, M. F. Duarte, D. H. Johnson, and R. G. Baraniuk, "Recovering Spikes from Noisy Neuronal Calcium Signals via Structured Sparse Approximation," *9th International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA)*, St. Malo, France, September 2010.
- M. F. Duarte and R. G. Baraniuk, "Kronecker Product Matrices for Compressive Sensing," *IEEE International Conference on Acoustics, Speech and Signal Processing – ICASSP'10*, Dallas, March 2010.
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- J. Laska, M. Davenport, and R. G. Baraniuk, "Exact Signal Recovery from Sparsely Corrupted Measurements through the Pursuit of Justice," *43rd Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, October 2009.
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