

## FACULTY RESEARCHERS



### GOVIND AGRAWAL

**James C. Wyant Professor of Optics, Professor of Physics, and Senior Scientist at the Laboratory for Laser Energetics, University of Rochester**

**Education** PhD, Indian Institute of Technology, Physics, 1974; MS, Indian Institute of Technology, Physics, 1971; BS, University of Lucknow, Physics and Statistics, 1969

**Research Interests** Quantum electronics, Nonlinear photonics, Fiber-optic communications

**Recent Research Projects** Transmission of optical pulses, Semiconductor lasers, Nonlinear fiber optics, Optical communications

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### MIGUEL ALONSO

**Associate Professor of Optics in The Institute of Optics, University of Rochester**

**Education** PhD, The Institute of Optics, University of Rochester, Optics, 1996; MS, Universidad Autonoma Metropolitana, Physics, 1990

**Research Interests** Propagation of waves, Connection between rays and waves, Integral transforms, Phase space representations, Uncertainty relations

**Recent Research Projects** Building accurate estimates of wave fields propagating based on ray information alone

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### JAMES AQUAVELLA

**Professor, Department of Ophthalmology, University of Rochester**

**Education** MD, Medicine, Italy-Fac Med U Naples, 1957; BA, Johns Hopkins University, Biological Sciences, 1952

**Research Interests** Ocular surface tear film, Cornea wound healing, Keratoprosthesis—artificial cornea transplantation

**Recent Research Projects** Ocular metrology and inflammatory mediator response to topical administration of anti-inflammatory drugs

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### MARK BOCKO

**Professor of Electrical and Computer Engineering and of Physics and Professor of Music Theory at the Eastman School of Music, University of Rochester**

**Education** PhD, University of Rochester, Physics, 1984; MS, University of Rochester, Physics and Astronomy, 1980; BS, Colgate University, Physics and Astronomy, 1978

**Research Interests** Imaging microelectronics, Wireless sensors, Multimedia signal processing

**Recent Research Projects** Digital audio watermarking and steganography, Image sensors with built-in image compression, Digital CMOS image sensor read-out circuits

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### THOMAS G. BROWN

**Professor of Optics and Director, Robert E. Hopkins Center for Optical Design and Engineering, University of Rochester**

**Education** PhD, University of Rochester, Optics, 1987; BS, Gordon College, Physics, 1979

**Research Interests** Optical polarization and metrology, Optoelectronic modeling, Integrated optoelectronics

**Recent Research Projects** Enhancing image contrast using polarization correlations, Stress engineering for polarimetry and imaging, Polarization control of optical nanostructures, Nonlinear properties of microstructured optical fibers

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### DENIS CORMIER

**Earl W. Brinkman Professor of Industrial and Systems Engineering and Director of AMPrint Center (CAT), Rochester Institute of Technology**

**Education** PhD, North Carolina State University; MS, University at Buffalo

**Research Interests** Rapid Prototyping, Rapid Manufacturing

**Recent Research Projects** Cu Ink Adhesion Solutions

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### JEAN-PHILIPPE COUDERC

**Associate Professor of Medicine, Department of Cardiology, University of Rochester**

**Education** PhD, National Institute of Applied Science (France), Biomedical Engineering, 1997; MBA, Simon Business School, Health Care Management, 2003; MS, Medical Specialties Non-Medical School (France), 1994

**Research Interests** Computational science and engineering, Numerical analysis, Applications of computer science in electrophysiological signaling stabilization, Refractometry, Flexure systems, Stage metrology

**Recent Research Projects** Noncontact video-based detector of cardiac arrhythmias

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### PAUL DUNMAN

**Associate Professor in the Department of Microbiology and Immunology, University of Rochester**

**Education** PhD, University of Medicine and Dentistry-NJ (UMDNJ), Microbiology, 1999; BS, Delaware Valley College, Arts and Sciences, 1992

**Research Interests** Novel strategies for the therapeutic intervention of bacterial infections, Modulation of mRNA turnover

**Recent Research Projects** Light Diffusing Fiber as a Disinfectant or Antimicrobial Agent, Efflux pumps and inhibitors of serum-grown *Acinetobacter baumannii*, Identifying new antimicrobial agents against *Mycobacterium tuberculosis*, Terfenadine as a new *S. aureus* antibiotic

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## FACULTY RESEARCHERS



### JONATHAN ELLIS

**Assistant Professor of Optics and of Mechanical Engineering, University of Rochester**

**Education** PhD, Delft University of Technology (The Netherlands) Mechanical Engineering, 2010; MSc, BS, University of North Carolina at Charlotte, Mechanical Engineering

**Research Interests** Linear displacement interferometry, High-power gas laser frequency stabilization, Refractometry, Flexure systems, Stage metrology

**Recent Research Projects** Designing and developing smart optical sensors for compact, remote displacement sensing and for multi-DOF interferometry

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### JAMES FERWERDA

**Associate Professor in the Munsell Color Science Laboratory and in the Center for Imaging Science, Rochester Institute of Technology**

**Education** PhD, Cornell University, Experimental Psychology, 1998; MS, Cornell University, Computer Graphics, 1987; BA, Cornell University, Psychology with Honors, 1980

**Research Interests** Computer graphics, Digital imaging, Data visualization, Visual perception, Low vision, Assistive technologies

**Recent Research Projects** Effects of image dynamic range on apparent surface gloss

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### PAUL FUNKENBUSCH

**Professor of Mechanical Engineering and of Materials Science, University of Rochester**

**Education** PhD, Michigan Technology University, 1984

**Research Interests** Relationships among microstructure, properties, and processing of materials

**Recent Research Projects** Optical Probing for Freeform Optics Metrology

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### THOMAS GABORSKI

**Assistant Professor in the Department of Biomedical Engineering, Rochester Institute of Technology**

**Education** PhD, University of Rochester, Biomedical Engineering, 2008; MS, University of Rochester, Biomedical Engineering, 2004; BS, Cornell University, Biological and Environmental Engineering, 2002

**Research Interests** Nanomaterials and membrane fabrication, Microfluidics, separations, and device design, Cellular biophysics, Quantitative fluorescence imaging

**Recent Research Projects** Cellular co-culture screening assays

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### CHUNLEI GUO

**Professor of Optics in The Institute of Optics, University of Rochester**

**Education** PhD, University of Connecticut, Physics, 1999; BS, Changchun Institute of Optics and Fine Mechanics, Physics, 1994

**Research Interests** Femtosecond Laser-Matter Interactions at High Intensities

**Recent Research Projects** Superwicking cooling devices for computer CPU and microelectronics

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### WENDI B. HEINZELMAN

**Associate Professor of Electrical and Computer Engineering and Dean of the Hajim School of Engineering & Applied Sciences, University of Rochester**

**Education** PhD, Massachusetts Institute of Technology, Electrical Engineering and Computer Science, 2000; MS, Massachusetts Institute of Technology, Electrical Engineering and Computer Science, 1997; BS, Cornell University, Electrical Engineering, 1995

**Research Interests** Multimedia communication, Wireless sensor networks, RFID systems, Cloud computing, Heterogeneous networking

**Recent Research Projects** Developing RFID systems for inventory management, Designing a QoS-aware protocol architecture to support real-time multimedia data transmission, Optimizing video-based sensor networks

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### KARL D. HIRSCHMAN

**Micron Technology Professor and Professor of Microelectronic Engineering, Rochester Institute of Technology**

**Education** PhD, University of Rochester, Electrical and Computer Engineering, 2000; MS, Rochester Institute of Technology, Electrical Engineering, 1992; BS, Rochester Institute of Technology, Microelectronic Engineering, 1990

**Research Interests** Silicon device integration on nontraditional substrates, Metal-oxide semiconductors for thin-film electronics, Silicon-based optoelectronics

**Recent Research Projects** Development and characterization of high-performance transistors on glass, Development of bipolar and MOS high-power microwave transistors

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### JOHN C. HOWELL

**Professor of Physics and of Optics, Department of Physics and Astronomy, University of Rochester**

**Education** PhD and MS, Pennsylvania State University, Physics, 2000; BS, Utah State University, Physics, 1995

**Research Interests** Quantum Optics, Quantum Physics

**Recent Research Projects** Experimental Quantum Optics and Quantum Information, Multi-view 3D Displays no head-worn component

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## FACULTY RESEARCHERS



### KRYSTEL R. HUXLIN

**Professor of Ophthalmology, of Neurobiology and Anatomy, of Brain and Cognitive Sciences, and in the Center for Visual Science, University of Rochester**

**Education** PhD and MS, Pennsylvania State University, Physics, 2000; BS, Utah State University, Physics, 1995

**Research Interests** Optics of the eye, Femtosecond laser micro-machining in cornea and lens, Visual perception and psychophysics, Biomedical imaging

**Recent Research Projects** Femtosecond laser micromachining, Effect of corneal wound healing on physiological optics of the eye, Perceptual learning with a damaged visual system

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### ZELJKO IGNJATOVIC

**Associate Professor of Electrical and Computer Engineering, University of Rochester**

**Education** PhD, University of Rochester, Electrical and Computer Engineering, 2004; MS, University of Rochester, Electrical and Computer Engineering, 2001; BS, University of Novi Sad, Electrical Engineering and Computer Science, 1999

**Research Interests** A/D conversion, CMOS analog circuits, Low power circuit architectures, Image sensors

**Recent Research Projects** Developing and investigating focal plane compression techniques where majority of multiplication computations required by the compression are rendered unnecessary

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### WAYNE H. KNOX

**Professor of Optics, of Physics, and in the Center for Visual Sciences and Associate Dean of Education and New Initiatives for the Hajim School of Engineering & Applied Sciences, University of Rochester**

**Education** PhD, University of Rochester, The Institute of Optics, 1983; BS, University of Rochester, The Institute of Optics, 1979

**Research Interests** Ultrafast laser physics and prototyping, Ultra-broadband laser systems, Biomedical optics using novel ultrafast lasers, Femtosecond micromachining of polymers, Nonlinear fiber and semiconductor devices

**Recent Research Projects** Femtosecond micromachining of ophthalmic polymers

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### JOHN LAMBROPOULOS

**Professor of Mechanical Engineering and of Materials Science, Director of Materials Science Program, and Senior Scientist in Laboratory for Laser Energetics, University of Rochester**

**Education** PhD, Harvard University, Mechanical Engineering, 1984; MS, Harvard University, Applied Sciences and Mechanical Engineering, 1981; BS, Brown University, Applied Mechanics, 1980

**Research Interests** Describing macroscopic behavior of solids by examining underlying microstructural features; Mechanical, electrical, and/or optical affects to response of homogenous or heterogeneous materials

**Recent Research Projects** Optimization of optics manufacturing techniques such as deterministic microgrinding, loose abrasive lapping, Magnetorheological Finishing (MRF), and loose abrasive finishing of optical glasses and ceramics

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### CRISTIAN A. LINTE

**Assistant Professor in the Department of Biomedical Engineering, Rochester Institute of Technology**

**Education** PhD, University of Western Ontario, Biomedical Engineering, 2010; MA University of Western Ontario, Biomedical Engineering, 2006; BS, University of Windsor, Mechanical and Materials Engineering, 2004

**Research Interests** Development, evaluation and preclinical integration of image guidance environments for surgical navigation of minimally invasive cardiac interventions

**Recent Research Projects** Predicting target vessel location in robot-assisted CABD interventions using feature-based CT to US registration

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### JIEBO LUO

**Professor of Computer Science, University of Rochester**

**Education** PhD, University of Rochester, Electrical Engineering, 1995; MS, University of Science & Technology (China), Electrical Engineering, 1992; BS, University of Science & Technology (China), Electrical Engineering, 1989

**Research Interests** Computer vision, Machine learning, Social media data mining, Human computer interaction, Biomedical informatics, Mobile and pervasive computing, Computational photography

**Recent Research Projects** Fine-grained user profiling from multiple social multimedia platforms, Wine recommendation for grocery shoppers

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### KARA MAKI

**Assistant Professor in the School of Mathematical Sciences, Rochester Institute of Technology**

**Education** PhD, University of Delaware, Applied Mathematics, 2009; MS, University of Delaware, Applied Mathematics, 2006; BS, University of New Hampshire, Mathematics, 2003

**Research Interests** Physical systems and industrial problems pertaining to flows of biological and complex fluids, Modeling, Ordinary and partial differential equations, Scientific Computing

**Recent Research Projects** Affect of contact lens distortion on exchange of tears, Model for suction pressure under a contact lens

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### JOHN MARCIANTE

**Associate Professor of Optics in The Institute of Optics, University of Rochester**

**Education** PhD, University of Rochester, 1997; MS, University of Rochester, 1992; BS, University of Illinois, 1991

**Research Interests** Lasers, Waveguides, Fiber Optics

**Recent Research Projects** Large-mode area fibers, Visible Fiber lasers, brightness semiconductor lasers, Fiber laser for display applications, High-efficiency fiber amplifiers, All-fiber optical components

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## FACULTY RESEARCHERS



### STEPHEN MCALEAVEY

**Associate Professor of Biomedical Engineering and of Electrical and Computer Engineering and in the Rochester Center for Biomedical Ultrasound, University of Rochester**

**Education** PhD, University of Rochester, Electrical and Computer Engineering, 2001; MS, University of Rochester, Electrical Engineering, 1998; BS, University of Rochester, Electrical Engineering, 1996

**Research Interests** Use of motion-tracking techniques to enhance the contrast of ultrasound images, Acoustic Radiation Force Impulse (ARFI), Magnetically induces vibration of brachytherapy seeds

**Recent Research Projects** Acoustic radiation force imaging techniques, Spatially Modulated Ultrasound Radiation (SMURF) imaging, Single tracking location (STL) Shear wave elastography imaging (SWEI)

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### JAMES L. MCGRATH

**Associate Professor of Biomedical Engineering, University of Rochester**

**Education** PhD, Massachusetts Institute of Technology, Biological Engineering, 1998; MS, Massachusetts Institute of Technology, Mechanical Engineering, 1994; BS, Arizona State University, Mechanical Engineering, 1991

**Research Interests** Nanoparticle and molecular separations, Nanotechnology, MEMS and micro fabrication, Cell culture technologies

**Recent Research Projects** The interaction of nanoparticles with cells and protein mixtures, Ultrathin silicon-based nanomembranes for filtration of molecules and nanoparticles, Ultrathin silicon-based nanomembranes for biological co-cultures

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### DAVID MESSINGER

**Professor and Director in the Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology**

**Education** PhD, Rensselaer Polytechnic Institute, Physics, 1998; BS, Clarkson University, Physics, 1991

**Research Interests** Remote sensing and image exploitation, Advanced mathematical approaches for spectral image processing, Target detection in hyperspectral imagery

**Recent Research Projects** Spatial segmentation of multi/hyperspectral imagery by fusion of spectral-gradient textural attributes, Knowledge-Based Automated Road Network Extraction System Using Multispectral Images

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### BENJAMIN MILLER

**Associate Professor of Dermatology, University of Rochester**

**Education** PhD, Stanford University, Organic Chemistry, 1994; BS, BA, Miami University, Chemistry, Mathematics, German, 1988

**Research Interests** Biomedical nanotechnology, Combinatorial chemistry, Biophysical methods, Biosensors

**Recent Research Projects** The AIR Flu Chip: A Multiplex Optical Biosensor of Influenza Serology

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### ZORAN NINKOV

**Micron Technology Professor of Microelectronic Engineering, Rochester Institute of Technology**

**Education** PhD, University of British Columbia, Astronomy, 1985; MS, Monash University, Physical Chemistry, 1980; BS, University of Western Australia, Physics, 1977

**Research Interests** Novel 2-D CMOS detector arrays, Fundamental limitations of visible and IR arrays, Miniaturized multispectral systems

**Recent Research Projects** Development of novel two-dimensional detector arrays, Development of image processing techniques for optimal analysis of such two-dimensional astronomical image data

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### ANTHONY P. PIETROPAOLI

**Associate Professor, Department of Medicine, University of Rochester**

**Education** MPH, University of Rochester, Clinical Investigations, 2008; MD, SUNY Upstate Medical University, Medicine, 1994; BA, College of the Holy Cross, English and Premed, 1986

**Research Interests** Internal Medicine, Pulmonary Disease, Critical Care Medicine

**Recent Research Projects** Protocols and Hospital Mortality in Critically Ill Patients: The United States Critical Illness and Injury Trials Group Critical Illness Outcomes Study

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### RICHARD PHIPPS

**Dean's Professor of Environmental Medicine, Professor of Oncology, of Pediatrics, and of Microbiology and Immunology; Director of the Lung Biology and Disease Program, University of Rochester**

**Education** PhD, Medical College of Virginia, Immunology, 1980; BS, Loyola College, Medical Technology, 1977

**Research Interests** Cellular and molecular characterization of fibroblasts, Control of normal and malignant lymphocyte activation

**Recent Research Projects** Ocular surface metrology and inflammatory mediator response to topical administration of anti-inflammatory drugs

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### JUDITH L. PIPHER

**Professor Emeritus of Physics and Astronomy, University of Rochester**

**Education** PhD, Cornell University, Astronomy, 1971; MS, Cornell University, Astronomy, 1970; BS, University of Toronto, Physics and Astronomy, 1962

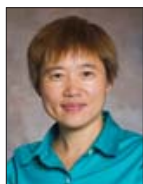
**Research Interests** Infrared observations of star-forming regions, Infrared detector array development and applications to astronomy and to persistent surveillance

**Recent Research Projects** Teledyne HgCdTe 10 micron cutoff detector arrays for use in future space experiments with particular emphasis on NEOCam (Near Earth Object Camera), Characterization of Raytheon long-wavelength HgCdTe detector arrays, FIRE spectrometer development, Persistent surveillance-driven projects

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## FACULTY RESEARCHERS



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**Associate Professor in the Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology**

**Education** PhD, University of Texas at Austin, Electrical and Computer Engineering, 2001; MBA, Simon Business School, 2012; MS, Tsinghua University (Beijing), Precision Instruments and Fine Mechanics, 1997

**Research Interests** Optical metrology, Optical instrumentations, Adaptive and active optics, Segmented large-scale optics alignment and testing, Pulse compression, ultrafast laser systems and applications, Optical system design and performance evaluation

**Recent Research Projects** Development and investigation of an integrated laser-based optics polishing and manufacturing technology, Laser polishing for additive manufacturing

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### MICHAEL RICHARDS

**Research Assistant Professor, Department of Surgery, Division of Vascular Surgery, University of Rochester**

**Education** PhD, Boston University, Biomedical Engineering, 2007; MS, Boston University, Biomedical Engineering, 2007; BS, University of Rochester, Biomedical Engineering, 2001

**Research Interests** Biomechanics of soft tissues and measuring the change in mechanical properties of diseased tissues using clinical imaging modalities

**Recent Research Projects** Development, validation, and implementation of elasticity imaging, or elastography, for diagnosing vascular diseases

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### JANNICK ROLLAND

**Brian J. Thompson Professor of Optical Engineering, Professor of Optics and of Biomedical Engineering and Professor in the Center for Visual Science, University of Rochester**

**Education** PhD, University of Arizona, Optical Science, 1990; MA, University of Arizona, Optical Science, 1987; Diplôme Grandes Ecoles, Institut d'Optique (France), 1984

**Research Interests** Optical system design for imaging and non-imaging optics, Physics-based modeling, Image quality assessment

**Recent Research Projects** Gabor-domain optical coherence microscopy for detection of defects in manufacturing, Optical coherence tomography for quantification of contact lens properties

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### LEWIS ROTHBERG

**Professor of Chemistry, of Chemical Engineering, and of Physics, University of Rochester**

**Education** PhD, Harvard University, Physics, 1971; BS, University of Rochester, Physics, 1977

**Research Interests** Organic device science, Metal nanoparticle enhanced spectroscopy and imaging, Bio-molecular sensing

**Recent Research Projects** Novel optical technologies for sensing of nucleic acids and proteins, Mechanistic studies of electronic polymers used in luminescent devices, Plasmonic enhancement of molecular absorption and luminescence, Small fragment removal for next-generation sequencing

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### DAVID ROSS

**Professor in the Center for Applied and Computational Mathematics, Rochester Institute of Technology**

**Education** PhD, New York University, Mathematics, 1985; BA, Colombia University Mathematics, 1980

**Research Interests** Statistical physics of protein mixtures, Cell signaling dynamics, Fluid mechanics and solid mechanics of contact lenses and tear film

**Recent Research Projects** Affect of contact lens distortion on exchange of tears, Model of suction under contact lens

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### CARL SALVAGGIO

**Professor of Imaging Sciences in the Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology**

**Education** PhD, SUNY ESF, Environmental Resource Engineering, 1994; MS and BS, Rochester Institute of Technology, Imaging Science, 1987

**Research Interests** Three-dimensional geometry extraction from multiview imagery, Material optical properties measurement and modeling, Still and motion image processing for various applications, Thermal infrared phenomenology, exploitation, and simulation, Design and implementation of novel imaging and ground-based measurement systems

**Recent Research Projects** Signatures Modeling, Derivation, and Exploitation, RIT Immersive Living Room, START-X ISP Signatures and SWIR Measurement Support

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### ANDREAS SAVAKIS

**Professor and Department Head, Computer Engineering, Rochester Institute of Technology**

**Education** PhD, North Carolina State University, Electrical Engineering, 1991; MS, Old Dominion University, Electrical Engineering, 1986; BS, Old Dominion University Electrical Engineering, 1984

**Research Interests** Real-time computer vision, Multimedia systems, Medical imaging

**Recent Research Projects** Real-time systems for object tracking and activity recognition; Algorithms and systems for robust scene categorization and object classification in consumer photographs; Document processing algorithms for thresholding, compression, and rendering in high-speed scanners; Digital Image Processing; and Computer Vision

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### ROMAN SOBOLEWSKI

**Professor of Electrical and Computer Engineering and of Physics, Senior Scientist in the Laboratory for Laser Energetics, University of Rochester**

**Education** ScD, Polish Academy of Sciences, Physics, 1996; PhD, Polish Academy of Sciences, Physics, 1983; MS, Warsaw Technical University

**Research Interests** Ultrafast optoelectronics, Quantum optoelectronic and spintronic devices, Ballistic transport in electronic nanodevices, Quantum communication and information

**Recent Research Projects** Quantum key distribution using polarized infrared single photons for practical quantum cryptography and deep space optical communications, Subpicosecond electro- and magneto-optic characterization of electronic, optoelectronic, and spintronic materials and systems, Smart sensor for classical and quantum data links

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## FACULTY RESEARCHERS

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### TARA C. VAZ

**Senior Instructor in the Department of Ophthalmology, University of Rochester**

**Education** PhD, SUNY College of Optometry, 2002; MS, SUNY College of Optometry, 2001; BS, McMaster University, 1996

**Research Interests** Contact lenses, Lens solution, Ophthalmic drops

**Recent Research Projects** High and low contrast visual acuity measurements in spherical and aspheric soft contact lens wearers, Continued development of portable low-cost wavefront sensors

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### GEUNYOUNG YOON

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**Education** PhD, Osaka University, Laser Optics, 1998; MS, Osaka University, Laser Optics, 1995; BS, SungKyunkwan University, Physics, 1990

**Research Interests** Adaptive optics and in-vivo ocular surface and intraocular imaging, Customized vision correction, Presbyopic correction

**Recent Research Projects** Large stroke adaptive optics for correcting highly aberrated eyes, Investigation of accommodation and presbyopic lenses (multifocal and accommodative intraocular lenses)

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### JAMES M. ZAVISLAN

**Associate Professor in The Institute of Optics, and of Dermatology and of Biomedical Engineering and Director of the Center for Institute Ventures, University of Rochester**

**Education** PhD, The Institute of Optics, University of Rochester, 1988; BS, The Institute of Optics, University of Rochester, 1981

**Research Interests** Improving the performance of optical imaging systems, Optical design, Optical fabrication, Optical design using anisotropic optical materials, Tolerancing of optical systems

**Recent Research Projects** Multi-model tumor mapping systems, Handheld Enhanced Reflectance Confocal Microscopy for Neuropathy Screening

(585) 275-9819 [www.optics.rochester.edu/workgroups/zavislan/Mysite5/index.htm](http://www.optics.rochester.edu/workgroups/zavislan/Mysite5/index.htm)  
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