Workshop on Translatable Advances in Optics and Photonics

CELL-MET — ***A National Science Foundation Engineering Research Center***
Room 901, Photonics Center, October 11, 2018

Schedule

0830 – 0900: Check-in/Breakfast

0900 – 0915: Thomas Dudley
Welcome

0915 – 0945: Thomas Bifano
Overview of optics/photonics challenges in ERC

0945 – 1015: Jerome Mertz
Fast, volumetric imaging in thick tissue

1015 – 1045: Xue Han
Voltage imaging of heart cells with novel genetically encoded voltage indicators

1045 – 1100: BREAK

1100 – 1130: Jin He
Multifunctional nanopipette for multimode cell imaging and sensing

1130 – 1200: Irving Bigio
Birefringence microscopy for quantitative imaging of engineered tissue anisotropy

1200 – 1230: Ji Xin Cheng & Jeroen Eyckmans
Label-free imaging of gap closure in engineered 3D microtissues

1230 – 1330 Working LUNCH

Tom Dudley, Team Leader, Industry Liaison – CELL–MET, Boston University,
8 Saint Mary's Street, Boston, MA 02215, Tjdudley@bu.edu, (617) 358-4924

Thomas Bifano

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Phone (617) 353-8908
Website Thomas Bifano

Professor (ME, MSE, BME)
Director, Photonics Center

Education

Ph.D., North Carolina State University

Additional Affiliations

Division of Materials Science & Engineering

Areas of Interest

Deformable Mirrors * Microelectromechanical Systems (MEMS) * Adaptive Optics
* Biphotonic Microscopy * Astronomical Telescope Instrumentation * Laser Wavefront Control

Research Areas

Dr. Bifano directs the Boston University Photonics Center (BUPC), a core facility and academic center of excellence comprised of thirty-five faculty members from seven academic departments, eighty graduate students, and ten staff members. He leads BUPC programs for education, scholarly research and development of advanced photonic device prototypes for commercial and military applications. He manages a state-of-the-art facility that includes more than a dozen special-purpose and shared research laboratories and a large business incubator.

Dr. Bifano also serves as a Professor of Mechanical Engineering, and was Chair of the Manufacturing Engineering Department from 1999-2006. His research focuses on modeling, design, production, and use of micro-electro-mechanical systems (MEMS) in optical applications.

Jerome C. Mertz, Ph.D.

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Phone (617) 358-0746
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Website Biomicroscopy Lab

Professor (BME, ECE)

Primary Appointment

Biomedical Engineering Department

Education

Ph.D., Physics, Université Paris VI & UC, Santa Barbara

B.A., Physics, Princeton University

Additional Affiliations

Department of Electrical and Computer Engineering

Neurophotonics Center

Photonics Center

Areas of Interest

Development and applications of novel optical microscopy techniques for biological imaging.

Xue Han, Ph.D.

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Phone (617) 358-6189
Website Han Lab

Associate Professor, (BME)

Primary Appointment

Associate Professor, Biomedical Engineering

Education

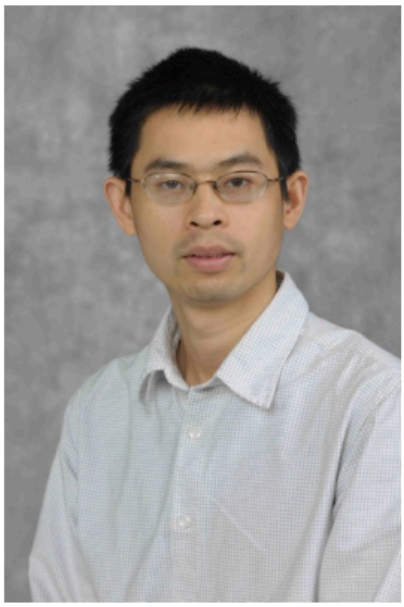
Ph.D. Physiology, University of Wisconsin-Madison
B.S. Biophysics, Beijing University, China

Areas of Interest

Neurotechnology, optical neural modulation, optogenetics, neural prosthetics, neural network dynamics, brain rhythms, neurological and psychiatric diseases, cognition.

Research Areas

Brain disorders represent the biggest unmet medical need, with many disorders being untreatable, and most treatments presenting serious side effects. Accordingly, we are discovering design principles for novel neuromodulation therapies. We invent and apply a variety of genetic, molecular, pharmacological, optical, and electrical tools to correct neural circuits that go awry within the brain. As an example, we have pioneered several technologies for silencing specific cells in the brain using pulses of light. We have also recently participated the first pre-clinical testing of a novel neurotechnology, optical neural modulation. Using these novel neurotechnologies and classical ones such as deep brain stimulation (DBS), we modulate the function of neural circuits to establish causal links between neural dynamics and behavioral phenomena (e.g., movement, attention, memory, and decision making). One of our current interests is the investigation of how neural synchrony arises within and across brain regions, and how synchronous activity contributes to normal cognition and pathology.



Jin He

Title: Associate Professor

Office: CP 227

Phone: 305-348-4376

Email: jinhe@fiu.edu

Specialty: Biophysics

Curriculum Vitae

Department(s): Physics, Biomolecular Sciences Institute

Education

- B.S. in Physics, Fudan University, Shanghai, China
- Ph.D. in Biophysics, Arizona State University, Tempe, USAff

Research Areas

- Single molecule cellular biophysics
- Nano bio technology
- Molecular electronics
- Instrument development

For more information, please view my Website

Awards

NSF Career

Irving Bigio, Ph.D.

Office ERO 233
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Phone (617) 358-1987
Website Biomedical Optics Laboratory

Professor (BME, ECE)

Primary Appointment
Department of Biomedical Engineering

Education
PhD, University of Michigan, 1974

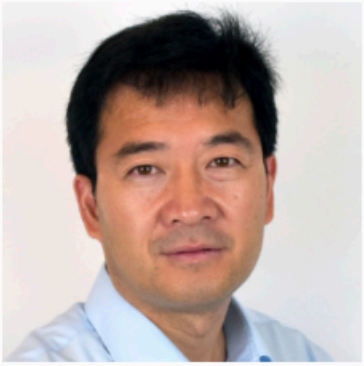
Additional Affiliations
Department of Electrical and Computer Engineering
Neurophotonics Center
Photonics Center
Director of Graduate Admissions, Biomedical Engineering

Honors and Awards
Fellow: Optical Society of America, American Society for Lasers In Medicine and Surgery, American Institute for Medical & Biological Engineering
2007 Faculty Service Award
Associate Editor, Journal of Biomedical Optics
Associate Editor, Lasers in the Life Sciences
Invited Nominator, 2007 Nobel Prize in Physics
Distinguished Lecturer Award, Boston University College of Engineering (2010)

Classes Taught
EK130 Introduction to Engineering
BE491 Engineering Physiology Laboratory I
BE492 Engineering Physiology Laboratory II
BE465/466 Senior Design Project
EC/BE765 Biomedical Optics and Biophotonics

Areas of Interest
Medical application of optics lasers, and spectroscopy
Biophotonics
Nonlinear optics
Applied spectroscopy
Laser physics

Ji-Xin Cheng, Ph.D.



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Website Cheng Group

Professor (ECE, BME)

Primary Appointment

Department of Electrical and Computer Engineering/Biomedical Engineering

Education

PhD, University of Science and Technology of China, 1998

Additional Affiliations

Department of Chemistry
Department of Physics
Neurophotonics Center
Photonics Center

Honors and Awards

Moustakas Chair Professor in Photonics and Optoelectronics, Boston University
Purdue University College of Engineering Research Excellence Award, 2016
Craver Award from Coblentz Society, 2015
Chang-Jiang Scholar, Minister of Education, China, 2015-17
Fellow of AIMBE (American Institute of Medicine and Biological Engineering), 2014
Translational Research Award from International Society for Optics and Photonics (SPIE), 2014

Areas of Interest

Molecular spectroscopic imaging technologies
Label-free microscopy
Medical Photonics
Neurophotonics
Cancer metabolism
Photonics for infectious diseases

Jeroen Eyckmans, PhD

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Phone (617) 358 6258

Research Assistant Professor, Biomedical Engineering

Primary Appointment

Research Assistant Professor, Biomedical Engineering

Education

Ph.D. Medical Sciences, KULeuven, Leuven, Belgium
M.S. Physical Education and Kinesiology, Leuven, Belgium

Areas of Interest

Tissue repair and regeneration, wound healing biomechanics, biomimetic tissue-on-chip models, skeletal organoid biology, reverse tissue engineering, fibrosis.

Research Areas

Prof. Eyckmans's research program aims to understands the mechanical and biochemical mechanisms that drive tissue repair (scarring) versus tissue regeneration in response to injury. Through an interdisciplinary approach combining microfabrication, nanotechnology and molecular biology, his group develops novel biomimetic models to study wound closure and extracellular matrix remodeling of soft (skin, tendon, ligament) and mineralized (bone, teeth) tissues. Ultimately, the goal is to harness tissue repair and regeneration mechanisms to rationally design targeted tissue engineering strategies for the healing of musculoskeletal tissues after injury.