IS&T International Symposium on Electronic Imaging (EI 2023)

Computational Imaging XXI

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Computational Imaging XXI

MONDAY 16 JANUARY 2023

KEYNOTE: Neutron Imaging Beyond Traditional Radiography (M1)
Session Chairs: Alexander Long, Los Alamos National Laboratory (United States) and Sven Vogel, Los Alamos National Laboratory (United States)
8:45 – 10:20 AM
Market Street

8:45
Conference Welcome

8:50 N/A
KEYNOTE: Advanced neutron imaging, *Markus Strobl, Paul Scherrer Institut (PSI) (Switzerland)*

Prof. Dr. Markus Strobl is the leader of the Applied Materials group at the Paul Scherrer Institute (PSI) of Switzerland. The Applied Materials Group (AMG) is a group within the Laboratory for Neutron Scattering and Imaging LNS, in the division research with Neutrons and Muons NUM of PSI. AMG is operating 2 dedicated neutron imaging facilities and the neutron strain scanner (diffractometer) POLDI for users from scientific institutions and industry. AMG also provides complementary x-ray imaging (in-situ bi-modal) and has dedicated beamtimes for imaging studies at the test beamline BOA providing an intense cold polarized neutron beam. Strobl has over 230 publications in the field.

9:20 N/A
Material decomposition in neutron time-of-flight radiography, *Thilo Balke[1], Alexander M. Long[2], Sven C. Vogel[2], Brendt Wohlberg[2], and Charles A. Bouman[1]; [1]Purdue University and [2]Los Alamos National Laboratory (United States)*

9:40 N/A
Artificial intelligence-driven hyperspectral neutron computed tomography (HSnCT) systems, *Shimin Tang[1], Diyu Yang[2], Mohammad S. Chowdhury[2], Singanallur Venkatakrishnan[1], Hassina Z. Bilheux[1], Charles A. Bouman[2], Gregery T. Buzzard[2], Jean-Christophe Bilheux[1], George J. Nelson[3], Maria Cekanova[4], and Ray Gregory[1]; [1]Oak Ridge National Laboratory, [2]Purdue University, [3]University of Alabama in Huntsville, and [4]Integrity Laboratories (United States)*

10:00 N/A
Enabling turnkey multiscale imaging/tomography of advanced materials with powerful and intuitive software, *Adrian Brügger, Columbia University (United States)*

Neutron Imaging Beyond Traditional Radiography (M2)

Session Chairs: Alexander Long, Los Alamos National Laboratory (United States) and Sven Vogel, Los Alamos National Laboratory (United States)
10:50 AM – 12:30 PM
Market Street

10:50 N/A
Characterization of irradiated nuclear transmutation fuel with neutron resonance imaging at LANSCE, *Sven C. Vogel[1], Thilo Balke[1], Charles A. Bouman[2], Luca Capriotti[3], Jason M. Harp[4], Alexander M. Long[1], and Brendt Wohlberg[1]; [1]Los Alamos National Laboratory, [2]Purdue University, [3]Idaho National Laboratory, and [4]Oak Ridge National Laboratory (United States)*

11:10 N/A
Advanced neutron imaging techniques at FRM II, *Adrian Losko[1], Richi Kumar[2], Alexander M. Long[3], Tobias Neuwirth[1], Simon Sebold[1], Lucas Sommer[1], Anton Tremsin[4], Sven C. Vogel[3], Alexander Wolfertz[1], and Michael Schulz[1]; [1]Technical University Munich (Germany), [2]Helmholtz-Zentrum Hereon GmbH (Germany), [3]Los Alamos National Laboratory (United States), and [4]University of California, Berkeley (United States)*

11:30 N/A
Assessment of imaging properties of scintillators at FP60R for neutron imaging applications, *Showera H. Haque, Stuart Miller, Stuart Baker, Katherine Walters, and Jesus Castaneda, Nevada National Security Site (United States)*

11:50 N/A
In-situ thermal neutron imaging of roots in soil at LSU Pennington Lab, *Les Butler[1], Kyungmin Ham[1], J. Theodore Cremer[2], Randall Urdahl[2], Eugene Guan[2], Craig Brown[2], Allan Chen[2], Charles Gary[2], Michael Vincent[3], and Charles Hartman[3]; [1]Louisiana State University, [2]Adelphi Technology, Inc., and [3]Refined Imaging LLC (United States)*

12:10 N/A
LSU and MIT reactor collaboration - Simultaneous X-ray/neutron imaging for energy, materials, and ecosystem applications, *Les Butler[1], Gerald Schneider[1], Markus Bleuel[2], Navid Jafari[1], Shengmin Guo[1], Joyoni Dey[1], Boris Khaykovich[3], and J. Theodore Cremer[4]; [1]Louisiana State University, [2]National Institute of Science and Technology (NIST), [3]Massachusetts Institute of Technology, and [4]Adelphi Technology, Inc (United States)*

Monday 16 January PLENARY: Neural Operators for Solving PDEs

Session Chair: Robin Jenkin, NVIDIA Corporation (United States)
2:00 PM – 3:00 PM
Cyril Magnin I/II/III

Deep learning surrogate models have shown promise in modeling complex physical phenomena such as fluid flows, molecular dynamics, and material properties. However, standard neural networks assume finite-dimensional inputs and outputs, and hence, cannot withstand a change in resolution or discretization between training and testing. We introduce Fourier neural operators that can learn operators, which are mappings between infinite dimensional spaces. They are independent of the resolution or grid of training data and allow for zero-shot generalization to higher resolution evaluations. When applied to weather forecasting, neural operators capture fine-scale phenomena and have similar skill as gold-standard numerical weather models for predictions up to a week or longer, while being 4-5 orders of magnitude faster.

Anima Anandkumar, Bren professor, California Institute of Technology, and senior director of AI Research, NVIDIA Corporation (United States)

Anima Anandkumar is a Bren Professor at Caltech and Senior Director of AI Research at NVIDIA. She is passionate about designing principled AI algorithms and applying them to interdisciplinary domains. She has received several honors such as the IEEE fellowship, Alfred. P. Sloan Fellowship, NSF Career Award, and Faculty Fellowships from Microsoft, Google, Facebook, and Adobe. She is part of the World Economic Forum's Expert Network. Anandkumar received her BTech from Indian Institute of Technology Madras, her PhD from Cornell University, and did her postdoctoral research at MIT and assistant professorship at University of California Irvine.

KEYNOTE: Computational Imaging using Fourier Ptychography and Phase Retrieval (M3)

Session Chairs: Tony Allen, Purdue University (United States) and Andre Van Rynbach, U.S. Air Force (United States)
3:30 – 4:50 PM
Market Street

3:30 N/A
KEYNOTE: Computational phase imaging, *Laura Waller, University of California, Berkeley (United States)*

Laura Waller leads the Computational Imaging Lab, which develops new methods for optical imaging, with optics and computational algorithms designed jointly. She holds the Ted Van Duzer Endowed Professorship and is a Senior Fellow at the Berkeley Institute of Data Science (BIDS), with affiliations in Bioengineering and Applied Sciences & Technology. Laura was a Postdoctoral Researcher and Lecturer of Physics at Princeton University from 2010-2012 and received BS, MEng and PhD degrees from MIT in 2004, 2005 and 2010, respectively. She is a Moore Foundation Data-Driven Investigator, Bakar fellow, Distinguished Graduate Student Mentoring awardee, NSF CAREER awardee, Chan-Zuckerberg Biohub Investigator, SPIE Early Career Achievement Awardee and Packard Fellow.

4:10 N/A
I can see clearly now: Sub-diffraction limit synthetic aperture lidar, *Tony G. Allen[1,2], David J. Rabb[2], Gregery T. Buzzard[1], and Charles A. Bouman[1]; [1]Purdue University and [2]Air Force Research Laboratory (United States)*

4:30 N/A
The role of phase retrieval for imaging and beam forming through turbulence, *Timothy J. Schulz[1] and David J. Brady[2]; [1]Michigan Technological University and [2]The University of Arizona (United States)*

EI 2023 Highlights Session
Session Chair: Robin Jenkin, NVIDIA Corporation (United States)
3:30 – 5:00 PM
Cyril Magnin II

Join us for a session that celebrates the breadth of what EI has to offer with short papers selected from EI conferences.

NOTE: The EI-wide "EI 2023 Highlights" session is concurrent with Monday afternoon COIMG, COLOR, IMAGE, and IQSP conference sessions.

N/A
Evaluation of image quality metrics designed for DRI tasks with automotive cameras, *Valentine Klein, Yiqi LI, Claudio Greco, Laurent Chanas, and Frédéric Guichard, DXOMARK (France)*

N/A
Human performance using stereo 3D in a helmet mounted display and association with individual stereo acuity, *Bonnie Posselt, RAF Centre of Aviation Medicine (United Kingdom)*

N/A
Smartphone-enabled point-of-care blood hemoglobin testing with color accuracy-assisted spectral learning, *Sang Mok Park[1], Yuhyun Ji[1], Semin Kwon[1], Andrew R. O'Brien[2], Ying Wang[2], and Young L. Kim[1]; [1]Purdue University and [2]Indiana University School of Medicine (United States)*

N/A
Designing scenes to quantify the performance of automotive perception systems, *Zhenyi Liu[1], Devesh Shah[2], Alireza Rahimpour[2], Joyce Farrell[1], and Brian Wandell[1]; [1]Stanford University and [2]Ford Motor Company (United States)*

N/A
Visualizing and monitoring the process of injection molding, *Christian A. Steinparz[1], Thomas Mitterlehner[2], Bernhard Praher[2], Klaus Straka[1,2], Holger Stitz[1,3], and Marc Streit[1,3]; [1]Johannes Kepler University, [2]Moldsonics GmbH, and [3]datavisyn GmbH (Austria)*

N/A
Commissioning the James Webb Space Telescope, *Joseph M. Howard, NASA Goddard Space Flight Center (United States)*

N/A

Critical flicker frequency (CFF) at high luminance levels, *Alexandre Chapiro[1], Nathan Matsuda[1], Maliha Ashraf[2], and Rafal Mantiuk[3]; [1]Meta (United States), [2]University of Liverpool (United Kingdom), and [3]University of Cambridge (United Kingdom)*

N/A

Physics guided machine learning for image-based material decomposition of tissues from simulated breast models with calcifications, *Muralikrishnan Gopalakrishnan Meena[1], Amir K. Ziabari[1], Singanallur Venkatakrishnan[1], Isaac R. Lyngaas[1], Matthew R. Norman[1], Balint Joo[1], Thomas L. Beck[1], Charles A. Bouman[2], Anuj Kapadia[1], and Xiao Wang[1]; [1]Oak Ridge National Laboratory and [2]Purdue University (United States)*

N/A

Layered view synthesis for general images, *Loïc Dehan, Wiebe Van Ranst, and Patrick Vandewalle, Katholieke University Leuven (Belgium)*

N/A

A self-powered asynchronous image sensor with independent in-pixel harvesting and sensing operations, *Ruben Gomez-Merchan, Juan Antonio Leñero-Bardallo, and Ángel Rodríguez-Vázquez, University of Seville (Spain)*

N/A

Color blindness and modern board games, *Alessandro Rizzi[1] and Matteo Sassi[2]; [1]Università degli Studi di Milano and [2]consultant (Italy)*

TUESDAY 17 JANUARY 2023

Neutron Imaging Beyond Traditional Radiography (T1)
Session Chairs: Alexander Long, Los Alamos National Laboratory (United States) and Sven Vogel, Los Alamos National Laboratory (United States)
8:50 – 10:10 AM
Market Street

8:50 N/A

Neutron Bragg-edge/dip imaging with least squares method and machine learning, *Hirotaka Sato, Hokkaido University (Japan)*

9:10 N/A

Event mode data collection for neutron imaging applications, *Adrian Losko[1], Jason Gochanour[2], Alex Gustschin[1], Yiyong Han[1], Alexander M. Long[2], Manuel Morgano[3], Michael Schulz[1], Anton Tremsin[4], Sven C. Vogel[2], and Alexander Wolfertz[1]; [1]Technical University Munich (Germany), [2]Los Alamos National Laboratory (United States), [3]European Spallation Source (Sweden), and [4]University of California, Berkeley (United States)*

9:30 N/A

Recent developments on diffraction-based and polarized neutron imaging modalities, *Søren Schmidt[1], Patrick Tung[2], Stavros Samothrakitis[3], Camilla B. Larsen[3], Markus Strobl[3], Luise T. Kuhn[4], Ryoji Kiyanagi[5], and Takenao Shinohara[5]; [1]European Spallation Source ERIC (Sweden), [2]University of New South Wales (Australia), [3]Paul Scherrer Institute (Switzerland), [4]Technical University of Denmark (Denmark), and [5]Japan Proton Accelerator Research Complex (J-PARC) Center (Japan)*

Neutron Imaging Beyond Traditional Radiography (T2)

Session Chairs: Alexander Long, Los Alamos National Laboratory (United States) and Sven Vogel, Los Alamos National Laboratory (United States)
10:50 – 11:50 AM
Market Street

10:50 N/A

Strain tomography using neutrons, *Christopher M. Wensrich[1], Alexander W. Gregg[1], Johannes N. Hendriks[1], Anton Tremsin[2], Adrian Wills[1], Takenao Shinohara[3], Oliver Kirstein[1], Vladimir Luzin[1], and Erich H. Kisi[1]; [1]University of Newcastle (Australia), [2]University of California, Berkeley (United States), and [3]Japan Proton Accelerator Research Complex (J-PARC) Center (Japan)*

11:10 N/A

Data processing for non-destructive studies of material properties through energy resolved neutron imaging, *Anton Tremsin[1], Winfried Kockelmann[2], Daniel Pooley[2], Saurabh Kabra[2], Takenao Shinohara[3], Kenichi Oikawa[3], Hassina Z. Bilheux[4], Jean-Christophe Bilheux[4], Adrian Losko[5], Sven C. Vogel[6], Alexander M. Long[6], John Rakovan[7], Christopher M. Wensrich[8], Florencia Malamud[9], Markus Strobl[9], and Javier Santisteban[10]; [1]University of California, Berkeley (United States), [2]STFC-Rutherford Appleton Laboratory (United Kingdom), [3]Japan Proton Accelerator Research Complex (J-PARC) Center (Japan), [4]Oak Ridge National Laboratory (United States), [5]Forschungs-Neutronenquelle Heinz Maier-Leibnitz (Germany), [6]Los Alamos National Laboratory (United States), [7]Miami University (United States), [8]University of Newcastle (Australia), [9]Paul Scherrer Institut (PSI) (Switzerland), and [10]Comisión Nacional de Energía Atómica CNEA/CONICET (Argentina)*

11:30 N/A

Neutron imaging at LANSCE: Characterizing materials for the next generation of nuclear reactor designs, *Alexander M. Long, Sven C. Vogel, James Torres, D. Travis Carver, S. Scott Parker, Marisa Monreal, J. Matthew Jackson, Holly Trellue, Aditya Shivprasad, Caitlin Taylor, and Erik Luther, Los Alamos National Laboratory (United States)*

Tuesday 17 January PLENARY: Embedded Gain Maps for Adaptive Display of High Dynamic Range Images

Session Chair: Robin Jenkin, NVIDIA Corporation (United States)
2:00 PM – 3:00 PM
Cyril Magnin I/II/III

Images optimized for High Dynamic Range (HDR) displays have brighter highlights and more detailed shadows, resulting in an increased sense of realism and greater impact. However, a major issue with HDR content is the lack of consistency in appearance across different devices and viewing environments. There are several reasons, including varying capabilities of HDR displays and the different tone mapping methods implemented across software and platforms. Consequently, HDR content authors can neither control nor predict how their images will appear in other apps.

We present a flexible system that provides consistent and adaptive display of HDR images. Conceptually, the method combines both SDR and HDR renditions within a single image and interpolates between the two dynamically at display time. We compute a Gain Map that represents the difference between the two renditions. In the file, we store a Base rendition (either SDR or HDR), the Gain Map, and some associated metadata. At display time, we combine the Base image with a scaled version of the Gain Map, where the scale factor depends on the image metadata, the HDR capacity of the display, and the viewing environment.

Eric Chan, Fellow, Adobe Inc. (United States)

Eric Chan is a Fellow at Adobe, where he develops software for editing photographs. Current projects include Photoshop, Lightroom, Camera Raw, and Digital Negative (DNG). When not writing software, Chan enjoys spending time at his other keyboard, the piano. He is an enthusiastic nature photographer and often combines his photo activities with travel and hiking.

Paul M. Hubel, director of Image Quality in Software Engineering, Apple Inc. (United States)

Paul M. Hubel is director of Image Quality in Software Engineering at Apple. He has worked on computational photography and image quality of photographic systems for many years on all aspects of the imaging chain, particularly for iPhone. He trained in optical engineering at University of Rochester, Oxford University, and MIT, and has more than 50 patents on color imaging and camera technology. Hubel is active on the ISO-TC42 committee Digital Photography, where this work is under discussion, and is currently a VP on the IS&T Board. Outside work he enjoys photography, travel, cycling, coffee roasting, and plays trumpet in several bay area ensembles.

Computational Imaging using Fourier Ptychography and Phase Retrieval (T3)

Session Chairs: Tony Allen, Purdue University (United States) and Andre Van Rynbach, U.S. Air Force (United States)
3:30 – 5:30 PM
Market Street

3:30 N/A
Scatter ptychography, *David J. Brady, The University of Arizona (United States)*

3:50 N/A
Diffractive optical networks & computational imaging without a computer, *Aydogan Ozcan, UCLA (United States)*

4:10 N/A
Computational microscopy of scattering samples, *Shwetadwip Chowdhury, University of Texas at Austin (United States)*

4:30 COIMG-153
Practical phase retrieval using double deep image priors, *Zhong Zhuang[1], David Yang[2], Felix Hofmann[2], David Barmherzig[3], and Ju Sun[1]; [1]University of Minnesota, Twin Cities (United States), [2]University of Oxford (United Kingdom), and [3]Flatiron Institute (United States)*

4:50 N/A
Synthetic wavelength imaging - Exploiting spectral diversity for absolute phase measurements through scattering scenes, *Florian Willomitzer, University of Arizona (United States)*

5:10 N/A
Commissioning the James Webb Space Telescope, *Joseph M. Howard, NASA Goddard Space Flight Center (United States)*

WEDNESDAY 18 JANUARY 2023

KEYNOTE: Processing at the Edge (W1) Joint Session

Session Chairs: Stanley Chan, Purdue University (United States) and Boyd Fowler, OmniVision Technologies (United States)
8:45 – 10:20 AM
Market Street

This session is jointly sponsored by: Computational Imaging XXI, Imaging Sensors and Systems 2023, and the International Image Sensor Society (IISS).

8:45
COIMG/ISS Joint Sessions Welcome

8:50 N/A
KEYNOTE: Deep optics: Learning cameras and optical computing systems, *Gordon Wetzstein, Stanford University (United States)*

Gordon Wetzstein is an Associate Professor of Electrical Engineering and, by courtesy, of Computer Science at Stanford University. He is the leader of the Stanford Computational Imaging Lab and a faculty co-director of the Stanford Center for Image Systems Engineering. At the intersection of computer graphics and vision, artificial intelligence, computational optics, and applied vision science, Prof. Wetzstein's research has a wide range of applications in next-generation imaging, wearable computing, and neural rendering systems. Prof. Wetzstein is a Fellow of Optica and the recipient of numerous awards, including an NSF CAREER Award, an Alfred P. Sloan Fellowship, an ACM SIGGRAPH Significant New Researcher Award, a Presidential Early Career Award for Scientists and Engineers (PECASE), an SPIE Early Career Achievement Award, an Electronic Imaging Scientist of the Year Award, an Alain Fournier Ph.D. Dissertation Award as well as many Best Paper and Demo Awards.

9:40 N/A
Computational photography on a smartphone, *Michael Polley, Samsung Research America (United States)*

10:00 N/A
Analog in-memory computing with multilevel RRAM for edge electronic imaging application, *Glenn Ge, Teramem Inc. (United States)*

Processing at the Edge (W2.1) Joint Session

Session Chairs: Stanley Chan, Purdue University (United States) and Boyd Fowler, OmniVision Technologies (United States)
10:50 – 11:50 AM
Market Street

This session is jointly sponsored by: Computational Imaging XXI, Imaging Sensors and Systems 2023, and the International Image Sensor Society (IISS).

10:50 N/A
Processing of real time, bursty and high compute iToF data on the edge (Invited), *Cyrus Bamji, Microsoft Corporation (United States)*

11:10 N/A
A distributed on-sensor compute system in AR/VR devices and neural architecture search (NAS) framework for optimal workload distribution (Invited), *Chiao Liu[1], Xin Dong[2], Ziyun Li[1], Barbara De Salvo[3], and H. T. Kung[2]; [1]Reality Labs, [2]Harvard University, and [3]Meta (United States)*

11:30 N/A
A 2.2um three-wafer stacked back side illuminated voltage domain global shutter CMOS image sensor, *Shimpei Fukuoka, OmniVision (Japan)*

HDR Imaging / Reflection Removal (W2.2)

Session Chair: Gregery Buzzard, Purdue University (United States)
11:50 AM – 12:30 PM
Market Street

11:50 COIMG-156
A lightweight exposure bracketing strategy for HDR imaging without access to camera raw, *Jieyu Li[1], Ruiwen Zhen[2], and Robert L. Stevenson[1]; [1]University of Notre Dame and [2]SenseBrain Technology (United States)*

12:10 COIMG-157
Sparse x-ray phase contrast dark field tomography, *Johnathan Mulcahy-Stanislawczyk and Amber L. Dagel, Sandia National Laboratories (United States)*

Wednesday 18 January PLENARY: Bringing Vision Science to Electronic Imaging: The Pyramid of Visibility
Session Chair: Andreas Savakis, Rochester Institute of Technology (United States)
2:00 PM – 3:00 PM
Cyril Magnin I/II/III

Electronic imaging depends fundamentally on the capabilities and limitations of human vision. The challenge for the vision scientist is to describe these limitations to the engineer in a comprehensive, computable, and elegant formulation. Primary among these limitations are visibility of variations in light intensity over space and time, of variations in color over space and time, and of all of these patterns with position in the visual field. Lastly, we must describe how all these sensitivities vary with adapting light level. We have recently developed a structural description of human visual sensitivity that we call the Pyramid of Visibility, that accomplishes this synthesis. This talk shows how this structure accommodates all the dimensions described above, and how it can be used to solve a wide variety of problems in display engineering.

Andrew B. Watson, chief vision scientist, Apple Inc. (United States)

Andrew Watson is Chief Vision Scientist at Apple, where he leads the application of vision science to technologies, applications, and displays. His research focuses on computational models of early vision. He is the author of more than 100 scientific papers and 8 patents. He has 21,180 citations and an h-index of 63. Watson founded the Journal of Vision, and served as editor-in-chief 2001-2013 and 2018-2022. Watson has received numerous awards including the Presidential Rank Award from the President of the United States.

Imaging with Coded Apertures (W3)
Session Chair: Xiaogang Yang, Brookhaven National Laboratory (United States)
3:30 – 5:30 PM
Market Street

3:30 N/A
X-ray phase contrast imaging using apertures: From proof-of-concept experiments at synchrotrons to pre-commercial prototypes with conventional sources, *Alessandro Olivo, University College London (United Kingdom)*

3:50 N/A
Deep regularization functions for coded-aperture design in computational imaging, *Roman Jacome, Emmanuel Martinez, Jorge Bacca, and Henry Arguello Fuentes, Universidad Industrial de Santander (Colombia)*

4:10 N/A
CodEx: A modular framework for joint temporal de-blurring and tomographic reconstruction, *Soumendu Majee[1], Selin Aslan[2], Doga Gursoy[2], and Charles A. Bouman[3]; [1]Samsung Research America, [2]Argonne National Laboratory, and [3]Purdue University (United States)*

4:30 N/A
First use of coded-apertures for depth-resolved Laue diffraction, *Doga Gursoy, Dina Sheyfer, Michael J. Wojcik, Wenjun Liu, and Jon Tischler, Argonne National Laboratory (United States)*

4:50 N/A
Deep learning image reconstruction for Laue microdiffraction with coded-apertures, *Xiaogang Yang[1], Esther Tsai[1], and Doga Gursoy[2]; [1]Brookhaven National Laboratory and [2]Argonne National Laboratory (United States)*

5:10 N/A
Coded aperture fabrication for x-ray experiments at the Advanced Photon Source, *Michael J. Wojcik, Dina Sheyfer, Doga Gursoy, Jon Tischler, Ralu Divan, and David Czaplewski, Argonne National Laboratory Advanced Photon Source (United States)*

Computational Imaging XXI Interactive (Poster) Paper Session

5:30 – 7:00 PM
Cyril Magnin Foyer

The following work will be presented at the EI 2023 Symposium Interactive (Poster) Paper Session.

N/A
Spectral recovery in a photograph with a hyperspectral color chart, *Semin Kwon, Sang Mok Park, Yuhyun Ji, Jungwoo Leem, and Young L. Kim, Purdue University (United States)*

PANEL: Next Generation Imaging-on-a-Chip Tech-Mixer Discussion (W4)
Hosts: Charles Bouman, Purdue University (United States) and Gregery Buzzard, Purdue University (United States)
Panelists: Stanley Chan, Purdue University (United States); Eiichi Funatsu, OmniVision Technologies, Inc. (United States); Sergio Goma, Qualcomm Inc. (United States); Michael Polley, Samsung Research America (United States); and Anton Tremsin, University of California, Berkeley (United States)
6:00 – 7:00 PM
Market Street

The need to both increase imaging capabilities and reduce cost is driving the need for extreme integration of sensing and processing. For example, in the future, analog sensors will be integrated with associated digital processing using methods such as 3D IC stacking. The function of this panel will be to facilitate discussions in the community on the future of imaging-on-a-chip solutions. What problems will these integrated imaging systems be uniquely suited to solve? How can the tight coupling of sensors and hardware be used to enhance capabilities and reduce cost? What should our community be doing to both enhance and exploit this emerging technology? Refreshments included, beer, wine, and snacks!

THURSDAY 19 JANUARY 2023

Computational Imaging Topics (R1)

Session Chair: Charles Bouman, Purdue University (United States)
8:50 – 10:10 AM
Market Street

8:50 N/A
Generative Adversarial Linear Discriminant Analysis (GALDA) for spectroscopy classification and imaging, *Ziyi Cao, Shijie Zhang, Youlin Liu, Casey Smith, Alex Sherman, and Garth Simpson, Purdue University (United States)*

9:10 N/A
Multi-agent consensus equilibrium (MACE) in electronic structure calculations, *Jiayue Rong, Lyudmila Slipchenko, Charles A. Bouman, Gregery T. Buzzard, and Garth Simpson, Purdue University (United States)*

9:30 N/A
Instrumentation and software development for parts-per-million characterization of pharmaceutical crystal forms using AF-PTIR microscopy, *Aleksandr Razumtcev, Minghe Li, and Garth Simpson, Purdue University (United States)*

9:50 COIMG-168
Multivariate curve resolution with autoencoders for CARS microspectroscopy, *Damien Boildieu[1,2], David Helbert[2], Amandine Magnaudeix[3], Philippe Leproux[1], and Philippe Carré[2]; [1]XLIM, UMR CNRS 7252, University of Limoges, [2]XLIM, UMR CNRS 7252, University of Poitiers, and [3]IRCER, UMR CNRS 7315, University of Limoges (France)*

Computational Imaging Topics (R2)
Session Chair: Charles Bouman, Purdue University (United States)
10:50 AM – 12:30 PM
Market Street

10:50 COIMG-169
BowTie Rasterization for extreme synthetic radiance image rendering, *Thomas L. Burnett, Justin Halter, and Justin Jensen, FoVI3D (United States)*

11:10 COIMG-170
Automatic parameter tuning for plug-and-play algorithms using generalized cross validation and Stein's unbiased risk estimation for linear inverse problems in computational imaging, *Canberk Ekmekci and Mujdat Cetin, University of Rochester (United States)*

11:30 COIMG-171
Ultrasound elasticity reconstruction with inaccurate forward model using integrated data-driven correction of data fidelity gradient, *Narges Mohammadi, Marvin M. Doyley, and Mujdat Cetin, University of Rochester (United States)*

11:50 COIMG-172
A globally optimal fast-iterative linear maximum likelihood classifier, *Prasanna Reddy Pulakurthi[1], Sohail A. Dianat[1], Majid Rabbani[1], Suya You[2], and Raghuveer M. Rao[2]; [1]Rochester Institute of Technology and [2]DEVCOM Army Research Laboratory (United States)*

12:10 COIMG-173
Multimodal contrastive learning for unsupervised video representation learning, *Anup Hiremath and Avideh Zakhor, University of California, Berkeley (United States)*

Computational Imaging Topics (R3)

Session Chair: Charles Bouman, Purdue University (United States)
2:00 – 2:40 PM
Market Street

2:00 N/A
Hyperspectral learning for mHealth hemodynamic imaging, *Yuhyun Ji, Sang Mok Park, Vidhya V. Nair, Yunjie Tong, and Young L. Kim, Purdue University (United States)*

2:20 N/A
Deep learning based image registration for 3D magnetic imaging at nanoscale, *Srutarshi Banerjee, Junjing Deng, Joerg Strempfer, and Doga Gursoy, Argonne National Laboratory Advanced Photon Source (United States)*