# Computational Imaging VI

*Conference Chairs:* **Charles A. Bouman,** Purdue Univ.; **Eric L. Miller,** Tufts Univ.; **Ilya Pollak,** Purdue Univ.

*Program Committee:* **Samit Basu,** GE Global Research; **Thomas S. Denney,** Auburn Univ.; **Peter C. Doerschuk,** Purdue Univ.; **Peyman Milanfar,** Univ. of California/Santa Cruz; **Joseph A. O'Sullivan,** Washington Univ. in St. Louis; **Zygmunt Pizlo,** Purdue Univ.; **Stanley J. Reeves,** Auburn Univ.; **Yongyi Yang,** Illinois Institute of Technology

*Cosponsored by:* **GE Healthcare**

## Monday 28 January

### SESSION 1

**Conv. Ctr. Room A4** . . . . . . . . . . . . . . . **Mon. 8:30 to 9:00 am**

#### Keynote Presentation I

Session Chair: **Charles A. Bouman,** Purdue Univ.

8:30 am: Fast acquisition and reconstruction in imaging enabled by sampling theory (Invited Paper), Yoram Bresler, Univ. of Illinois at Urbana-Champaign . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-01]

### SESSION 2

**Conv. Ctr. Room A4** . . . . . . . . . . . . . . . **Mon. 9:00 to 10:20 am**

#### Image Reconstruction I

Session Chair: **Eric L. Miller,** Tufts Univ.

9:00 am: **Regularized estimation of Stokes images from polarimetric measurements**, John R. Valenzuela, Jeffrey A. Fessler, Univ. of Michigan . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-02]

9:20 am: **Nonhomogeneous ICD optimization for targeted reconstruction of volumetric CT**, Zhou Yu, Purdue Univ.; Jean-Baptiste Thibault, GE Healthcare; Ken D. Sauer, Univ. of Notre Dame; Charles A. Bouman, Purdue Univ.; Jiang Hsieh, GE Healthcare . . . . . . . . . . [6814-03]

9:40 am: **Statistical reconstruction for muon tomography**, Jinyi Qi, Univ. of California/Davis . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-04]

10:00 am: **Fast and accurate scatter estimation**, Samit Basu, GE Global Research . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-05]

Coffee Break . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 10:20 to 10:50 am

### SESSION 3

**Conv. Ctr. Room A4** . . . . . . . . . . **Mon. 10:50 am to 12:10 pm**

#### Geometry-based Techniques in Image Analysis

Session Chair: **Mary L. Comer,** Purdue Univ.

10:50 am: **MCMC curve sampling and geometric conditional simulation**, Ayres Fan, John W. Fisher III, Jonathan A. Kane, Alan S. Willsky, Massachusetts Institute of Technology . . . . . . . . . . . . . . . . . . . . . [6814-06]

11:10 am: **Mixing geometric and radiometric features for change classification**, Alexandre M. Fournier, Xavier Descombes, Josiane B. Zerubia, INRIA Sophia Antipolis (France) . . . . . . . . . . . . . . . . . . . [6814-07]

11:30 am: **3D object recognition using fully intrinsic skeletal models**, Djamila Aouada, A. Hamid Krim, North Carolina State Univ. . . . . . . [6814-08]

11:50 am: **Looking at snake initialization as an inverse problem**, Bing Li, Scott T. Acton, Univ. of Virginia . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-09]

Lunch Break . . . . . . . . . . . . . . . . . . . . . . . . . . . 12:10 to 1:30 pm

### SESSION 4

**Conv. Ctr. Room A4** . . . . . . . . . . . . . . . **Mon. 1:30 to 3:10 pm**

#### Segmentation

Session Chair: **Charles A. Bouman,** Purdue Univ.

1:30 pm: **Segmentation of digital microscopy data for the analysis of defects and grain structure of materials**, Landis M. Huffman, Purdue Univ.; Jeff Simmons, Air Force Research Lab.; Ilya Pollak, Purdue Univ. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-10]

1:50 pm: **A new approach for joint estimation of magnitude, decay, and frequency from a single-shot MRI signal**, Weidong Tang, Stanley J. Reeves, Auburn Univ.; Donald B. Twieg, The Univ. of Alabama at Birmingham . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-11]

2:10 pm: **A novel image analysis method based on Bayesian segmentation for event-related functional MRI**, Lejian Huang, Mary L. Comer, Thomas M. Talavage, Purdue Univ. . . . . . . . . . . . . . . . . . [6814-12]

2:30 pm: **Volumetric fMRI data analysis using an iterative classification method**, Liang Liu, Kihwan Han, Thomas M. Talavage, Purdue Univ. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-13]

2:50 pm: **Rule-based fuzzy vector median filtering for 3D PCMRI segmentation**, Kartik Sundareswaran, Georgia Institute of Technology; David H. Frakes, 4-D Imaging, Inc.; Ajit P. Yoganathan, Georgia Institute of Technology . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-14]

Coffee Break . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 3:10 to 3:30 pm

### SESSION 5

**Conv. Ctr. Room A4** . . . . . . . . . . . . . . . **Mon. 3:30 to 5:50 pm**

#### Sparse Recovery and Compressed Sensing

Session Chair: **Ilya Pollak,** Purdue Univ.

3:30 pm: **Compressive imaging architectures**, Justin K. Romberg, California Institute of Technology . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-15]

3:50 pm: **Manifold models for compressive imaging**, Michael B. Wakin, Rice Univ. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-16]

4:10 pm: **Fundamental limits in the detection of sparse signals**, Jose A. Costa, California Institute of Technology . . . . . . . . . . . . . . . . . . . . [6814-17]

4:30 pm: **Greedy signal recovery and uncertainty principles**, Roman Vershynin, Deanna Needell, Univ. of California/Davis . . . . . . . . . . [6814-18]

4:50 pm: **Blind reconstruction of sparse images with unknown point spread function**, Raviv Raich, Oregon State Univ.; Alfred O. Hero III, Kyle Herrity, Univ. of Michigan . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-19]

5:10 pm: **Results in non-iterative MAP reconstruction for optical tomography**, Guangzhi Cao, Charles A. Bouman, Kevin J. Webb, Purdue Univ. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-40]

5:30 pm: **Sparse spectral unmixing**, Mark Davenport, Marco F. Duarte, Rice Univ.; Rebecca M. Willett, Duke Univ.; Richard G. Baraniuk, Rice Univ. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-20]

## Tuesday 29 January

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**Awards and Plenary Presentation . . Tues. 8:15 to 9:15 am**

**Digital Forensics**

**Hany Farid,** Dartmouth College
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### SESSION 6
**Conv. Ctr. Room A4** . . . . . . . . . . . . . . .**Tues. 9:30 to 10:00 am**

**Keynote Presentation II**

9:30 am: Stationary features and cat detection (Invited Paper, Presentation Only), Donald Geman, Johns Hopkins Univ. . . . . . . . . . . . . . . . . . [6814-21]

### SESSION 7
**Conv. Ctr. Room A4** . . . . . . . . . **Tues. 10:00 am to 12:20 pm**

**Image Analysis I**

Session Chair: **Paul Salama,** Indiana Univ.-Purdue Univ. at Indianapolis

10:00 am: **Learning image-fragment templates by maximum likelihood**, Wei Zhang, Stuart Geman, Brown Univ. . . . . . . . . . . . . . . . . . . . . [6814-22]

**Coffee Break**. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 10:20 to 10:40 am

10:40 am: **A generalization of non-local means via kernel regression**, Peyman Milanfar, Priyam Chatterjee, Univ. of California/Santa Cruz . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-23]

11:00 am: **Functional minimization problems in image processing**, Luminita A. Vese, Univ. of California/Los Angeles . . . . . . . . . . . . [6814-24]

11:20 am: **Clustering of target LADAR data on information manifold and by locality preserving projection**, Ping-Feng Chen, Hamid Krim, North Carolina State Univ. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-25]

11:40 am: **An new eigenvalue formulation of the problem of depth-from-motion**, Ji Zhang, Mireille Boutin, Daniel G. Aliaga, Purdue Univ. [6814-26]

12:00 pm: **3D shape: its unique place in visual perception**, Zygmunt Pizlo, Purdue Univ.. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-43]

**Lunch/Exhibition Break** . . . . . . . . . . . . . . . . . . . . . . . . 12:20 to 1:40 pm

### SESSION 8
**Conv. Ctr. Room A4** . . . . . . . . . . . . . . **Tues. 1:40 to 3:20 pm**

**Image Reconstruction II**

Session Chair: **Edward J. Delp,** Purdue Univ.

1:40 pm: **A least squares approach to estimating the probability distribution of unobserved data in multiphoton microscopy**, Paul Salama, Indiana Univ.-Purdue Univ. at Indianapolis . . . . . . . . . . [6814-27]

2:00 pm: **Progress in mesh based spatio-temporal reconstruction**, Jovan G. Brankov, Ricard Delgado, Yongyi Yang, Mingwu Jin, Miles N. Wernick, Illinois Institute of Technology. . . . . . . . . . . . . . . . . . . . . [6814-28]

2:20 pm: **Diode laser absorption tomography using data compression techniques**, Chad Lindstrom, Air Force Research Lab.; Ryan Givens, Air Force Institute of Technology; Chung-Jen Tam, Doug Davis, Skip Williams, Air Force Research Lab.. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-29]

2:40 pm: **3D macromolecule structure reconstruction from a single view electron micrograph by exploiting symmetry and sparsity**, Min Woo Kim, Jiyoung Choi, Jong Chul Ye, Korea Advanced Institute of Science and Technology (South Korea). . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-30]

3:00 pm: **Alternating minimization algorithm for quantitative differential-interference contrast (DIC) microscopy**, Joseph A. O'Sullivan, Washington Univ. in St. Louis; Chrysanthe Preza, The Univ. of Memphis. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-42]

**Coffee Break**. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 3:20 to 3:50 pm

### SESSION 9
**Conv. Ctr. Room A4** . . . . . . . . . . . . . . **Tues. 3:50 to 5:30 pm**

**Image Analysis II**

Session Chair: **Mireille Boutin,** Purdue Univ.

3:50 pm: **Image filter effectiveness characterization with taking into account HVS**, Vladimir V. Lukin, Nikolay N. Ponomarenko, Sergey S. Krivenko, National Aerospace Univ. (Ukraine); Jaakko T. Astola, Karen O. Egiazarian, Tampere Univ. of Technology (Finland) . . . . . . . . . . . [6814-31]

4:10 pm: **Mutual information based multimodal unbiased large deformation image registration**, Igor Yanovsky, Paul M. Thompson, Alex D. Leow, Univ. of California/Los Angeles. . . . . . . . . . . . . . . . . . . . [6814-32]

4:30 pm: **Technology-assisted dietary assessment**, Edward J. Delp III, David S. Ebert, Carol J. Boushey, Purdue Univ. . . . . . . . . . . . . . . [6814-33]

4:50 pm: **New methods for fMRI data processing based on locally near embeddings**, Imam Samil Yetik, Illinois Institute of Technology. . [6814-34]

5:10 pm: Online consistency checking for AM-FM target tracks, Chuong T. Nguyen, Nick Mould, Ngao D. Mamuya, Joseph P. Havlicek, Univ. of Oklahoma. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-35]

### Interactive Paper and Symposium Demonstration Session
**Conv. Ctr. Room A4** . . . . . . . . . . . . . . **Tues. 5:30 to 8:30 pm**

A symposium-wide demonstration session will be open to attendees 5:30 to 8:30 pm Tuesday evening in Room Exhibit Hall 1. Demonstrators will provide interactive, hands-on demonstrations of a wide-range of products related to Electronic Imaging.

**Posters** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 5:30 to 7:00 pm

*Posters will be placed on display after 9:00 am in Exhibit Hall 1. An interactive paper session, with authors present at their posters, will be held Tuesday evening, 5:30 to 7:00 pm.*

**Image mosaicking using local descriptor based on color invariants**, Dong-Chang Lee, Oh-Seol Kwon, Kyung-Woo Woo, Yeong-Ho Ha, Kyungpook National Univ. (South Korea). . . . . . . . . . . . . . . . . . . [6814-36]

**Inverse perspective transformation for video surveillance**, Theo E. Schouten, Radboud Univ. Nijmegen (Netherlands); Egon L. van den Broek, Univ. Twente (Netherlands) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . [6814-37]

**Illumination normalization for face recognition**, Ji Hoon Kim, Jong Geun Park, Chulhee Lee, Yonsei Univ. (South Korea). . . . . . . . . . . . . . . [6814-38]

**Audio-video synchronization management in embedded multimedia applications**, Hamood-Ur Rehman, The Univ. of Texas at Austin; Taehyun Kim, Freescale Semiconductor, Inc.; Niranjan Avadhanam, Novafora Inc.; Sridharan Subramanian, Freescale Semiconductor, Inc.. . . . . . . . [6814-41]