Conference 5674 • Conv. Ctr. Room A4

Monday-Tuesday 17-18 January 2005 • Proceedings of SPIE Vol. 5674

Computational Imaging III

Conference Chairs: **Charles A. Bouman**, Purdue Univ.; **Eric L. Miller**, Northeastern Univ.

Program Committee: **Thomas S. Denney, Jr.**, Auburn Univ.; **Peter Doerschuk**, Purdue Univ.; **Maya R. Gupta**, Univ. of Washington; **Peyman Milanfar**, Univ. of California/Santa Cruz; **Zygmunt Pizlo**, Purdue Univ.; **Stanley J. Reeves**, Auburn Univ.; **Yongyi Yang**, Illinois Institute of Technology; **Yibin Zheng**, Univ. of Virginia

Monday 17 January

SESSION 1

Conv. Ctr. Room A4 ..... Mon. 8:30 to 10:00 am

Inverse Problems

Chair: **Stanley J. Reeves**, Auburn Univ.

Keynote ..... 8:30 to 9:00 am

The boundary of x-ray and electron tomography *(Keynote Presentation,* Z. H. Levine, National Institute of Standards and Technology ..... [5674-01]

9:00 am: **Seismic image reconstruction using complex wavelets,** M. A. Miller, N. Kingsbury, Univ. of Cambridge (United Kingdom); R. Hobbs, Univ. of Durham (United Kingdom) ..... [5674-02]

9:20 am: **Electrical resistance tomography for real-time mapping of the solid-liquid interface in tanks containing optically opaque fluids,** A. Madupu, Florida International Univ. and Hemispheric Ctr. for Environmental Technology; A. Mazumdar, J. Zhang, D. Roelant, R. Srivastava, Florida International Univ. . [5674-03]

9:40 am: **Implementation and evaluation of the ultrasonic TOF tomography for the NDT of concrete structures,** J. Kwon, S. Choi, S. M. Song, Seoul National Univ. (South Korea) ..... [5674-04]

Coffee Break ..... 10:00 to 10:30 am

SESSION 2

Conv. Ctr. Room A4 .....Mon. 10:30 am to 12:10 pm

Tomography

Chair: **Yongyi Yang**, Illinois Institute of Technology

10:30 am: **Imaging of oscillatory behavior in event-related MEG studies,** D. Pantazis, R. M. Leahy, Univ. of Southern California ..... [5674-05]

10:50 am: **Domain decomposition methods for diffuse optical tomography,** K. Kwon, I. Son, M. Guven, B. Yazici, Rensselaer Polytechnic Institute ..... [5674-06]

11:10 am: **Robust uncertainty principles and exact signal reconstruction from highly incomplete frequency information,** E. Candes, J. K. Romberg, California Institute of Technology; T. Tao, Univ. of California/Los Angeles ..... [5674-07]

11:30 am: **Statistical image reconstruction with a noisy system model,** J. Qi, Lawrence Berkeley National Lab. ..... [5674-08]

11:50 am: **Exact 3D cone-beam reconstruction from two short-scans using a C-arm imaging system,** K. Ramamurthi, Johns Hopkins Univ.; N. Strobel, Stanford Univ. Medical Ctr. and Siemens Medical Solutions (Germany); J. L. Prince, Johns Hopkins Univ. and Stanford Univ. Medical Center ..... [5674-09]

Lunch Break ..... 12:10 to 1:40 pm

SESSION 3

Conv. Ctr. Room A4 ..... Mon. 1:40 to 4:30 pm

Image Analysis and Restoration

Chairs: **Peyman Milanfar**, Univ. of California/Santa Cruz; **Yibin Zheng**, Univ. of Virginia

1:40 pm: **Image registration in high-dimensional feature spaces,** A. O. Hero, H. Neemuchwala, Univ. of Michigan ..... [5674-10]

2:00 pm: **Prewarping techniques in imaging: applications in nanotechnology and biotechnology,** A. Poonawala, P. Milanfar, Univ. of California/Santa Cruz .. [5674-11]

2:20 pm: **Ray casting approach for boundary extraction and Fourier shape descriptor characterization,** J. Rosiene, Eastern Connecticut State Univ.; X. Liu, C. Imielinska, Columbia Univ. ..... [5674-12]

2:40 pm: **Fast Huber-Markov edge-preserving image restoration,** R. Pan, S. J. Reeves, Auburn Univ. ..... [5674-13]

Coffee Break ..... 3:00 to 3:30 pm

3:30 pm: **Efficient multiresolution algorithm for compensating density-dependent media blurring,** S. S. Saquib, W. T. Vetterling, Polaroid Corp. ..... [5674-14]

3:50 pm: **Adaptive filtering framework for local registration of multiple images,** G. Caner, W. Heinzelman, G. Sharma, Univ. of Rochester; A. M. Tekalp, Univ. of Rochester and Koc Univ. (Turkey) ..... [5674-15]

4:10 pm: **Multichannel image deblurring of raw color components,** M. Trimeche, Nokia Research Ctr. (Finland); D. Dmitry, Tampere Univ. of Technology (Finland); M. Vehvilainen, Nokia Research Ctr. (Finland); V. Katkovnic, Tampere Univ. of Technology (Finland) ..... [5674-16]

SESSION 4

Conv. Ctr. Room A4 ..... Mon. 4:30 to 5:50 pm

Medical Image Processing

Chair: **Peter C. Doerschuk**, Purdue Univ.

4:30 pm: **Morphological study of cortical surfaces with principal component analysis,** Y. Sun, Purdue Univ. ..... [5674-17]

4:50 pm: **Detection of mass tumors in mammograms using SVD subspace analysis,** E. T. Lin, Y. Liu, E. J. Delp III, Purdue Univ. ..... [5674-18]

5:10 pm: **Increasing the depth of field for medical ultrasound imaging,** Y. Zheng, S. D. Silverstein, Univ. of Virginia ..... [5674-19]

5:30 pm: **Markov chain Monte Carlo method for tracking myocardial borders,** R. L. Janiczek, N. Ray, S. T. Acton, R. J. Roy, B. A. French, F. H. Epstein, Univ. of Virginia ..... [5674-20]

Tuesday 18 January

Plenary Speaker ..... Tues. 8:30 to 9:15 am

Marriott Hotel: San Jose Ballroom

20 Cameras on Mars: The Mars Exploration Rover Imaging System

Justin Maki, Jet Propulsion Lab.

See pg. x for details.

SESSION 5

Conv. Ctr. Room A4 ..... Tues. 9:30 to 11:50 am

Human Visual Inverse Problems

Chair: **Zygmunt Pizlo**, Purdue Univ.

Keynote ..... 9:30 to 10:00 am

Surface color perception as an inverse problem in human vision *(Keynote Presentation),* L. T. Maloney, New York Univ. ..... [5674-21]

10:00 am: **Model selection in cognitive science as an inverse problem,** J. I. Myung, M. Pitt, The Ohio State Univ. ..... [5674-51]

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

10:50 am: **Regularization model of human binocular vision,** Z. Pizlo, Y. Li, Purdue Univ. ..... [5674-23]

11:10 am: **Color constancy using fractals,** H. K. Rising III, F. A. Baqai, Sony Electronics ..... [5674-24]

11:30 am: **Structure from motion: a computational study,** M. Boutin, D. G. Aliaga, Purdue Univ. ..... [5674-25]

Lunch/Exhibition Break ..... 11:50 am to 1:10 pm

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SESSION 6

Conv. Ctr. Room A4 ..... Tues. 1:10 to 2:30 pm

Color Imaging

Chair: **Maya R. Gupta**, Univ. of Washington

1:10 pm: **Simulating the effect of illumination using color transformations,** M. R. Gupta, J. Bowen, Univ. of Washington ..... [5674-26]

1:30 pm: **Bayesian edge-preserving color image reconstruction from color filter array data,** M. Parmar, S. J. Reeves, T. S. Denney, Jr., Auburn Univ. ..... [5674-27]

1:50 pm: **Real-time multiresolution algorithm for correcting the distortions produced by thermal printers,** S. S. Saquib, W. T. Vetterling, Polaroid Corp. ..... [5674-28]

2:10 pm: **Multiresolution order-statistic CFAR techniques for radar target detection,** M. R. Bell, Purdue Univ. ..... [5674-29]

SESSION 7

Conv. Ctr. Room A4 ..... Tues. 2:30 to 5:30 pm

Biomedical Inverse Problems

Chairs: **Thomas S. Denney, Jr.**, Auburn Univ.; **Yinlong Sun**, Purdue Univ.

2:30 pm: **Parametric reconstruction of kinetic PET data with plasma function estimation,** M. E. Kamasak, C. A. Bouman, Purdue Univ.; E. D. Morris, Purdue Univ. and Indiana Univ. School of Medicine; K. D. Sauer, Univ. of Notre Dame ... [5674-30]

2:50 pm: **Motion-compensated fully 4D reconstruction of gated cardiac sequences,** Y. Yang, E. Gravier, Illinois Institute of Technology ..... [5674-31]

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

3:30 pm: **Recursive estimation methods for tracking of localized perturbations in absorption and scattering using diffuse optical tomography,** A. Hamdi, E. L. Miller, Northeastern Univ.; M. E. Kilmer, Tufts Univ.; D. Boas, Massachusetts General Hospital and Harvard Medical School; M. A. Franceschini, Massachusetts General Hospital and Tufts Univ. ..... [5674-32]

3:50 pm: **Computer simulation of light scattering and propagation in the imaging process of biological confocal microscopy,** Y. Sun, Purdue Univ. ..... [5674-33]

4:10 pm: **A fast algorithm for maximum likelihood 3D reconstruction of viruses from cryo-electron microscope images,** J. Lee, Y. Zheng, P. C. Doerschuk, Purdue Univ. ..... [5674-34]

4:30 pm: **Frequency domain simultaneous algebraic reconstruction techniques: algorithm and convergence,** J. Wang, Y. Zheng, Univ. of Virginia ..... [5674-35]

4:50 pm: **Incremental matrix orthogonalization with an application to curve fitting,** M. Harker, P. L. O'Leary, Montan Univ. Leoben (Austria); P. Zsombor-Murray, McGill Univ. (Canada) ..... [5674-36]

5:10 pm: **Implementation of alternating minimization algorithms for fully 3D CT imaging,** D. G. Politte, S. Yan, J. A. O'Sullivan, D. L. Snyder, B. R. Whiting, Washington Univ. ..... [5674-49]

✔ Posters-Tuesday

Posters will be placed on display after 9:00 am in Conv. Ctr. Room Exhibit Hall 1. A poster session, with authors present at their posters, will be held Tuesday evening, 5:30 to 7:00 pm.

✔ **Inversion of flow fields from sensor network data,** A. Khemka, C. A. Bouman, M. R. Bell, Purdue Univ. ..... [5674-37]

✔ **New inverse method for simultaneous reconstruction of object buried beneath rough ground and the ground surface structure using SAMM forward model,** R. Firoozabadi, E. L. Miller, C. M. Rappaport, A. W. Morgenthaler, Northeastern Univ. ..... [5674-38]

✔ **Inter-update Metz filtering as regularization for variable block-art in PET reconstruction,** M. Sadki, M. Trujillo, Brunel Univ. (United Kingdom) ... [5674-39]

✔ **Sonification of portrait pictures,** S. Torpey, O. Curran, A. Shearer, National Univ. of Ireland/Galway (Ireland) ..... [5674-40]

✔ **Approach to reduce the computational image processing requirements for a computer vision system using sensor preprocessing and the hoteling transform,** T. R. Schei, Northrop Grumman Mission Systems; C. H. G. Wright, Univ. of Wyoming; D. J. Pack, U.S. Air Force Academy ..... [5674-41]

✔ **Subpixel target detection in hyperspectral data using higher order statistics source separation algorithms,** S. A. Robila, Montclair State Univ. ..... [5674-42]

✔ **Nonlinear image restoration methods for marker extraction in 3D fluorescent microscopy,** A. Kryvanos, J. Hesser, G. Steidl, Univ. Mannheim (Germany) ..... [5674-43]

✔ **Contour-based image mosaicking in the presence of moving objects,** S. Jung, Y. Choi, T. Choi, Gwangju Institute of Science and Technology (South Korea)[5674-44]

✔ **Multigrid inversion algorithms for Poisson noise model-based tomographic reconstruction,** S. Oh, C. A. Bouman, K. J. Webb, Purdue Univ. ..... [5674-46]

✔ **Concentrated light characterization through scattering and CCD image processing,** A. Parretta, C. Privato, G. Nenna, Ente per le Nuove Tecnologie l'Energia e l'Ambiente (Italy); A. Antonini, M. Stefancich, Univ. degli Studi di Ferrara (Italy) ..... [5674-47]

✔ **Model-based automatic calculation and evaluation of camera positions for industrial machine vision,** M. M. Ellenrieder, DaimlerChrysler AG (Germany); H. Komoto, Technical Univ. of Karlsruhe (Germany) ..... [5674-48]

✔ **Superresolution image synthesis using projections onto convex sets in the frequency domain,** F. W. Wheeler, R. T. Hoctor, GE Global Research; E. B. Barrett, Lockheed Martin Space Systems ..... [5674-50]