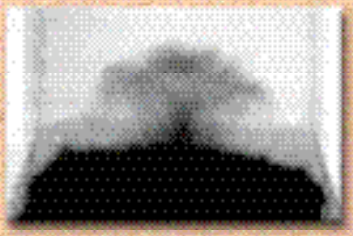
AGENDA

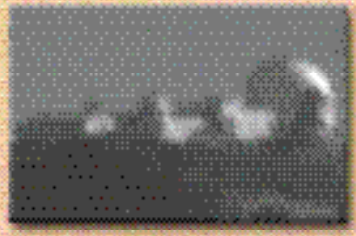
Signal and Image Sciences workshop



Back-lit fast x-ray image (above) and HYDRA computer simulation (below) of a supersonic (70,000 mph) aluminum plasma jet through aerogel 22 ns after a two-beam laser ablation pulse. The experiment was performed by LLNL, LANL, and AWE in the National Ignition Facility (NIF).

Images courtesy of Harry Robey, ICF Program, LLNL

CASIS is a workshop for LLNL, UC community personnel, and others to share accomplishments, ideas, and areas of need in the Signal, Imaging and Communications Sciences



Unprocessed (above) and speckle-processed (below) images of Lick observatory from Mt. Diablo, 60 km away through distributed turbulence. Bispectral speckle processing recovers a high-resolution image of Lick from 100 short-exposure frames taken through an 11-inch telescope.

Images courtesy of Carmen Carrano, EE/PAT, LLNL

November 17–18, 2005

Sponsored by LLNL Engineering Directorate and the Center for Advanced Signal and Image Sciences (CASIS)

Center for Advanced Signal and Image Sciences

AGENDA
Signal and Image Sciences Workshop
Center for Advanced Signal and Image Sciences
Lawrence Livermore National Laboratory

THURSDAY, NOVEMBER 17, 2005 ***BUILDING 123 AUDITORIUM***

8:15 AM ***Registration and Continental Breakfast***
8:45 AM *Opening Remarks, Introductions* . . . . . *Stephen Azevedo, CASIS Director*
8:55 AM *Welcome from Engineering* . . . . . *Dr. Steven Patterson, AD Engineering*
9:00 AM *Natural Interfaces for Information Systems* . . . . . *Prof. James L. Flanagan, Keynote Speaker, Rutgers University*
10:00 AM ***MORNING BREAK—Complimentary***

"AS BUILT" MODELING
Harry E. Martz, Session Chair

10:15 AM *As-Built Modeling Overview* . . . . . *Harry E. Martz*
10:30 AM *As-Built Modeling for Performance Assessment: Nondestructive Characterization* . . . . . *Diane J. Chinn*
10:45 AM *Registration and Fusion of X-Ray and Ultrasound Images for As-Built Modeling* . . . . . *Grace A. Clark*
11:00 AM *As-Built Modeling with VisIt* . . . . . *Edwin J. Kokko*
11:15 AM *Extraction of Object Geometry from X-Ray CT Data* . . . . . *David H. Chambers*

ADAPTIVE OPTICS
David W. Palmer, Session Chair

11:30 AM *Ophthalmic Imaging with Adaptive Optics* . . . . . *Diana C. Chen*
11:45 AM *Angular Differential Imaging: Removing Quasi-Static Speckles for High Contrast Exoplanet Detections* . . . . . *Christian Marois*
12:00 PM ***LUNCH BREAK—Complimentary***
1:30 PM *"Extreme" Adaptive Optics for Direct Imaging of Extrasolar Planets* . . . . . *Bruce A. Macintosh*
1:45 PM *Characterization and Performance of a MEMS Deformable Mirror for High Contrast Imaging* . . . . . *Julia W. Evans*
2:00 PM *Image Restoration in Remote Imaging with Use of Scene-Based Wavefront Sensor Data* . . . . . *Lisa A. Poyneer*
2:15 PM *Enhanced Infra-red Surveillance Imaging* . . . . . *Carmen Carrano*
2:30 PM ***AFTERNOON BREAK—Complimentary***

SCIENTIFIC DATA MINING
Chandrika Kamath, Session Chair

3:00 PM *Classification of Orbit Data* . . . . . *Chandrika Kamath*
3:15 PM *Segmentation in Multi-Variate Data* . . . . . *Abel G. Gezahegne*
3:30 PM *Phase Contrast Radiography for Dynamic Plasma Experiments* . . . . . *Brian K. Spears*
3:45 PM *Three-Dimensional Hydrodynamic Experiments on the National Ignition Facility* . . . . . *Brent E. Blue*
4:00 PM *Image Processing and Data Reduction for Dynamic X-Ray Diffraction with Multiple Film Planes* . . . . . *James S. Stölken*
4:15 PM *Characterization of High-Gain NIF Fusion Target Fuel Layers* . . . . . *Bernard J. Kozioziemski*
4:30 PM ***ADJOURN***

FRIDAY, NOVEMBER 18, 2005 **BUILDING 123 AUDITORIUM**

8:15 AM **Registration and Continental Breakfast**
8:40 AM Opening Remarks, Introductions . . . . . Stephen Azevedo, CASIS Director

TRACKING & SIGNAL PROCESSING
Randy S. Roberts, Session Chair

8:45 AM Image Processing for the Fight Sight Bullet Tracking Experiment . . . . . Randy S. Roberts
9:00 AM Data Association and Bullet Tracking Algorithms for the Fight Sight Experiment . . . . . Eric F. Breitfeller
9:15 AM Sapphire Video Tracking Pipeline . . . . . Cyrus D. Harrison
9:30 AM Comparison of Block Matching Techniques for Tracking . . . . . Nicole S. Love
9:45 AM Ultra-Wideband Urban Tracking Positioning System . . . . . Claudia Kent Hertzog
10:00 AM **MORNING BREAK—Complimentary**
10:15 AM Model-Based Algorithms for Detecting Cable Damage from Time-Domain Reflectometry Measurements . . . . . Grace A. Clark
10:30 AM Towards Transportation Surveillance Video Analysis for Detection of Chemical Threats . . . . . Lenny Tsap

IMAGE PROCESSING & ANALYSIS
David W. Paglieroni, Session Chair

10:45 AM Using the Image Content Engine (ICE) for Large-Scale Model-Based Image Query and Search . . . . . David W. Paglieroni
11:00 AM Diverse Problems–Similar Solutions: Applying Geophysical Imaging Algorithms to NDE Problems . . . . . Sean K. Lehman
11:15 AM Super-Resolution Algorithms for Ultrasonic Nondestructive Evaluation Imagery . . . . . Grace A. Clark
11:30 AM Pulsed and CW Laser De-speckling Techniques Used in High-Magnification High-Speed Photography . . . James T. Wade
11:45 AM Using Image Analysis to Determine Permeability in Otherwise Unmeasurable Systems . . . . . John H. Kinney
12:00 PM **LUNCH BREAK—Complimentary**
1:30 PM Tomographic Reconstruction by Reciprocal Space Optimization . . . . . Eugene A. Ingerman
1:45 PM NIF Target Alignment Sensor Algorithm . . . . . Walter Ferguson
2:00 PM An Alternate Method for Detecting a Correlation Mismatch . . . . . Abdul A. S. Awwal

NIF OPTICS INSPECTION
Laura M. Kegelmeyer, Session Chair

2:15 PM NIF Optics Inspection Analysis: Overview and Update . . . . . Laura M. Kegelmeyer
2:30 PM Detection Limits and Registration Issues for Optics Inspection Analysis Software . . . . . Judith A. Liebman
2:45 PM **AFTERNOON BREAK—Complimentary**
3:15 PM Detection of Laser Optic Damage Using Gradient Direction Sensitive Matching . . . . . Barry Y. Chen
3:30 PM Lessons Learned Using MATLAB™ for Image Processing in a Production Application Environment . . . . Steven M. Glenn
3:45 PM Optics Inspection Data Visualization . . . . . John W. Carlson
4:00 PM Ultrasonic Shear Wave Imaging of Laser Damaged Optics . . . . . Michael J. Quarry
4:15 PM **ADJOURN**