

**Center for Subsurface Sensing and Imaging Systems
CenSSIS**

NATIONAL SCIENCE FOUNDATION Year 5 Site Visit

April 7-8, 2005

Research Poster Presentations by Students and Researchers

| Poster ID # | Student Presenters | Advisor / Other Faculty / Researchers / University Presenters | Poster Title |
|------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thrust R1-A Posters: Nonlinear and Dual Wave Probes | | | |
| R1A p1 | Darryl Goode / BU | Bahaa Saleh / BU | "Quantum Optical Coherence Tomography" |
| R1A p2 | Brynmor Davis / BU | W. Clem Karl / BU Selim Unlu / BU Anna Swan / BU Bennett Goldberg / BU | "Utilizing Out-of-Focus Light in Confocal Microscopy" |
| R1A p3 | Lei Sui / BU | Todd Murray / BU Emmanuel Bossy / NU Ronald Roy / BU | "Pulsed Acousto-Optic Imaging (AOI) and Its Fusion with Conventional Diagnostic Ultrasound" |
| R1A p4 | Gopi Maguluri / BU | Todd Murray / BU | "Modeling of Optoacoustic Signal Generation with Experimental Verification" |
| R1A p5 | Michael Richards / BU | Paul Barbone / BU | "Quantitative Three Dimensional Elasticity Imaging" |
| R1A p6 | Hua Zhong / RPI | Albert Redo / RPI Yunqing Chen / RPI Jingzhou Xu / RPI Xi -Cheng Zhang / RPI | "Long Distance THz Sensing" |
| R1A p7 | Kai Liu / RPI | Jingzhou Xu / RPI Xi-Cheng Zhang / RPI | "TeraHertz Wave Emitters and Detectors" |
| R1A p8 | Tao Yuan / RPI | Xi-Cheng Zhang / RPI | "Image by Scanning THz Emission Microscope" |
| R1A p9 | Alex Nieva / NU Matthew Bouchard / NU | Charles DiMarzio / NU | "Opto-Acoustic Signal Detection with a Coherent Confocal Microscope Setup" |
| Thrust R1-B Posters: Effective Forward Models | | | |
| R1B p1 | Qiuzhao Dong / NU | Carey Rappaport / NU | "Some Comparison and Improvement in 3D Matlab-based FDFD Computational Methods" |
| R1B p2 | Reza Firoozabadi / NU | Eric Miller / NU Carey Rappaport / NU Ann Morgenthaler / NU | "Inversion Method for Reconstruction of Objects Buried under Rough Surfaces" |
| R1B p3 | | Ann Morgenthaler / NU Carey Rappaport / NU | "The Semi-Analytic Mode Matching (SAMM) Algorithm for Efficient Computation of Scattered Near Fields from 3D Dielectric Targets Buried in Lossy Soil" |
| R1B p4 | He (Sophia) Zhan / NU | Carey Rappaport / NU | "Lossy Half Space Born Approximation Modeling of EM Wave Source and Scattering in Soil by Cross Well Radar" |
| R1B p5 | Panos Kosmas / NU | Carey Rappaport / NU | "A Matched-Filter FDTD-Based Time Reversal Approach for Microwave Breast Cancer Detection" |
| R1B p6 | Brent Poliquin / NU | Carey Rappaport / NU | "Dielectric Properties of Breast Tissue for Imaging" |
| R1B p7 | Heidy Sierra-Gil / NU | Charles DiMarzio / NU Dana Brooks / NU | "DIC Microscopy Image Modeling" |
| R1B p8 | Blair Simon / NU | Charles DiMarzio / NU | "FDTD Simulation of a Confocal Microscope Using a Theta Line Scanner" |
| Thrust R2-A Posters: Multi-View Tomographic Methods | | | |
| R2A p1 | Yiheng Zhang / NU | Dana Brooks / NU David Boas / MGH | "The Use of Hemodynamic Response Function Model in Spatio-Temporal Diffuse Optical Tomography Reconstruction" |

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| Thrust R2-A Posters: Multi-View Tomographic Methods (cont.) | | | |
| R2A p2 | Gregory Boverman / NU | Eric Miller / NU Dana Brooks / NU David Boas / MGH-Harvard | "Spectroscopic and Shape-Based Prior Models in the Diffuse Optical Tomography Inverse Problem" |
| R2A p3 | Saeed Babaeizadeh / NU | Dana Brooks / NU David Isaacson / RPI Jonathan Newell / RPI Rob MacLeod / Sci Institute | "Experimental Validation of Forward and Inverse Solutions for Electrical Impedance Tomography Using the Boundary Element Method" |
| R2A p4 | Jamie Rich / Univ of Oklahoma | Alan Witten / Univ of Oklahoma Sean Lehman / LLNL | "Electromagnetic Imaging in an Inhomogeneous Background" |
| R2A p5 | Yujuan Cheng / NU | Anthony Devaney / NU | "Optical Diffraction Tomography" |
| R2A p6 | Fred Gruber / NU | Edwin Marengo / NU | "Generalized Time-Reversal Imaging With MUSIC" |
| R2A p7 | Basak Ulker Karbeyaz / NU | Eric Miller / NU Robin Cleveland / BU Ronald Roy / BU | "Reduced Complexity Geometry-Based Born Inversion for Frequency Domain Ultrasonic Monitoring of Cancer Treatment" |
| R2A p8 | Kiwoon Kwon / RPI Il-Young Son / RPI | Birsen Yazici / RPI | "Domain Decomposition Methods for Diffuse Optical Tomography" |
| R2A p9 | Il-Young Son / RPI | Birsen Yazici / RPI | "Human Performance Assessment Using fNIR" |
| R2A p10 | Tzu-Jen Kao / RPI | David Isaacson / RPI Jonathan Newell / RPI Gary Saulnier / RPI | "A 3-D Reconstruction Algorithm for a Planar Electrode Array in Electrical Impedance Tomography" |
| R2A p11 | Bong Seok Kim / RPI / Cheju Nat'l Univ Tzu-Jen Kao / RPI | Kyung Youn Kim / Cheju Nat'l U. Korea Jonathan Newell / RPI David Isaacson / RPI | "Dynamic Electrical Impedance Imaging of a Chest Phantom Using the Kalman Filter" |
| Thrust R2-B Posters: Localized Probing and Mosaicing Methods | | | |
| R2B p1 | Karin Griffis / BU Zhihua He / BU | Maja Bystrom / BU | "Unsupervised Change Detection of Remote Sensing Imagery with Preliminary Change Analysis" |
| R2B p2 | Andrew Litvin / BU | W. Clem Karl / BU | "Feature Distribution Based Shape Priors for Image Segmentation" |
| R2B p3 | Omar Al-Kofahi / RPI | Badrinath Roysam / RPI Richard Radke / RPI | "Object-Level Analysis of Changes in Biomedical Image Sequences" |
| R2B p4 | Muhammad-Amri Abdul-Karim / RPI Natalie Dowell / Wadsworth Murat Yuksel / RPI Shivkumar Kalyanaraman / RPI | Badrinath Roysam / RPI William Shain / Wadsworth | "Automated Parameter Selection for Improved Segmentation of Tube-Like Biological Structures Using MDL and Global Optimization" |

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| R2B p5 | Harihar Narasimha-Iyer / RPI | Ali Can / WHOI Hanumant Singh / WHOI Badrinath Roysam / RPI Charles Stewart / RPI Howard Tanenbaum / Center for Sight Anna Majerovics / Center for Sight | "Analysis of Vascular and Non-Vascular Changes from Multi-Temporal Color Retinal Fundus Images" |
| Thrust R2-B Posters: Localized Probing and Mosaicing Methods (cont.) | | | |
| R2B p6 | Alex Tyrrell / RPI | Badrinath Roysam / RPI | |
| R2B p7 | Gang Lin / RPI M. Amri Abdul-Karim / RPI Ying Chen / RPI | Badrinath Roysam / RPI | "General Approaches to Large-Scale, Automated, High-Throughput Image Analysis for n-Dimensional Microscopy" |
| R2B p8 | Mykola Hayvanovych / RPI Yousef Al-Kofahi / RPI | Badrinath Roysam / RPI | "Image Change Understanding Systems: Application to Neural Implant Assessment" |
| R2B p9 | Nicolas Roussel / RPI | Badrinath Roysam / RPI | "A model based approach to detection segmentation and tracking of C.elegans worms" |
| Thrust R2-C Posters: MultiSpectral Discrimination Methods | | | |
| R2C p1 | Tianchen Shi / NU | Charles DiMarzio / NU | "Hyperspectral Skin Imaging" |
| R2C p2 | Eladio Rodriguez-Diaz / BU | David Castanon / BU Irving Bigio / BU | "Optical Diagnosis of Cancer Using Elastic-Scattering Spectroscopy" |
| R2C p3 | Yahya Masalmah / UPRM | Miguel Velez-Reyes / UPRM | "Unsupervised Unmixing of Hyperspectral Images" |
| R2C p4 | Julio Martin Duarte-Carvajalino / UPRM | Miguel Velez-Reyes / UPRM | "Object-Based Segmentation of Hyperspectral Images" |
| R2C p5 | Vanessa Ortiz / UPRM | Miguel Velez-Reyes / UPRM Badrinath Roysam / RPI | "Hyperspectral Change Detection Using Temporal Principal Component Analysis" |
| R2C p6 | Jaime Jose Laracuenta-Diaz / UPRM | Shawn Hunt / UPRM | "A User Independent Noise Reduction Method for Hyperspectral Imagery Based on Oversampling" |
| R2C p7 | Alexey Castrodad / UPRM | Miguel Velez-Reyes / UPRM James Goodman / UPRM | "Estimation of Inherent Optical Properties in Coastal Water from Hyperspectral Imagery" |
| Thrust R2-D Posters: Image Understanding and Sensor Fusion Methods | | | |
| R2D p1 | Julia Pavlovich / BU Darryl Goode / BU | W. Clem Karl / BU Bahaa Saleh / BU | "Estimation of Parameters of Closely Spaced Layered Sample in QOCT" |
| R2D p2 | Zhuangli Liang / BU | W. Clem Karl / BU | "Super-Resolution Image Reconstruction Approach for Coronary Study in Cardiac CT" |
| R2D p3 | Yonggang Shi / BU | W. Clem Karl | "Fast Level Sets Without Solving PDEs" |
| R2D p4 | Anupama Jagannathan / NU | Eric Miller / NU | "Point Matching Within Thermodynamic and Graph-Theoretic Frameworks" |
| R2D p5 | Andrey Krokhin / NU | Eric Miller / NU | "Superresolution Methods for Object Tracking and Identification" |
| R2D p6 | Renzhi Lu / RPI | Richard Radke / RPI Andrew Jackson / MSKCC Chen Chui / MSKCC | "Learning the Optimization Parameters of Intensity Modulated Radiotherapy (IMRT)" |
| R2D p7 | Yongwon Jeong / RPI | Richard Radke / RPI | "Model-Based Segmentation of Medical Images by Matching Distributions" |

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| Thrust R3-A Posters: Image and Data Information Management - Parallel Hardware Implementation for Fast Subsurface Detection | | | |
| R3A p1 | Xiaojun Wang / NU | Miriam Leeser / NU | "Variable Precision Floating-Point Library Used on a K-Means Clustering Application" |
| R3A p2 | Haiqian Yu / NU | Miriam Leeser / NU | "Optimizing Data Intensive Window-Based Image Processing on Reconfigurable Hardware Boards" |
| R3A p3 | Wang Chen / NU | Miriam Leeser / NU | "Acceleration of the 3D FDTD Algorithm in Fixed-Point Arithmetic Using Reconfigurable Hardware" |
| R3A p4 | Albert Conti / NU Ben Cordes / NU | Miriam Leeser / NU Eric Miller / NU | "Backprojection and Synthetic Aperture Radar Processing on a HHPC" |
| Thrust R3-A Posters: Image and Data Information Management - Parallel Hardware Implementation for Fast Subsurface Detection (cont.) | | | |
| R3A p5 | Joshua Noseworthy / NU | Miriam Leeser / NU | "Using the Virtex-II Pro FPGA to Optimally Partition FM3TR Waveform Processing" |
| R3A p6 | Juemin Zhang / NU | Waleed Meleis / NU David Kaeli / NU | "Tomosynthesis on the Grid" |
| R3A p7 | Javier Morales / UPRM Marcos Mejias / UPRM | Nayda Santiago / UPRM | "Hardware Implementation of the ISRA Algorithm" |
| R3A p8 | Marcos Mejias / UPRM Javier Morales / UPRM | Nayda Santiago / UPRM | "On the Use of VHDL and Xilinx FPGAs for the ISRA Algorithm Implementation" |
| Thrust R3-B Posters: Solutionware Tools | | | |
| R3B p1 | Diego Rivera / NU | David Kaeli / NU | "Developing Efficient Sparse Matrix Libraries Targeting SSI Applications" |
| R3B p2 | Diego Rivera / NU Roberto Cabral / NU | David Kaeli / NU | "Tying Advanced Imaging Instruments to High Performance Computing" |
| R3B p3 | Huanmei Wu / NU | Gregory Sharp / MGH Betty Salzberg / NU David Kaeli / NU Steve Jiang / NU | "A Finite State Model for Respiratory Motion Analysis in Image Guided Radiation" |
| R3B p4 | Huanmei Wu / NU | Furong Yang / NU David Kaeli / NU | "The CenSSIS Web-Based Image Database" |
| R3B p5 | Monica Page / Spelman College Angel Clark / Spelman College Erica Costen / Spelman College Nicole Epps / Spelman College Kayra Hopkins / Spelman College | James Hale / Spelman College | "CenSSIS Citation Index System Submission Module" |
| R3B p6 | Samuel Rosario-Torres / UPRM | Miguel Velez-Reyes / UPRM Luis Jimenez-Rodriguez / UPRM | "An Update on the MATLAB Hyperspectral Image Analysis Toolbox" |
| Validating TestBED and Research Posters on Real World Problems for I-PLUS Development | | | |
| Bio/Med p1 | | Gary Laevsky / NU | "The W.M. Keck Three Dimensional Fusion Microscope" |

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| Bio/Med p2 | Judith Newmark / NU | Gary Laevsky / NU Charles DiMarzio / NU Carol Warner / NU | "Using a Live Cell Culture Chamber and the Keck 3DFM to Image the Development of Oocytes and Embryos" |
| Bio/Med p3 | Judith Newmark / NU | Carol Warner / NU | "Using Live Cell Imaging to Visualize the Growth and Differentiation of Mouse Embryonic Stem Cells" |
| Bio/Med p4 | William Warger II / NU Judith Newmark / NU | Carol Warner / NU Dana Brooks / NU Charles DiMarzio / NU | "Producing Accurate Cell Counts in Mouse Embryos with the Combination of Optical Quadrature and Differential Interference Contrast" |
| Bio/Med p5 | Peter Dwyer / NU | Charles DiMarzio / NU Milind Rajadhyaksha / NU | "Confocal Reflectance Theta Line-Scanner for Intra-Operative Imaging" |
| Bio/Med p6 | Martina Comiskey / NU | Carol Warner / NU | "Is HLA-G the Functional Human Homolog of the Mouse Ped Gene? Molecular Imaging of Membrane Microdomains" |
| Bio/ Med p7 | Carmit Goldstein / NU Judith Newmark / NU | Carol Warner / NU | Imaging of Qa-2, the Ped Gene Product, on Mouse Preimplantation Embryos" |
| Bio/Med p8 | Leslie Day / NU John Arsenaault / NU | Don O'Malley / NU Gary Laevsky / NU Charles DiMarzio / NU Lynn Dunner / NU | "Multimodal Imaging of the Larval Zebrafish CNS Using the Keck 3D Microscope" |
| Bio/Med p9 | Gustavo Herrera / NU | Charles DiMarzio / NU Milind Rajadhyaksha / MSKCC | "Reflectance Confocal Articulated Scanner for Clinical Skin Imaging" |
| Bio/Med p10 | Elias-Vladimir Beauchamp-Rodriguez / NU | Anna Yaroslavsky / MGH Charles DiMarzio / NU | "Pattern Recognition Techniques for the Detection of Nonmelanoma Skin Cancers" |
| Bio/Med p11 | Ersel Karbeyaz / NU | Carey Rappaport / NU Charles DiMarzio / NU | "Assessment of Embryo Health by Microscopy" |
| Bio/Med p12 | | Bing Zhao / NU Charles DiMarzio / NU | "Differential Interference Contrast (DIC) Microscopy and Modeling" |
| Bio/Med p13 | | Robin Cleveland / BU Todd W. Murray / BU Ronald Roy / BU | "MedBED-A: A TestBED Supporting Research in Biomedical Ultrasonics and Ultrasound Imaging" |
| Bio/Med p14 | Caleb Farny / BU | Ronald Roy / BU R. Glynn Holt / BU Charles Thomas / BU | "Observations of Cavitation Activity and Lesion Growth in Optically-Clear Tissue Phantoms" |
| Bio/Med p15 | Caleb Farny / BU | Ronald Roy / BU R. Glynn Holt / BU Charles Thomas / BU | "Controlling a HIFU-Induced Cavitation Field Via Duty Cycle" |
| Bio/Med p16 | Eleonora Vidolova / BU | Robin Cleveland / BU Emmanuel Bossy / BU | "Coral Imaging Using Ultrasound" |
| Bio/Med p17 | Hongjun Xia / RPI | Jonathan Newell / RPI Gary Saulnier / RPI Alexander Ross / CardioMag | "The User Interface for ACT4" |
| Bio/Med p18 | Ning Liu / RPI | Gary Saulnier / RPI Jonathan Newell / RPI | "ACT4: A High Precision, Multi-Frequency Electrical Impedance Tomograph" |

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| Sea/Soil p1 | Ninos Donabed / NU | Purnima Ratilal / NU | "Minimum Population Necessary for Imaging Fish Schools with Long Range Sonar in Continental Shelf Environment" |
| Sea/Soil p2 | | James Goodman / UPRM Fernando Gilbes / UPRM Miguel Velez-Reyes / UPRM Shawn Hunt / UPRM | "SeaBED: A Controlled Laboratory and Field Test Environment for the Validation of Coastal Hyperspectral Image Analysis Algorithms" |
| Validating TestBED and Research Posters on Real World Problems for I-PLUS Development (cont.) | | | |
| Sea/Soil p3 | Kimberly Belli / NU | Sara Wadia-Fascetti / NU Carey Rappaport / NU | "Integrated Modeling for Subsurface Sensing of Civil Infrastructure" |
| Sea/Soil p4 | Clay Kurison / NU He (Sophia) Zhan / NU | M. Farid / NU Akram Alshwabkeh / NU Carey Rappaport / NU | "Challenges and Validation of Cross-Tomography Experimentation for Inverse Scattering Problems in DNAPL Contaminated Soils" |
| Sea/Soil p5 | Maria Serrano Guzman/UPRM | Ingrid Padilla / UPRM | "Detection of DNAPLs in Two-Dimensional Flow and Electromagnetic Settings" |
| Education and K-12 Outreach | | | |
| Educ p1 | Jairo Argueta / Boston Latin Academy Andrea Narino / Plymouth High School | Charles DiMarzio / NU Claire Duggan/NU CESAME | "Young Scholars Program - Design of Test Targets for Biological Imaging" |
| Educ p2 | | Claire Duggan/NU CESAME | Research Experience for Teachers (RET) Program |
| Educ p3 | Seth Baum / NU Robin Canali / EHS Ryda Chea / EHS Jiaan Hyland-Babaie / EHS | Carey Rappaport / NU Claire Duggan / Nu Paul Muller / EHS | "Modeling Ground Penetrating Radar While Teaching High School Science" |
| Educ p4 | Jodi Zareski / NU Joshua Poulin / NU Noosheen Kahlil-Naji / NU | Phil Cheney / NU | System Engineering for Complex Projects - "International Space Station Retrofit and Transporter/Lander Assembly Process" |
| Educ p5 | Ken Conanti / NU Amirali Fattahi / NU Maher Kachmar / NU Ronald Majocho-Moulton / NU Nimitch Payongsith / NU Jenoi Wilson / NU | Phil Cheney / NU | Northeastern University's Mission to Mars |
| Educ p6 | | Jose Colom-Ustariz / UPRM Rafael Rodriguez / UPRM | "Tools and Toys Laboratory at UPRM" |
| Educ p7 | Stephanie Mendoza / UPRM Pedro Falta / UPRM Neyka Ramos / UPRM | Sandra Cruz-Pol / UPRM Rafael Rodriguez-Solis / UPRM | "UPRM CenSSIS K-12 Educational Outreach Program" |
| Educ p8 | Maria E Vasquez / UPRM Pedro A Falto / UPRM Neyka Z Ramos / UPRM | James Goodman / UPRM Shawn Hunt / UPRM Samuel Rosario / UPRM | "An Undergraduate Student Research Project for SeaBED: Development of Techniques for the Acquisition of Field-Level Hyperspectral Imagery" |