

Douglas Lanman

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Education

- 08/05 – present **Brown University**, Providence, RI
Ph.D. Candidate in Electrical Engineering
Advisor: Prof. Gabriel Taubin
- 08/05 – 12/06 **Brown University**, Providence, RI
Master of Science in Electrical Engineering (GPA: 4.0/4.0)
- 09/98 – 06/02 **California Institute of Technology**, Pasadena, CA
Bachelor of Science with Honors in Applied Physics (GPA: 3.8/4.0)
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Professional Experience

- 04/08 – 08/08 **MIT Media Lab**, Visiting Student
Camera Culture Research Group, Cambridge, MA

Researched methods in computational photography, human-computer-interaction, and medical imaging. Published results at ICCP 2009, SIGGRAPH 2009, and SIGGRAPH Asia 2009.
- 07/07 – 03/08 **Mitsubishi Electric Research Laboratories (MERL)**, Research Intern
Mitsubishi Research Laboratory (MRL), Cambridge, MA

Worked in collaboration with Dr. Ramesh Raskar to develop methods for computational photography, 3D scanning, and active imaging. Published results at CAe 2008 and SIGGRAPH Asia 2008.
- 07/06 – 07/06 **INRIA Rhône-Alpes**, NSF-INRIA REUSSI Research Intern
Video and Mesh Processing for 3D Cinematography (VAMP), Montbonnot, France

Investigated 3D reconstruction using image silhouettes and camera arrays, including the “osculating circle” [Vaillant and Faugeras 1992] and the “osculating quadric” [Boyer and Berger 1997].
- 08/02 – 08/05 **MIT Lincoln Laboratory**, Assistant Technical Staff Member
Seeker and Interceptor Technology (Group 38), Lexington, MA

Supported the development of advanced image-processing technologies for interceptor systems.
 - Demonstrated a novel method to restore a single super-resolution image from a sequence of blurred, noisy, and under-sampled infrared focal plane array measurements.
 - Led the development, deployment, and application of a 24-processor cluster computing environment for use in parallel Matlab simulations utilizing MatlabMPI.
- 06/01 – 09/01 **Los Alamos National Laboratory**, Technical Intern
Space Instrumentation and System Engineering (NIS-4), Los Alamos, NM

Performed fundamental research regarding ad-hoc distributed sensor networks.
- 06/01 – 09/01 **California Institute of Technology**, Research Assistant
Prof. John C. Crocker (Assistant Professor of Applied Physics), Pasadena, CA

Implemented 3D tracking system for colloidal particles observed in microscope images.

Professional Experience (continued)

- 06/00 – 09/00 **Intel Corporation**, Technical Intern
06/99 – 09/99 Intel Mask Operations (IMO), Santa Clara, CA
Realized a complete package for improving inspection capabilities on photolithographic equipment.
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Teaching

- 12/09 **Build Your Own 3D Scanner: Optical Triangulation for Beginners**, Presenter
SIGGRAPH Asia 2009 – Yokohama, Japan
Presented an introductory course on 3D photography addressing, through concrete examples, the mathematics, software, and practical details necessary to build several homemade 3D scanners using inexpensive commercial off-the-shelf parts. Topics covered included: 3D triangulation, camera/projector calibration, and the general use of projector-camera systems in computer graphics and vision research.
- 07/09 **Build Your Own 3D Scanner: 3D Photography for Beginners**, Presenter
SIGGRAPH 2009 – New Orleans, LA
Presented an introductory course on 3D photography addressing, through concrete examples, the mathematics, software, and practical details necessary to build several homemade 3D scanners using inexpensive commercial off-the-shelf parts. Topics covered included: 3D triangulation, camera/projector calibration, and the general use of projector-camera systems in computer graphics and vision research.
- 09/08 – 12/08 **Linear System Analysis**, Teaching Assistant
Brown University – EN 157 – Providence, RI
Served as the main TA for an upper-level undergraduate course on signal and system analysis. Primary responsibilities included: (1) teaching a weekly recitation section covering applications, Matlab programming, and problem-solving techniques, (2) holding office hours, and (3) grading problem sets.
- 01/07 – 05/07 **3D Photography and Geometry Processing**, Teaching Assistant
Brown University – CS 220/EN 292-34 – Providence, RI
Served as the main TA for an advanced graduate course on 3D capture, modeling, and mesh processing. Primary responsibilities included: (1) creating an assignment in which the students implemented Bouguet’s desktop 3D scanner using only a webcam, a halogen lamp, and a stick, (2) managing student projects, and (3) implementing a custom 3D scanner using structured light and a DLP projector.
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Journal Articles

- M. Hirsch, D. Lanman, H. Holtzman, and R. Raskar. **BiDi Screen: A Thin, Depth-Sensing LCD for 3D Interaction using Light Fields**. ACM Transactions on Graphics (Proc. of SIGGRAPH Asia 2009), December 2009, Yokohama, Japan
- D. Lanman, R. Raskar, A. Agrawal, and G. Taubin. **Shield Fields: Modeling and Capturing 3D Occluders**. ACM Transactions on Graphics (Proc. of SIGGRAPH Asia 2008), December 2008, Singapore
- D. Lanman, D. Crispell, and G. Taubin. **Surround Structured Lighting: 3-D Scanning with Orthographic Illumination**. Elsevier Journal for Computer Vision and Image Understanding (CVIU), Special Issue on New Advances in 3D Imaging and Modeling, Spring 2009

Book Chapters

D. Crispell, D. Lanman, P. G. Sibley, Y. Zhao, and G. Taubin. **Shape from Depth Discontinuities**. Emerging Trends in Visual Computing, Lecture Notes in Computer Science Series, Springer-Verlag, Vol. 5416, 2009

R. Raskar, J. Tumblin, and D. Lanman. **Processing and Reconstruction**. Computational Photography: Mastering New Techniques for Lenses, Lighting, and Sensors, A K Peters, 2009

Conference Publications

D. Lanman, D. C. Hauagge, and G. Taubin. **Shape from Depth Discontinuities under Orthographic Projection**. In Proc. of the IEEE International Workshop on 3D Digital Imaging and Modeling (3DIM 2009), October 2009, Kyoto, Japan

A. Mohan, D. Lanman, S. Hiura, and R. Raskar. **Image Destabilization: Programmable Defocus using Lens and Sensor Motion**. In Proc. of the IEEE International Conference on Computational Photography (ICCP 2009), April 2009, San Francisco, CA

D. Lanman, R. Raskar, and G. Taubin. **Modeling and Synthesis of Aperture Effects in Cameras**. In Proc. of the International Symposium on Computational Aesthetics in Graphics, Visualization, and Imaging (CAe 2008), June 2008, Lisbon, Portugal

D. Lanman, D. Crispell, and G. Taubin. **Surround Structured Lighting for Full Object Scanning**. In Proc. of 3D Digital Imaging and Modeling (3DIM 2007), August 2007, Montréal, Québec, Canada

D. Lanman, M. Wachs, G. Taubin, and F. Cukierman. **Reconstructing a 3D Line from a Single Catadioptric Image**. In Proc. of the Third International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT 2006), June 2006, Chapel Hill, NC

D. Lanman, D. Crispell, M. Wachs, and G. Taubin. **Spherical Catadioptric Arrays: Construction, Multi-View Geometry, and Calibration**. In Proc. of the Third International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT 2006), June 2006, Chapel Hill, NC

D. Crispell, D. Lanman, P. G. Sibley, Y. Zhao and G. Taubin. **Beyond Silhouettes: Surface Reconstruction using Multi-Flash Photography**. In Proc. of the Third International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT 2006), June 2006, Chapel Hill, NC

D. Lanman, E. Hines and K. Schultz. **Physics-based Laser Radar Simulation Tool**. Eighth Annual Workshop on High Performance Embedded Computing, September 2004, Lexington, MA

J-S. Smokelin, D. Lanman, R. Dufour and K. Schultz. **Seeker Super-Resolution and CSO Detection**. In Proc. of the 2003 Military Sensing Symposium Specialty Group Meeting on Missile Defense Sensors, Environments and Algorithms, November 2003, Monterey, CA

J-S. Smokelin, D. Tessier, D. Lanman and R. Dufour. **Advanced Algorithms for Endgame Aimpoint Selection**. In Proc. of the First Missile Defense Conference, March 2003, Washington, DC

D. Lanman and A. Jorgensen. **Distributed Sensor Networks with Collective Computation**. Technical Report LA-UR-01-4388, Los Alamos National Laboratory, August 2001

D. Lanman, B. Eng and R. Mayes. **Model-based Face Capture from Orthogonal Images**. Symposium 2001: Championing Scientific Careers, August 2001, Santa Fe, NM

Technical Reports

D. Lanman. **Distributed Sensor Networks with Collective Computation: A Preliminary Report on Real-time Optimization Algorithms.** Technical Report, Los Alamos National Laboratory, September 2001

D. Lanman and A. Jorgensen. **Distributed Sensor Networks with Collective Computation.** Technical Report LA-UR-01-4388, Los Alamos National Laboratory, August 2001

Refereed Posters

M. Hirsch, D. Lanman, R. Raskar, and H. Holtzman. **BiDi Screen: Depth and Lighting Aware Interaction and Display.** In Proc. of the 36th International Conference and Exhibition on Computer Graphics and Interactive Techniques (SIGGRAPH 2009), August 2009, New Orleans, LA

S. B. Oh, R. Raskar, D. Lanman, and G. Barbastathis. **Mask-based Vision Systems by Use of the Wigner Distribution Function and Ambiguity Function.** In Proc. of Advances in Imaging: OSA Optics & Photonics Congress and Tabletop Exhibit, Topical Meeting on Digital Holography and Three-Dimensional Imaging (DH), April 2009, Vancouver, BC, Canada

T. Aoki, D. Miaw, D. Lanman, R. Raskar, and M. Sato. **High-Speed Hand Tracking for Gesture Recognition.** In Proc. of the 1st ACM SIGGRAPH Conference and Exhibition in Asia (SIGGRAPH Asia 2008), December 2008, Singapore

D. Lanman, P. G. Sibley, D. Crispell, Y. Zhao and G. Taubin. **Multi-Flash 3D Photography: Capturing Shape and Appearance.** In Proc. of the 33rd International Conference and Exhibition on Computer Graphics and Interactive Techniques (SIGGRAPH 2006), August 2006, Boston, MA

Mika L. M. MacInnis, Marcelo S. Caetano, Douglas Lanman, and Russell M. Church. **Does adjunctive behavior play in a role timing?.** In Proc. of the 31st Annual Meeting of the Society for the Quantitative Analyses of Behavior (SQAB 2008), May 2008, Chicago, IL

D. Lanman, E. Hines and K. Schultz. **Physics-based Laser Radar Simulation Tool.** In Proc. of the 2004 Military Sensing Symposium Specialty Group Meeting on Missile Defense Sensors, Environments and Algorithms, October 2004, Monterey, CA

Invited Talks

D. Lanman. **3D Scanning Tutorial: Historical, Do-It-Yourself, and State-of-the-Art Methods.** At Mitsubishi Electric Research Laboratories (MERL), September 2009, Cambridge, MA

M. Hirsch, D. Lanman, R. Raskar, and H. Holtzman. **BiDi Screen: Depth and Lighting Aware Interaction and Display.** In Proc. of the 36th International Conference and Exhibition on Computer Graphics and Interactive Techniques (SIGGRAPH 2009), August 2009, New Orleans, LA

D. Lanman. **New Directions for Active Illumination in 3D Photography.** At the Multi-View Image and Geometry Processing for 3D Cinematography Workshop, Banff International Research Station, July 2008, Banff, Canada

D. Lanman, R. Ronfard, and G. Taubin. **Silhouette Interpolation Using Trinocular Camera Arrays.** At the VAMP Associate Team Student Seminar on Video and Mesh Processing for 3D Cinematography, INRIA Rhne-Alpes, July 2006, Montbonnot, France

Invited Talks (continued)

D. Lanman. **Enhanced 3D Acquisition: Multi-Flash Photography and Silhouette Consistency**. At the REUSSI Seminar, INRIA Rocquencourt, July 2006, Rocquencourt, France

Awards and Recognition

2005-2008 ASEE National Defense Science and Engineering Graduate (NDSEG) Fellowship

2001-2002 California Institute of Technology Upper Class Merit Award (Carnation Award)

2000-2001 ARCS (Achievement Rewards for College Scientists) Scholar

1999-2000 ARCS (Achievement Rewards for College Scientists) Scholar

Computer Vision and Pattern Recognition (CVPR) 2008 Outstanding Reviewer Award

Second Place in ACM SIGGRAPH 2009 Student Research Competition (Graduate Category) for “BiDi Screen: Depth and Lighting Aware Interaction and Display” by M. Hirsch (presenter), D. Lanman, R. Raskar, and H. Holtzman, August 2009

Overall Best Numerical Analysis Paper for “Model-based Face Capture from Orthogonal Images”, Symposium 2001: Championing Scientific Careers, hosted by Los Alamos National Laboratory, Santa Fe, NM, August 2001

Demonstrations

M. Hirsch, D. Lanman, R. Raskar, and H. Holtzman. **BiDi Screen: A Thin, Depth-Sensing LCD for 3D Interaction using Light Fields**. In Proc. of the 2nd ACM SIGGRAPH Conference and Exhibition in Asia (SIGGRAPH Asia 2009: Emerging Technologies), December 2009, Yokohama, Japan

Skills

Scientific Computing: Matlab, Mathematica, Maple, IDL, \LaTeX

Programming: C/C++, Java, OpenGL, OpenCV, MPI, VXL

Professional Service and Membership

Reviewer for numerous computer vision and graphics journals and conferences, including: IEEE Transactions of Image Processing (TIP), SPIE Optical Engineering (OE), Computer Vision and Image Understanding (CVIU), CVPR 2006-2009, ICCV 2007 and 2009, ICIP 2008, SIGGRAPH 2008, SIGGRAPH Asia 2009, EUROGRAPHICS 2008, Graphics Interface 2008, Virtual Reality 2007, and SIBGRAPI 2007.

Founded the Computer Vision Reading Group and Seminar Series (CVRG) at Brown University

ACM and IEEE Student Member since 2006