

Curriculum Vitae of Dr. Kristin J. Dana

Electrical and Computer Engineering
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Education

Ph.D. Columbia University, NY 1999

Thesis Advisor: Shree Nayar

Major: Electrical Engineering

Thesis: Models and Measurements of 3D Texture

GPA: 4.0/4.0

MS Massachusetts Institute of Technology 1992

Major: Electrical Engineering and Computer Science

Thesis: Image reconstruction using Nomarski DIC microscopy

GPA: 4.8/5.0

BS Cooper Union and New York University 1990

GPA: 3.8/4.0

Current Positions

- **Associate Professor**, Department of Electrical and Computer Engineering, Rutgers University (1999-present)
- **Adjunct Assistant Professor of Clinical Medicine**, University of Medicine and Dentistry of New Jersey UMDNJ (2004-present)
Member of:
 - **Graduate Faculty, Computer Science Department**, Rutgers University (2002-present)
 - **Rutgers Center for Cognitive Science**, Rutgers University (2002- present)
 - **Center for Advanced Information Processing**, Rutgers University (1999-present)

Previous Employment

- **Columbia University** Graduate Research Assistant, *Advisor*: Shree Nayar, 1995-1999
- **Sarnoff Corporation** Technical Staff, *Supervisor*: Peter Burt, 1992-1995
- **MIT Graduate** Research Assistant, *Advisor*: Dennis M. Freeman, 1990-1992
- **Bell Laboratories** Technical Associate, 1989-1990
- **Cooper Union Research Foundation** Research Intern, Spring 1989
- **NYU Robotics Lab** Research Assistant, Summer 1988

Awards

- **NSF Faculty Early Career (CAREER)** Surface Science for Vision and Graphics 2001
- **IEEE Best Paper in Session Award** CVPR Computer Vision and Pattern Recognition 1997
- Sarnoff Corporation **Team Award** 1995
- Sarnoff Corporation **Technical Achievement Award** 1994
- General Electric **Faculty of the Future Fellowship** for MIT 1990
- New York University **Computer Science and Engineering Award** 1990

Grants

- **NSF CAREER** Faculty Early Career Development, Kristin J. Dana, *Surface Science for Vision and Graphics*, March 2001, 5 year, **\$375,000**
- **NSF ITR/HCI Information Technology Research**, *Complex Interactions with the Visual World: Capturing, Understanding and Predicting Appearance*, September 2000 - September 2005, Shree Nayar (Columbia University), Jitendra Malik (U.C. Berkeley), Pat Hanrahan (Stanford University), Peter Belhumeur (Yale University), Elli Angelopoulou (Stevens Institute), Kristin J. Dana (Rutgers University), Total: **3.5 million**, co-PI subtotal: **\$435,000**
- **Rutgers University SROA** Strategic Resource and Opportunity, Kristin J. Dana, *Advanced Imaging Device and Methods for Diagnosis and Evaluation of Skin Disorders*, 2000-2001, **\$50,000**

Teaching

- Robotics and Vision ECE 471
- Machine Vision ECE 561
- Computer Graphics ECE 474
- Concepts in Vision ECE 472

Curriculum Development

- Major Revision of ECE 471 (Robotics and Vision) and ECE 561 (Machine Vision) *Revision Summary*: Design lab was developed to incorporate hands-on learning of robot vision concepts. This lab enables students to design and build visually guided robots using LEGO components, actuators, sensors, programmable controller that interfaces to a PC via infrared signals, and USB video cameras. The student projects teach robot control and video processing such as mosaic construction, image alignment, camera calibration and stereo reconstruction. Course Web Page: www.ece.rutgers.edu/~kdana/ece471 and www.ece.rutgers.edu/kdana/ece472.

PhD Students

- Oana G. Cula, “Bidirectional Imaging and Modeling of Real World Surfaces”, Fall 2000-2005

- Jing Wang, “Modeling Surface Geometry”, Fall 2001-2005

Master of Science (MS) Students

- Alex Wu, “Capturing and Rendering Detailed Face Models”, 2004-present
- Raghunand Makonahalli, “Optical Encryption via Advanced Watermarking”, 2003- 2005
- Jayant Susikumar, “Analysis, Synthesis and Visualization of 3D Textures”, 2002-2004
- Jasvinder Singh, “Texture Synthesis and Measurements”, 2000-2002

Undergraduate Students

- Michael Sverdlove, “Robust Image Registration”, Fall 2004
- Dun Zhe (Vinny) Lin, “BRDF/BTF Measurement”, Fall 2001
- Chi-Wei Yung, “Image-Based Rendering”, Fall 2000
- Ben Williams, “3D Texture Synthesis”, Summer 2000
- Rob Utama, “Texture Synthesis Algorithms”, Summer 2000

PhD Degrees Supervised

- Oana G. Cula, **PhD** in Computer Science, thesis defense May 2005
- Jing Wang, **PhD** in Electrical and Computer Engineering, thesis defense August 2005

MS Degrees Supervised

- Raghunand Makonahalli, **Master of Science** in Electrical Engineering, October 2005
- Jayant Susikumar **Master of Science** in Electrical and Computer Engineering, January 2004
- Jasvinder Singh **Master of Science** in Electrical and Computer Engineering, October 2003
- Oana Cula **Master of Science** in Computer Science May 2001

Patents

- US/IPTO Patent : *Apparatus and Method for Measuring Spatially Varying Bidirectional Reflectance Distribution Function*, Number: 6,987,568, Issue Date January 17, 2006, Inventor: Kristin J. Dana
- Patent Pending: *Advanced Watermarking Using Optical Pattern Encryption*, April 2005, Inventors: Kristin J. Dana, Gabriela Livescu, Yicheng Lu

Publications: Journal Articles (*refereed*)

1. Oana G. Cula, Kristin J. Dana, Dinesh K. Pai, and Dongsheng Wang , "Polarization Multiplexing and Demultiplexing for Appearance-based Modeling", to appear in *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2007
2. Jing Wang and Kristin J. Dana , “Relief Texture Shape from Specularities,” *IEEE Transactions on Pattern Recognition and Machine Intelligence*, vol. 28, no. 3, pp. 446-457, March 2006
3. Oana G. Cula, Kristin J. Dana, Frank P. Murphy and Babar K. Rao, “Skin Texture Modeling,” *International Journal of Computer Vision*, vol. 62, no. 1-2, pp. 97-119, April-May 2005

4. Oana G. Cula, Kristin J. Dana, Frank P. Murphy and Babar K. Rao, "Bidirectional Imaging and Modeling of Skin Texture," *IEEE Transactions on Biomedical Engineering*, vol. 51, no. 12, pp. 2148-2159, December 2004
5. Oana G. Cula and Kristin J. Dana, "3D Texture Recognition using Bidirectional Feature Histograms," *International Journal of Computer Vision*, vol. 59, August 2004
6. Jasvinder Singh and Kristin J. Dana, "Clustering and blending for texture synthesis," *Pattern Recognition Letters*, pp. 619-629, vol. 25, no. 6, April 2004
7. Kristin J. Dana and Jing Wang, "Device for Convenient Measurement of spatially varying bidirectional reflectance," *Journal of the Optical Society of America A*, pp. 1-12, January 2004
8. Kristin J. Dana, Bram van Ginneken, Shree K. Nayar, Jan J. Koenderink, "Reflectance and texture of real world surfaces," *ACM Transactions on Graphics*, vol. 18, no. 1, pp. 1-34, January 1999
9. Bram van Ginneken, Jan J. Koenderink, Kristin J. Dana, "Texture histograms as a function of irradiation and viewing direction," *International Journal of Computer Vision*, vol. 31, no. 2-3, pp. 169-84, 1999
10. Jan J. Koenderink, Andrea J. Van Doorn, Kristin J. Dana, Shree K. Nayar, "Bidirectional reflection distribution function of thoroughly pitted surfaces," *International Journal of Computer Vision*, vol. 31, no. 2-3, pp. 129-44, 1999

Publications: Conference Proceedings

The top computer vision conferences (CVPR, ICCV) are highly competitive with low acceptance rates. ICCV has a CiteSeer impact factor ranking in the top 5% of all major computer science journals and conferences.

11. Oana G. Cula, Kristin J. Dana, Dinesh Pai, and Dongsheng Wang, "Polarization multiplexing for bidirectional imaging," *CVPR IEEE Proceedings on Computer Vision and Pattern Recognition*, June 2005 (Acceptance rate: 28%)
12. Jing Wang and Kristin J. Dana, "Hybrid Textons: Modeling Surfaces with Reflectance and Geometry", *CVPR IEEE Proceedings on Computer Vision and Pattern Recognition*, June 2004 (Acceptance rate: 17%)
13. Oana G. Cula, Kristin J. Dana, Frank P. Murphy and Babar K. Rao, "Bidirectional Imaging and Modeling of Skin Texture," *Texture 2003, The Third International Workshop on Texture Analysis and Synthesis*, pp. 12-18, Nice, France October 2003
14. Jing Wang and Kristin J. Dana, "A Novel Approach for Texture Shape Recovery", *ICCV International Conference on Computer Vision*, pp. 1374-1380, Nice, France October 2003 (Acceptance rate: 21%)
15. Oana G. Cula and Kristin J. Dana, "Image-based Skin Analysis," *Texture 2002, The Second International Workshop on Texture Analysis and Synthesis* ((held with European Conference on Computer Vision 2002), pp. 35-42, Copenhagen, Denmark, June 2002
16. Oana G. Cula, Kristin J. Dana, "Compact Representations for Bidirectional Texture Functions," *CVPR IEEE Conference on Computer Vision and Pattern Recognition*, pp. 1041-7, Kauai, Hawaii, December 2001 (Acceptance rate: 30%)
17. Kristin J. Dana, "BRDF/BTF measurement device", *ICCV Proceedings of Eighth IEEE International Conference on Computer Vision*) vol. 2, pp. 460-6, Vancouver, British Columbia, July 2001 (Acceptance rate: 34%)

18. Oana G. Cula and Kristin J. Dana, "Recognition methods for 3D textured surfaces," *Proceedings of SPIE International Society for Optical Engineering*, vol. 4299, pp. 209-20. San Jose, CA, January 2001
19. Kristin J. Dana and Shree K. Nayar, "3D textured surface modeling," *IEEE Workshop on the Integration of Appearance and Geometric Methods in Object Recognition*, pp. 46-56, Fort Collins, CO, June 1999
20. Kristin J. Dana and Shree K. Nayar, "Correlation Model for 3D Texture," *ICCV Proceedings of Seventh IEEE International Conference of Computer Vision*, vol. 2, pp. 1061-66, Corfu, Greece, September 1999 (**Acceptance rate: 31%**)
21. Kristin J. Dana and Shree K. Nayar, "Histogram model of 3D textures," *CVPR IEEE Conference on Computer Vision and Pattern Recognition*, pp. 618-24, Santa Barbara, CA, June 1998 (**Acceptance rate for oral presentation: 9%**)
22. Kristin J. Dana, Bram van Ginneken, Shree K. Nayar and Jan J. Koenderink, "Reflectance and texture of real world surfaces," *CVPR IEEE Conference on Computer Vision and Pattern Recognition*, pp. 151-7, San Juan, Puerto Rico, June 1997 (**Acceptance rate for oral presentation: 7%**)
23. Kristin J. Dana and Rick Wildes, "A Dynamic energy image with applications," *ARPA Image Understanding Workshop*, vol. 2, pp. 1611-18, 1994
24. Rakesh Kumar, Kristin J. Dana, P. Anandan, Neil Okamoto and James Bergen, "Frameless registration of MR & CT 3D volumetric data sets," *IEEE Workshop on Applications of Computer Vision*, pp. 240-8, Sarasota, Florida, December 1994
25. Michael Hansen, P. Anandan, Kristin J. Dana, Gooitzen van derWaal and Peter Burt, "Real-time scene registration and mosaic construction," *IEEE Workshop on Applications of Computer Vision*, pp. 54-62, Sarasota, Florida, December 1994
26. Kristin J. Dana and P. Anandan, "Registration of visible and infrared images", *Proceedings of the SPIE Conference on Architecture, Hardware and Forward-looking Infrared Issues in Automatic Target Recognition*, pp. 1-12, Orlando, Florida, May 1993
27. Jakub Segen and Kristin J. Dana, "Parallel symbolic computation for deformable shapes," *From Pixels to Features II*, Papers from the Bonas workshop, pp. 387-400, August 27-September 1 1990, Amsterdam: North Holland 1991

Medical Conference Poster

- Frank P. Murphy, Babar K. Rao, Oana G. Cula and Kristin J. Dana, "Standardized Digital Photography: A Novel Approach for Directional Imaging," *61st Annual Meeting of American Academy of Dermatology*, March 21-26, 2003, San Francisco, California

Conference Courses

- Kristin J. Dana, "Surface Appearance: Texture and Reflectance", **ACM SIGGRAPH 2000** (*Association for Computing Machinery, Special Interest Group in Graphics*) Course Title: "Image-based Surface Detail", New Orleans, Louisiana, July 24, 2000

Electronic Articles and Databases

- *Rutgers Skin Texture Database*: Quantitative characterization of skin appearance has potential uses in many fields and applications including realistic rendering for computer graphics, robust

face models for computer vision, computer assisted diagnosis for dermatology, topical drug efficacy testing for the pharmaceutical industry and quantitative comparison for cosmetics.

www.caip.rutgers.edu/rutgers_texture

(refereed as part of Skin Texture Modeling, IJCV 2005 journal article listed above)

- *Columbia-Utrecht Reflectance and Texture Database (CURET)*: Database of precise reflectance measurements that has become the popular standard database for algorithm testing.

www.cs.columbia.edu/CAVE/curet

(refereed as part of ACM Transactions on Graphics 1999 journal article listed above)

Invited Talks and Demonstrations

1. “Computational Skin Texture Modeling,” Grasp Lab Vision Talks, *University of Pennsylvania*, Philadelphia, PA, November 2005
2. “Imaging and Modeling Surface Detail,” University of Maryland Vision Seminar, *University of Maryland, College Park*, Fall 2005
3. “Computational Skin Modeling and Imaging,” *Thirteenth Color Imaging Conference*, Society for Imaging Science and Technology, Scottsdale, Arizona, Invited Talk, November 9, 2005
4. “Surface Models for Graphics and Medicine,” Princeton Graphics Group Lunchtime Talks, *Princeton University*, October 2005
5. “Quantitative Photography for Measuring Skin Texture”, Volunteer Faculty Summer Lecture Series, *University of Medicine and Dentistry of New Jersey (UMDNJ)- Robert Wood Johnson Clinical Research Center*, New Brunswick, NJ, July 8, 2005
6. “Capturing and Modeling Surface Detail,” Yale Vision Talks, *Yale University*, New Haven, Connecticut, April 14, 2005
7. “Capturing and Modeling Surface Detail,” Siemens Vision Talks, *Siemens Corporate Research*, Princeton, NJ, April 5, 2005
8. “Models and Measurements of Skin Texture,” Carnegie Mellon Vision Talks, *Carnegie Mellon University*, Pittsburgh, PA, March 25, 2005
9. “Computational Skin Texture,” Proctor and Gamble Invited Talks, *Proctor and Gamble*, Cincinnati, Ohio, Wednesday February 16, 2005
10. “Skin Texture Modeling,” Oana G. Cula and Kristin J. Dana, J&J Invited Talks, *Johnson & Johnson*, Skillman, NJ, February 8, 2005
11. “Imaging Skin Texture,” Sarnoff Vision Talks, *Sarnoff Corporation*, Princeton, NJ, November 12 2004
12. “Surface Modeling using Bidirectional Texture Functions,” Computer Vision Talk Series, *Columbia University*, New York, NY, February 2002
13. “Models and Measurements of 3D Texture,” Computer Vision Talk Series, *NEC Research Institute*, Princeton, NJ 08540, February 2000
14. “3D Texture Models,” The Rutgers Series on Human and Computer Vision, *Dept of Psychology, Rutgers University*, March 27, 2000
15. “Models and Measurements of 3D texture,” Workshop on Color and Appearance, *NIST National Institute of Standards and Technology*, Gaithersburg, MD, March 30 2000
16. “Models and Measurements of 3D texture,” Workshop on Rendering, Perception and Measurement, Optical Measurements, *Cornell University*, April 1999

17. “Change Detection for Mammograms”, Sarnoff Demonstration at Central Intelligence Agency Press Conference, *National Photographic Interpretation Center (NPIC)*, Washington D.C., April 4, 1995
18. “Change Detection in Serial Mammograms”, *Capitol Hill Briefing on Breast Cancer Detection*, organized by Dr. Susan J. Blumenthal, Deputy Assistant Secretary for Women's Health for Director of Central Intelligence R. James Woolsey, Rayburn House Office Building, Capitol Hill, Washington D.C., October 11, 1994

Reviewer

Conferences:

- CVPR (IEEE Computer Vision and Pattern Recognition), Program Committee 2001-2005
- ICCV (International Conference on Computer Vision), Program Committee 2001
- ACM SIGGRAPH (Special Interest Group in Computer Graphics)
- ECCV (European Conference on Computer Vision), Program Committee 2004-2005
- International Workshop on Texture Analysis (Texture 2002-2005) Program Committee
- ACCV 2006, 7th Asian Conference on Computer Vision Program Committee
- Eurographics Workshop on Rendering

Journals:

- IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)
- Journal of the Optical Society of America
- IEEE Signal Processing
- IEEE Transactions on Circuits and Systems
- Computer Vision and Image Understanding
- Computer Graphics Forum

Panels

- NSF Robotics and Human Augmentation (VIS04-2) Reviewer February 2004
- NSF Robotics and Human Augmentation (RHAVIS-4) Reviewer Spring 2002
- NSF Robotics and Human Augmentation (RHA) Program Panel Fall 2001

PhD Thesis Committees

- External Reader of PhD Dissertation, Electrical Engineering Department, *Yale University*, Melissa L. Koudelka, “Capture, Analysis and Synthesis of Textured Surfaces with Variation in Illumination, Viewpoint and Time”, Advisor: Peter Belhumeur, Fall 2004
- Haifeng Chen, PhD, Department of Electrical and Computer Engineering, *Rutgers University*, “Projection based Robust Estimators for Computer Vision”, Advisor: Peter Meer, May 2004
- External Committee Member for PhD Defense, *Columbia University*, Rahul Swaminathan, “Non-perspective Imaging Systems”, Advisor: Shree Nayar, August 2003
- External Committee Member for PhD Defense, *Columbia University*, Srinivas Narasimhan, “Computer Vision in Bad Weather”, Advisor: Shree Nayar, December 2003

MS Thesis Committees

Department of Electrical and Computer Engineering, Rutgers University:

- Devdatt Lad, “Robust Feature Correspondence and Tracking for a Real-Time Novel View Synthesis System,” Advisor: Richard Mammone, August 2005
- Manoj Bave, “Automatic planar patch detection and homographic transfer for real-time novel view synthesis,” Advisor: Richard Mammone, June 2005
- Arpit Mathur, “A Composite Application Development Paradigm Using Java and Macromedia Flash,” Advisor: Ivan Marsic, September 2004
- Tilottama Roy, “An Interactive Feature Tracking Visualization Tool,” Advisor: Deborah Silver September 2001
- Arindam Bhattacharya, “Developing A Volume Animation toolkit,” Advisor: Deborah Silver June 2001
- Kun Xu, “Performance Analysis in Content-based Retrieval with Textures,” Advisor: Peter Meer February 2000
- Chengwei Feng, “A Methodology for Plume Visualization,” Advisor: Deborah Silver, December 1999

External Collaborators

- Alice Gottlieb, Frank Murphy, Babar Rao, UMDNJ-RWJ (University of Medicine and Dentistry of New Jersey/ Robert Wood Johnson)
- Gabriella Livescu, Visiting Professor, Bell Labs Scientist, Lambdacore, LLC

Departmental/University Activities

- ECE Graduation Day Marshall, 2005, 2004, 2002, 2001, 2000
- ECE Freshman Orientation Lecturer, 2004, 2001, 2000
- University Applied Sciences Committee 2005-2009
- ECE Graduate Student Orientation Lecturer, August 2001
- Graduate Admissions Committee 2005, 2004, 2002, 2000
- ECE Open House student demos 2004, 2005
- University Hearing Board (Fall 2000-2001)