Gabriel J. Brostow

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Education

May 2004 — **Ph.D., Computer Science**
Georgia Institute of Technology
Thesis: Novel Skeletal Representation For Articulated Creatures
Advisor: Prof. Irfan A. Essa
Minor: Architectural Design Tools & Interfaces

May 2004 — **M.S., Computer Science**
Georgia Institute of Technology

Dec. 1996 — **B.S., Electrical Engineering**
University of Texas at Austin

Academic & Teaching Experience

2004-Present — **University of Cambridge** — Cambridge, U.K.
Postdoctoral Research Fellow - Machine Intelligence Laboratory
Managed PhD and MEng students in joint research projects on motion analysis, forensics, image synthesis, and deformable 3*D* surface capture. Co-PI on object recognition grant.

1997-2004 — **Georgia Institute of Technology** — Atlanta, GA
Graduate Research Assistant - Graphics, Visualization, and Usability Center
Performed basic research on graphics and computer vision algorithms to automatically construct 2, $2\frac{1}{2}$, and 3D models from motion. Built prototype applications in domains of animation, human-computer interaction, and security monitoring. Mentored and trained younger students and undergraduates.

Spring 2002 — **Georgia Institute of Technology** — Atlanta, GA
Co-Instructor - Digital Video Special Effects
Co-created curriculum, presented lectures, and held lab sessions. This project-course has students apply research from graphics, animation, and vision to create new special effects. Teams design and implement working systems to produce original short films.

1999-2001 — **Georgia Institute of Technology** — Atlanta, GA
Teaching Assistant - Digital Video Special Effects
Taught camera usage and digital video & audio editing. Counseled teams through production of over 30 short films. Built and lit blue screen sets and camera rigs.

1994-1996 — **University of Texas at Austin** — Austin, TX
Undergraduate Research Assistant - ECE Lab for Intelligent Processes and Systems
Designed lab demo movies and constructed 3D animations/presentations. Programmed graphical user interfaces for autonomous-agent testbed applications.

1992-1993 — **University of North Texas** — Denton, TX
Undergraduate Research Assistant - Dept. of Physics Semiconductor Laboratory
Administered and tested a new technique for measuring doping levels of semiconductor samples non-invasively using the Faraday Rotation effect.

Industrial Work Experience

Summer 2001 **Industrial Light & Magic** San Rafael, CA
Research Intern - Research and Development Group
Researched motion capture innovations for recording on-set performances of actors.

Summer 2000 **Microsoft Research** Redmond, WA
Research Intern - Vision Based Interaction Group
Developed new multi-hypothesis person-locating system for use with multiple unsynchronized cameras.

1997 **Lockheed - Sanders** Nashua, NH
Software Engineer I - Mapping, Cartography, and Information Group
Designed and programmed interfaces for field-usable digital map-retrieval applications to be used by emergency-response and military personnel. Prototyped graphics and network libraries for inclusion in subsequent application versions.

Summer 1995 **IBM** Rochester, MN
Software Engineering Co-op - AS/400 Systems Management Group
Helped design and program OS/2 software to communicate with AS/400 systems. Updated content and interface behavior of graphical marketing program.

Summer 1994 **Fraunhofer Institute for Applied Solid-State Physics** Freiburg/Br., Germany
Visiting Research Assistant - Semiconductor Division
Designed and assembled optical laser systems. Programmed and automated high-vacuum, high magnetic-field, and low-temperature equipment controllers.

Refereed Publications

Note: The top 3 computer vision conferences (ICCV, ECCV, CVPR) are highly competitive with low acceptance rates of less than 30%. ICCV and ECCV have CiteSeer impact factor rankings in the top 5% and 7%, respectively, of all computer science journals and conferences. SIGGRAPH is within the top 1%.

G. J. Brostow and R. Cipolla, "Unsupervised Bayesian Detection of Independent Motion in Crowds," in Proceedings of IEEE International Conference on Computer Vision and Pattern Recognition, Vol I: 594-601, June 2006.

M. Johnson, G. J. Brostow, J. Shotton, O. Arandjelovic, V. Kwatra, R. Cipolla, "Semantic Photo Synthesis," Computer Graphics Forum (Proc. Eurographics) Volume 25, #3, p407-413, 2006.

A. R. Shen, G. J. Brostow, R. Cipolla, "Toward Automatic Bloodspatter Analysis in Crime Scenes," In Proceedings IET Crime and Security Conference (Imaging for Crime Detection and Prevention), p378-383, 2006.

M. Wilczkowiak, G. J. Brostow, B. Tordoff, and R. Cipolla, "Hole Filling Through Photomontage," in Proceedings of British Machine Vision Conference 2005, Oxford, United Kingdom, September 5-8, 2005.

G. J. Brostow, I. A. Essa, D. Steedly, and V. Kwatra, "Novel Skeletal Representation For Articulated Creatures," in Proceedings of European Conference on Computer Vision 2004, Prague, Czech Republic, May 11-14, 2004.

K. E. Sukel, R. Catrambone, I. A. Essa, and G. J. Brostow, "Presenting Movement in a Computer-Based Dance Tutor," in International Journal of Human-Computer Interaction, 15(3), p433-452 2003.

G. J. Brostow, and I. A. Essa, "Image-Based Motion Blur for Stop Motion Animation," in ACM SIGGRAPH 2001 Proceedings.

I. A. Essa, and G. J. Brostow, "A Course on Digital Video Special Effects," in Proceedings of the IEEE CS Workshop on Undergraduate Education & Image Computation (held with CVPR), Hilton Head, South Carolina, June, 2000.

J. O' Brien, B. Bodenheimer, G. J. Brostow, and J. Hodgins, "Automatic Joint Parameter Estimation From Magnetic Motion Capture Data," Graphics Interface 2000, Montreal, Canada.

G. J. Brostow, and I. A. Essa, "Motion Based Decompositing of Video," in Proceedings of IEEE International Conference on Computer Vision 1999, Corfu, Greece, September 1999.

A. J. Syllaios, L. Colombo, D. Chandra, J. Dodge, H. D. Shih, M. Bevan, C. L. Littler, G. J. Brostow, X. N. Song, C. R. Christensen, J. A. Grisham, and F. W. Clarke, "Magneto-Optical Characterization of HgCdTe Thin Films," in Producibility of II-VI Materials and Devices, Proceedings of SPIE 2228, 309, February 1994.

A. J. Syllaios, V. C. Lopes, L. Taylor, M. Woosley, C. L. Littler, G. J. Brostow, C. R. Christensen, J. A. Grisham, and F. W. Clarke, "Progress on Magneto-Optical Characterization of LWIR HgCdTe," in Proceedings of the 1993 IRIS Specialty Group on Infrared Materials (classified).

Videos

"Unsupervised Bayesian Detection of Independent Motion in Crowds," on DVD: Video Proceedings for CVPR 2006.

"Digital Video Special Effects Archive Collection: 1999-2002," DVD & VHS
Mentored and co-produced.

"An Alien Occurrence," In LCC Video Opticon 98 at Georgia Institute of Technology
Modeled sets, animated cloth simulations.

Ph.D. Examiner / Thesis Committees

M. Eng, Amy Rui Shen, May 2006
3D Origin of Impact Localisation from Liquid Spatter Patterns
Dept of Engineering, University of Cambridge

Undergraduate Student Supervision

Nathan Robertson, **B.S. Computer Science**, 2005
Multi-view video segmentation and character lighting.

James Hays, **B.S. Computer Science**, 2003
Non-photorealistic rendering of images and video.
Ph.D. Student at Carnegie Mellon University.

Anil Rohatgi, **B.S. Electrical & Computer Engineering**, 2005
Creature Capture multi-camera light stage.
M.S. Electrical & Computer Engineering, 2006

Clinton Hidinger, **B.S. Computer Science**, 2002
Spoke-based remeshing of spines for keyframing and rendering.

Scott Carter, **B.S. Computer Science**, 2002
VIPeR Toolkit (Video & Image Processing and Rendering); Surface-ripple animation tool
Core Technology Group, Electronic Arts Los Angeles.

Spencer Reynolds, **B.S. Electrical & Computer Engineering**, 2002
Software tools for camera synchronization, deinterlacing, and segmentation.
Motion Capture Group, Industrial Light & Magic

Tim Keenan, **B.S. Computer Science**, 2001
Primatech project: American Sign Language animation and training for installation at orangutan exhibit at Zoo Atlanta.
DreamWorks SKG

Robby Walia, **B.S. Computer Science**, 2000
View interpolation extensions.

Frank Castaneda, **B.S. Computer Science**, 2000
Tracking people with limited field-of-view cameras in the Aware Home.

Irwin Coleman, **M.S. Computer Science**, 1999
Voxel carving from silhouettes of calibrated cameras.

Paul Bennett, **B.S. Computer Science**, 1999
Developing rigid-object trackers as 3rd party plugins
Contract programmer.

Roberto Peon, **B.S. Computer Science**, 2000
Fast image-differencing in video; View-volume intersection with constructive solid geometry
Google.

Professional Service

Reviewer for ACM SIGGRAPH, Eurographics, Symposium on Computer Animation, IEEE ICCV, IEEE CVPR, ECCV, ICPR, 3DPVT, IEEE-CS Workshop on the Applications of Computer Vision, CVIU, IEEE Face & Gesture, IEEE TVCG, IEEE CG&A, IEEE T-PAMI

Member of IEEE, ACM, BMVA, and IET

Honors

Visiting Fellow, St. John's College, University of Cambridge	2004 - 2007
Georgia Tech College of Computing Outstanding Ph.D. Dissertation	2005
Visiting Fellow, Wolfson College, University of Cambridge	2004 - 2006
Marshall Sherfield Post-Doctoral Fellow	2004 - 2005
Georgia Tech College of Computing Outstanding Graduate Teaching Assistant	2001
Intel Foundation Ph.D. Fellowship	2000 - 2001
National Science Foundation Graduate Research Traineeship in HCI	1998 - 2000
Dean Grant for Undergraduate Research, University of Texas at Austin	1995
University of Texas at Austin Honors Engineering Scholarship	1993
Texas Academy of Mathematics and Science Summer Research Scholarship	1992

Funding

Object Recognition and Segmentation by Modelling Texture, Shape and Motion Context
Granted by Toyota Motor Corporation for 2006/2007: **305k Euros**
Co-author with Roberto Cipolla

Invited Talks and Presentations

Studying Motion Patterns
Dept of Computer & Information Science, University of Pennsylvania, 12 March 2007
Dept of Electrical Eng & Computer Science, University of Central Florida, 8 March 2007
Dept of Engineering Science, University of Oxford, 26 Feb 2007

Intrinsic Images for Computational Photography
Dept of C.S., Technical University of Catalonia, Barcelona, Spain, 10 July 2006

Toward Automatic Bloodspatter Analysis in Crime Scenes
IET (formerly IEE) Crime and Security Conference, London, UK, 13 June 2006

Detection of Independent Motion in Crowds
Institute of Physics, Jagellonian University, Krakow, Poland, 18 May 2006
AGH University of Science and Technology, Krakow, Poland, 16 May 2006
Dept of Zoology, University of Oxford, 23 Feb 2006

Detecting People in Crowds by Bayesian Clustering
Intel Research Laboratory, Seattle, WA, 16 Aug 2005
CSAIL Machine Vision Colloquium, MIT, 25 May 2005

Motion in Crowds & Blood Spatter Analysis
London Metropolitan Police, Public Order Training Grounds,
Chemical, Biological, Radiological and Nuclear (CBRN) Response, 5 Dec 2005

Finding Spines In Articulated Creatures
Computer Laboratory, Rainbow Group Seminar, University of Cambridge, 11 Nov 2004

Do's and Don'ts of Graduate Studies
GVU Brown Bag Series, Georgia Tech, 2 Sep 2004

Novel Skeletal Representation For Articulated Creatures
ECCV, Prague, Czech Republic, 13 May 2004

Vision-Based Computer Perception
Dept of Electrical Engineering, Cracow University of Technology, 6 June 2003

Digital Special Effects: Home-made Technology Supporting Art
Dept Mechanical Engineering, Cracow University of Technology, 5 June 2003

Vision-Based Computer Perception
Dept of Psychology: Sensation and Perception, Georgia Tech, 24 March 2003

Overview of Vision-Based Computer Perception
Dept of Architecture: Parametric CAD as a Design Aid, Georgia Tech, 18 March 2003

Processing Video Data for HCI Purposes
HCI: Principles of User Interface Software, Georgia Tech, 23 Oct 2002

Image-Based Motion Blur for Stop Motion Animation
ACM SIGGRAPH, Los Angeles, CA, 17 Aug 2001
ILM (Industrial Light & Magic), San Rafael, CA, 2 Aug 2001

Motion Based Decompositing of Video
IEEE ICCV, Corfu, Greece, 23 Sept 1999

References

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