

Philippos Mordohai
Postdoctoral Researcher
Department of Computer and Information Science
University of Pennsylvania

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EDUCATION

Ph.D. in Electrical Engineering University of Southern California, Los Angeles, CA (2005)
Doctoral thesis: "A Perceptual Organization Approach for Figure Completion, Binocular and Multiple-View Stereo and Machine Learning using Tensor Voting". Advisor: Gérard Medioni.
GPA: 3.95

M.S. in Electrical Engineering, University of Southern California, Los Angeles, CA (2000)
GPA: 3.92

Diploma in Electrical and Computer Engineering, Aristotle University of Thessaloniki, Greece (1998)

Diploma thesis: "Netscape Navigator plug-in for decoding pyramid-encoded medical images with watermarks". Advisor: Michael G. Strintzis. GPA: 8.14/10 (best among graduating class of June 1998)

RESEARCH INTERESTS

- Binocular, multiple-view and video-based 3D reconstruction
- Perceptual organization
- 3D shape representation and object recognition
- Machine learning

RESEARCH EXPERIENCE

Postdoctoral Researcher Department of Computer and Information Science, University of Pennsylvania (UPenn) **Aug 2007 - present**

I work with K. Daniilidis, J. Shi and B. Taskar on the DARPA Urban Reasoning and Geospatial Exploitation Technology (URGENT) program. The goal is the analysis of very large point clouds captured in urban environments by terrestrial and airborne LIDAR sensors. I also work on projects related to 3D shape representation and object recognition, supervise students, participate in meetings with the prime contractor and the funding agency and contribute to the submission of grant proposals.

Postdoctoral Research Associate Department of Computer Science, University of North Carolina at Chapel Hill (UNC) **Sep 2005 - Jul 2007**

I worked with M. Pollefeys on a complete system for real-time, video-based reconstruction of urban environments, captured by multiple cameras on a moving vehicle under the DARPA UrbanScape program. I also worked on several projects related to 3D reconstruction as well as on methods to achieve temporally consistent reconstruction. I supervised several graduate students, prepared for and participated in project-related meetings and contributed in the preparation of proposals to funding agencies.

Research Assistant Department of Computer Science, University of Southern California (USC) **Jan 2000 - Aug 2005**

I worked with G. Medioni on computer vision, perceptual organization, machine learning, 3D face modeling and recognition. I also contributed in the preparation of several grant proposals.

Research Assistant Department of Electrical Engineering, USC **Jan - May 1999**
Affiliated with the Signal and Image Processing Institute. Performed research on segmentation of MR images of the brain.

TEACHING

Lecturer Short Course in conjunction with the IEEE International Conference on Computer Vision and Pattern Recognition, Minneapolis, Minnesota, USA **June 2007**

Designed and taught a four-hour short course entitled "Tensor Voting: A Perceptual Organization Approach for Computer Vision and Machine Learning".

Tutorial Instructor Department of Computer Science, UNC **Fall 2005**

Designed and taught ten-week tutorial on "Multiple View Geometry", based on R. Hartley's and A. Zisserman's "*Multiple View Geometry in Computer Vision*". Attendees to the tutorial included graduate students, research staff and faculty of the department.

Substitute Instructor Department of Computer Science, UNC **Fall 2006**

Gave two lectures for the graduate level "3D Urban Modeling" course.

Substitute Instructor Department of Computer Science, UNC **Fall 2005**

Gave four lectures for the graduate level "Recent Advances in Computer Vision and Image Analysis" course.

Guest Lecturer Department of Computer Science, USC **Spring 2005**

Gave one lecture for the graduate level "Advanced Topics in Computer Vision" course.

Substitute Instructor Department of Computer Science, USC **Fall 2004**

Gave one lecture for the graduate level "Computer Vision" course.

Mentor Viterbi School of Engineering, USC **2004-2005**

Mentored undergraduate students (a freshman and three juniors) performing research in computer vision.

PUBLICATIONS

Dissertations and Book

1. **P. Mordohai** and G. Medioni. *Tensor Voting: A Perceptual Organization Approach to Computer Vision And Machine Learning*. A.C. Bovik (ediotr). Synthesis Lectures on Image, Video, and Multimedia Processing. Morgan & Claypool. 136 pages. November, 2006
2. **P. Mordohai**. *A Perceptual Organization Approach for Figure Completion, Binocular and Multiple-View Stereo and Machine Learning using Tensor Voting*. Ph.D. Thesis. August, 2005
3. **P. Mordohai**. *Netscape Navigator plug-in for decoding pyramid-encoded medical images with watermarks*.(In greek). Diploma thesis. Electrical and Computer Engineering Department Aristotle University of Thessaloniki, Greece. June, 1998

Journal Articles

1. M. Pollefeys, D. Nistér, J.-M. Frahm, A. Akbarzadeh, **P. Mordohai**, B. Clipp, C. Engels, D. Gallup, S.-J. Kim, P. Merrell, C. Salmi, S. Sinha, B. Talton, L. Wang, Q. Yang, H. Stewénius, R. Yang, G. Welch, H. Towles. *Detailed Real-Time Urban 3D Reconstruction From Video*. International Journal of Computer Vision, published online, 2007. (impact factor: 6.09 first in Computer Science AI in 2006)
2. **P. Mordohai** and G. Medioni. *Stereo using Monocular Cues within the Tensor Voting Framework*. IEEE Trans. on Pattern Analysis and Machine Intelligence, vol. 28, no. 6, pp. 968-982, June 2006. (impact factor: 4.31 second in Computer Science AI in 2006)
3. W.S. Tong, C.K. Tang, **P. Mordohai**, and G. Medioni. *First Order Augmentations to Tensor Voting for Boundary Inference and Multiscale Analysis in 3-D*. IEEE Trans. on Pattern Analysis and Machine Intelligence, vol. 26, no. 5, May 2004, pp: 594 - 611. (impact factor: 4.35 second in Computer Science AI in 2004)
4. M.S. Lee, G. Medioni and **P. Mordohai**. *Inference of Segmented Overlapping Surfaces from Binocular Stereo*. IEEE Trans. on Pattern Analysis and Machine Intelligence, vol. 24, no. 6, June 2002, pp. 824-837. (impact factor: 2.92 second in Computer Science AI in 2002)

Book Chapters

1. G. Medioni and **P. Mordohai**. *Saliency in Computer Vision*. In *Neurobiology of Attention*, L. Itti, G. Rees, and J. Tsotsos (editors), Elsevier Science, 2005.
2. G. Medioni, **P. Mordohai**, and M. Nicolescu. *The Tensor Voting Framework*. In *Handbook of Geometric Computing : Applications in Pattern Recognition, Computer Vision, Neuralcomputing, and Robotics*, E. Bayro-Corrochano (editor), Springer-Verlag, 2005.
3. G. Medioni and **P. Mordohai**. *The Tensor Voting Framework*. In *Emerging Topics in Computer Vision*, S.B. Kang and G. Medioni (editors), Prentice Hall, 2004.

Highly-Selective Conference Proceedings

1. V. Kwatra, **P. Mordohai**, S. Kumar Penta, R. Narain, M Carlson, M. Pollefeys and M. Lin. *Fluid in Video: Augmenting Real Video with Simulated Fluids*. Eurographics, 2008.
2. P. Merrell, A. Akbarzadeh, L. Wang, **P. Mordohai**, J-M. Frahm, R. Yang, D. Nistér and M. Pollefeys. *Real-Time Visibility-Based Fusion of Depth Maps*. International Conference on Computer Vision (ICCV), 2007. (acceptance rate for oral presentations: 3.9%)
3. E.S. Larsen, **P. Mordohai**, M. Pollefeys and H. Fuchs. *Temporally Consistent Reconstruction from Multiple Video Streams Using Enhanced Belief Propagation*. International Conference on Computer Vision (ICCV), 2007. (acceptance rate: 23.5%)
4. S. Sinha, **P. Mordohai** and M. Pollefeys. *Multi-View Stereo via Graph Cuts on the Dual of an Adaptive Tetrahedral Mesh*. International Conference on Computer Vision (ICCV), 2007. (acceptance rate: 23.5%)
5. D. Gallup, J.-M. Frahm, **P. Mordohai**, Q. Yang and M. Pollefeys. *Real-time Plane-sweeping Stereo with Multiple Sweeping Directions*. International Conference on Computer Vision and Pattern Recognition (CVPR), 2007. (acceptance rate: 27.5%)
6. **P. Mordohai** and G. Medioni. *Unsupervised Dimensionality Estimation and Manifold Learning in high-dimensional Spaces by Tensor Voting*. International Joint Conference on Artificial Intelligence, pp. 798-803, 2005. (acceptance rate for oral presentations: 18.1%)
7. **P. Mordohai** and G. Medioni. *Stereo using Monocular Cues within the Tensor Voting Framework*. European Conference on Computer Vision (ECCV), Lecture Notes in Computer Science, vol. 3024, pp 588-601, 2004. (acceptance rate for oral presentations: 7.4%)

Other Conference and Workshop Proceedings

1. P. Merrell, **P. Mordohai**, J.-M. Frahm and M. Pollefeys. *Evaluation of Large Scale Scene Reconstruction*. Virtual Representations and Modeling of Large-scale environments (VRML), 2007.
2. **P. Mordohai**, J.-M. Frahm, A. Akbarzadeh, B. Clipp, C. Engels, D. Gallup, P. Merrell, C. Salmi, S. Sinha, B. Talton, L. Wang, Q. Yang, H. Stewénus, H. Towles, G. Welch, R. Yang, M. Pollefeys and D. Nistér. *Real-Time Video-Based Reconstruction of Urban Environments.*, 3D-ARCH'2007: 3D Virtual Reconstruction and Visualization of Complex Architectures, 2007.
3. E.S. Larsen, **P. Mordohai**, M. Pollefeys and H. Fuchs. *Simplified Belief Propagation for Multiple View Reconstruction*. Third International Symposium on 3-D Data Processing, Visualization and Transmission (3DPVT), 2006.
4. **P. Mordohai** and G. Medioni. *Dense Multiple View Stereo with General Camera Placement using Tensor Voting*. Second International Symposium on 3-D Data Processing, Visualization and Transmission (3DPVT), 2004.
5. **P. Mordohai** and G. Medioni. *Junction Inference and Classification for Figure Completion using Tensor Voting*. Workshop on Perceptual Organization in Computer Vision (POCV), pp. 56-64, 2004.
6. O. Dor, **P. Mordohai**, C.G. Sammis. and Y. Ben-Zion. *Slip Surfaces in Fault Breccia From the Sierra Madre Fault Zone: Geometry and Mechanical Implications*. SECE, Proceedings and Abstracts, 2003.

7. **P. Mordohai**, O. Dor, J. Zechar, C.G. Sammis. and Y. Ben-Zion. *Slip Surfaces in Fault Breccia From the Sierra Madre Fault Zone: Geometry and Mechanical Implications*. American Geophysical Union, EOS, 2003.
8. **P. Mordohai** and G. Medioni. *Perceptual Grouping for Multiple View Stereo using Tensor Voting*. International Conference on Pattern Recognition (ICPR), vol. 3, pp. 639-644, 2002.
9. **P. Mordohai**, G. Medioni, and M.S. Lee. *Inference of Segmented Overlapping Surfaces from Binocular and Multiple-View Stereo*. Third Workshop on Perceptual Organization in Computer Vision (POCV), 2001.

Invited Conference and Workshop Proceedings

1. A. Akbarzadeh, J.-M. Frahm, **P. Mordohai**, B. Clipp, C. Engels, D. Gallup, P. Merrell, M. Phelps, S. Sinha, B. Talton, L. Wang, Q. Yang, H. Stewenius, R. Yang, G. Welch, H. Towles, D. Nistér and M. Pollefeys. *Towards Urban 3D Reconstruction From Video*. Third International Symposium on 3-D Data Processing, Visualization and Transmission (3DPVT), 2006.

INVITED LECTURES AND PRESENTATIONS

1. *Three Tales of Reconstruction: Real-time, Accurate and Temporally Consistent*, at the Computer Vision seminar, University of Southern California, hosted by Gérard Medioni, October 2007.
2. *Stereo using Tensor Voting, Real-Time Urban Modeling and other Tales of Reconstruction*, at the GRASP Laboratory seminar, University of Pennsylvania, hosted by Kostas Daniilidis, May 2007.
3. *A Perceptual Organization Approach for Figure Completion, Binocular and Multiple-View Stereo and Machine Learning using Tensor Voting*, at the Image Lunch, University of North Carolina at Chapel Hill, hosted by Stephen Pizer, November 2005.
4. *Binocular and Multiple View Stereo using Tensor Voting*, at the Digital Technology Center, University of Minnesota, hosted by Stergios Roumeliotis, March 2005.
5. *The Tensor Voting Framework*, at the Computer Graphics and Immersive Technologies group, University of Southern California, hosted by Ulrich Neumann, June 2003.
6. *Multiple View Stereo using Tensor Voting*, at the Machine Vision Group, Jet Propulsion Laboratory, NASA, hosted by Larry Matthies, May 2002.

AWARDS

- Best Demo Award for *Real-Time Video-Based Reconstruction of Urban Environments* by J.-M. Frahm, A. Akbarzadeh, **P. Mordohai**, B. Clipp, C. Engels, D. Gallup, P. Merrell, C. Salmi, S. Sinha, B. Talton, L. Wang, Q. Yang, H. Stewenius, H. Towles, G. Welch, R. Yang, D. Nistér and M. Pollefeys during the International Conference on Computer Vision and Pattern Recognition (CVPR), Minneapolis, Minnesota, USA, June 2007.

- Listed in Marquis Who's Who in Science and Engineering 2007.
- USC Integrated Media Systems Center Award for Excellence in Technology Demonstrations, 2003.
- Phi-Kappa-Phi All-University Honor society, The University of Southern California Chapter, 2000.
- National Scholarship Foundation of Greece (top 5 GPA in ECE Department), 1997 and 1998.
- Award of excellence in the Greek Mathematical Society Annual Student Contest, 1990, 1992 and 1993.

PH.D. COMMITTEE MEMBER

- E. Scott Larsen, *Temporal Multi-View Reconstruction Using Enhanced Belief Propagation*, Department of Computer Science, UNC, October 2006.

PROFESSIONAL AFFILIATIONS AND SERVICE

- Chair of local organization for the Third International Symposium on 3-D Data Processing, Visualization and Transmission, Chapel Hill, North Carolina, June 2006.
- Reviewer for the International Journal of Computer Vision, the IEEE Transactions on Pattern Analysis and Machine Intelligence, the IEEE Transactions on Image Processing, the IEEE Transactions on Neural Networks, the Computer Vision and Image Understanding journal, the Machine Vision and Applications Journal, The Visual Computer, the Elsevier journal on Signal Processing, the Elsevier journal on Computers & Geosciences and the IEE Electronic Letters.
- Reviewer/Member of the program committee of the European Conference on Computer Vision 2008, the International Conference on Robotics and Automation 2008, the International Conference on Computer Vision 2007, the Asian Conference on Computer Vision 2007, the ACM Symposium on Solid and Physical Modeling 2007, the IEEE International Conference on Computer Vision and Pattern Recognition 2007 the Third International Symposium on 3-D Data Processing, Visualization and Transmission 2006, the European Conference on Computer Vision 2006 and the workshop on Perceptual Organization in Computer Vision 2004.
- Member of the IEEE and the IEEE computer society since 2001.