

Philippos Mordohai
Assistant Professor
Department of Computer Science
Stevens Institute of Technology

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EDUCATION

Ph.D. in Electrical Engineering University of Southern California, Los Angeles, CA (2005)

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

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

RESEARCH INTERESTS

- Binocular, multiple-view and video-based 3D reconstruction
- Perceptual organization
- 3D shape representation and object recognition
- Large-scale visual processing and structure inference
- Machine learning

PROFESSIONAL EXPERIENCE

Assistant Professor Department of Computer Science, Stevens Institute of Technology
Aug 2008 - present

Postdoctoral Researcher Department of Computer and Information Science, University of Pennsylvania
Aug 2007 - Aug 2008

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

RESEARCH GRANTS

1. DHS Exploratory Research: *Development of Volumetric Imaging Methods for Reliable Detection of Nuclear Materials*, PI: L. Mihalescu (Lawrence Berkeley National Laboratory), Stevens PI: P. Mordohai. 09/2010-08/2013.
2. Google Research Awards: *Object Recognition in Large-Scale Scenes from Video and Point Cloud Streams*, PI: P. Mordohai, co-PIs: G. Kamberov and G. Kamberova. 03/2010.
3. NSF Robust Intelligence: *Organizing Recognition: the Uses of Perceptual Organization*, PI: J. Oliensis, co-PI: P. Mordohai. 09/2009-09/2012.
4. NSF Computing Research Infrastructure: *Flexible Mobile Platforms for Continuous Range and Imagery Collection*, PI: G. Kamberov, co-PIs: P. Mordohai, G. Kamberova, H.Q. Dinh and J. Oliensis. 08/2009-07/2012.

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 (editor). 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. **P. Mordohai** and G. Medioni. *Dimensionality Estimation, Manifold Learning and Function Approximation using Tensor Voting*. Journal of Machine Learning Research, vol 11, pp. 411-450, 2010. (impact factor: 2.682 7th in Computer Science AI in 2007)
2. 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 (acceptance rate for oral presentations: 19.3%); also in Computer Graphics Forum, vol. 27, no. 2, p. 487-496, 2008. (impact factor in 2007: 1.107)
3. 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. Stewénus, R. Yang, G. Welch, H. Towles. *Detailed Real-Time Urban 3D Reconstruction From Video*. International Journal of Computer Vision, vol. 78, no. 2-3, pp. 143-167, July 2008. (impact factor: 6.09 first in Computer Science AI in 2006)
4. **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)
5. 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, pp. 594 - 611, May 2004. (impact factor: 4.35 second in Computer Science AI in 2004)

6. 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, pp. 824-837, June 2002. (impact factor: 2.92 second in Computer Science AI in 2002)

Highly-Selective Conference Proceedings

1. L. Xu and **P. Mordohai**. *Automatic Facial Expression Recognition using Bags of Motion Words*. British Machine Vision Conference (BMVC), 2010. (acceptance rate: 34%)
2. X. Hu and **P. Mordohai**. *Evaluation of Stereo Confidence Indoors and Outdoors*. International Conference on Computer Vision and Pattern Recognition (CVPR), 2010. (acceptance rate: 26.8%)
3. A. Toshev, **P. Mordohai** and B. Taskar. *Detecting and Parsing Architecture at City Scale from Range Data*. International Conference on Computer Vision and Pattern Recognition (CVPR), 2010. (acceptance rate: 26.8%)
4. **P. Mordohai**. *The Self-Aware Matching Measure for Stereo*. International Conference on Computer Vision (ICCV), 2009. (acceptance rate: 23.5% in 2007)
5. A. Patterson, **P. Mordohai** and K. Daniilidis. *Object Detection from Large-Scale 3D Datasets using Bottom-up and Top-down Descriptors*. European Conference on Computer Vision (ECCV), Vol. 4, pp. 553-566, 2008. (acceptance rate: 27.9%)
6. D. Gallup, J.-M. Frahm, **P. Mordohai** and M. Pollefeys. *Variable Baseline/Resolution Stereo*. International Conference on Computer Vision and Pattern Recognition (CVPR), 2008. (acceptance rate for oral presentations: 4%)
7. 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%)
8. 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%)
9. 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%)
10. 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%)
11. **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%)
12. **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. H.Q. Dinh, L. Xu, **P. Mordohai** and T. Ramsay. *Detecting Patterns in Vector Fields*. accepted to AIAA Aerospace Sciences Meeting, 2011.
2. Q. Zhu and **P. Mordohai**. *A Minimum Cover Approach for Extracting the Road Network from Airborne LIDAR Data*. 3-D Digital Imaging and Modeling (3DIM), 2009.

3. 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.
4. **P. Mordohai**, J.-M. Frahm, A. Akbarzadeh, B. Clipp, C. Engels, D. Gallup, Merrell, C. Salmi, S. Sinha, B. Talton, L. Wang, Q. Yang, H. Stewénius, R. Yang, H. Towles, G. Welch, 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.
5. 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.
6. **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.
7. **P. Mordohai** and G. Medioni. *Junction Inference and Classification for Figure Completion using Tensor Voting*. Workshop on Perceptual Organization in Computer Vision (POCV), 2004.
8. 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.
9. **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.
10. **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.
11. **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.

Book Chapters

1. **P. Mordohai** and G. Medioni. *Manifold Learning*. In *Encyclopedia of Biometrics*, Stan Z. Li (editor), Springer, 2009.
2. G. Medioni and **P. Mordohai**. *Saliency in Computer Vision*. In *Neurobiology of Attention*, L. Itti, G. Rees, and J. Tsotsos (editors), Elsevier Science, 2005.
3. 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.
4. 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.

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.

Short Courses in International Conferences

1. **P. Mordohai**. *Tensor Voting: A Perceptual Organization Approach for Computer Vision and Machine Learning*. Short Course in conjunction with the IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), June 2007

PATENT

G. Medioni and **P. Mordohai**. *Tensor voting in N dimensional spaces*. United States Patent 7,953,675. Awarded, May 31, 2011.

INVITED LECTURES AND PRESENTATIONS

1. *Real-Time Large-Scale 3D Reconstruction from Video*, Department of Nuclear Engineering, University of California at Berkeley, hosted by Lucian Mihalescu, June 2010.
2. *Measuring Uncertainty in Stereo Reconstruction* (poster), International Workshop on Computer Vision, hosted by Gérard Medioni, Gabriella Saniti di Baja and Ramin Zabih, May 2010.
3. *Real-Time 3D Reconstruction and Range Data Analysis at Large Scales*, iRobot Corporation, hosted by Christopher Geyer, May 2010.
4. *Object Detection in Large-Scale Range Datasets and Temporally Consistent 3D Reconstruction*, Sarnoff Corporation, hosted by Elena Dotsenko, June 2009.
5. *Temporally Consistent 3D Reconstruction from Video*, Perceptual Science Series, Rutgers University, Center for Cognitive Science, hosted by Peter Meer, March 2009.
6. *Structure from Data*, Computer Science Seminar, Stevens Institute of Technology, hosted by George Kamberov, March 2008.
7. *Three Tales of Reconstruction: Real-time, Accurate and Temporally Consistent*, Computer Vision seminar, University of Southern California, hosted by Gérard Medioni, October 2007.
8. *Stereo using Tensor Voting, Real-Time Urban Modeling and other Tales of Reconstruction*, GRASP Laboratory seminar, University of Pennsylvania, hosted by Kostas Daniilidis, May 2007.
9. *A Perceptual Organization Approach for Figure Completion, Binocular and Multiple-View Stereo and Machine Learning using Tensor Voting*, Image Lunch, University of North Carolina at Chapel Hill, hosted by Stephen Pizer, November 2005.
10. *Binocular and Multiple View Stereo using Tensor Voting*, at the Digital Technology Center, University of Minnesota, hosted by Stergios Roumeliotis, March 2005.
11. *The Tensor Voting Framework*, at the Computer Graphics and Immersive Technologies group, University of Southern California, hosted by Ulrich Neumann, June 2003.
12. *Multiple View Stereo using Tensor Voting*, at the Machine Vision Group, Jet Propulsion Laboratory, NASA, hosted by Larry Matthies, May 2002.

TEACHING

CS 677: Multicore Platforms for Cognitive Gaming and Simulation Spring 2011.

CS 559: Machine Learning: Fundamentals and Applications Fall 2010.

CS 559: Machine Learning: Fundamentals and Applications Spring 2010.

CS 537: Interactive Computer Graphics Fall 2009.

CS 559: Machine Learning: Fundamentals and Applications Spring 2009.

Multiple View Geometry Ten-week tutorial, Department of Computer Science, UNC, Fall 2005.

AWARDS

- Best Reviewer award (1 of 51), IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2011.
- Outstanding Reviewer award, Asian Conference on Computer Vision (ACCV), 2010.
- 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. Stewénus, H. Towles, G. Welch, R. Yang, D. Nistér and M. Pollefeys at 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 2008, 2010.
- 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.

RESEARCH SUPERVISION

Research Advisor

- Xiaoyan Hu (Ph.D.), 2009-present
- Qiuxia Han (Ph.D.), 2009-present
- Konstantinos Batsos (M.S.), 2011-present

Alumni

- Liefei (Lucy) Xu (Ph.D. co-advised with H. Quynh Dinh), "Vector Field Analysis for Flow Pattern Detection and Video Analysis", 2011
- Morgan Baron (M.S. co-advised with G. Kamberov), 2011
- Wei Jiang (M.S.), 2010

Ph.D. Committee Member

- Bart Luczynski, Stevens Institute of Technology
- Jianhua Yao, Stevens Institute of Technology
- Wajahat Gilani, Rutgers University, Newark
- Yafeng Yin, Stevens Institute of Technology
- Yuhua Zheng, Stevens Institute of Technology
- Matthew Burlick, Stevens Institute of Technology
- Viorel Dragnea, *Shape from Intensity Regions*, Stevens Institute of Technology, May 2011
- Theodoros Kamakaris, *Dynamic Spectrum Access in Cellular Networks*, Stevens Institute of Technology, April 2010
- E. Scott Larsen, *Temporal Multi-View Reconstruction Using Enhanced Belief Propagation*, University of North Carolina, Chapel Hill, October 2006

M.S. Thesis Advisor

- Shivom Raval, *Performance Analysis of Web Servers*, April 2009

Undergraduate Independent Study or Research Supervisor

- Daniel Ready (senior), *Facial Expression Recognition*, Spring 2010
- Kirill Marants (sophomore), *3D Modeling of the S.C. Williams Library*, Spring 2010
- Ori Steele (sophomore), *The Music Chat-Bot*, Summer 2009
- Brittany Brandon (sophomore), *Object Detection in large-scale LIDAR Datasets*, UPenn, Summer 2008
- Zachary Bodnar (sophomore), *Object Detection in large-scale LIDAR Datasets*, UPenn, Summer 2008

Graduate Mentor for Undergraduate Students

- Altan Alparslan (junior), *3D Face Modeling*, USC, Fall 2004-Spring 2005
- Gurkan Gokul (junior), *3D Face Modeling*, USC, Fall 2004-Spring 2005
- Lily Cheng (freshman) *Development and Evaluation of Stereo Correspondence Methods with emphasis on Multi-Resolution Methods and Face Modeling*, USC, Fall 2004-Summer 2005
- Ammar Chinoy (junior) *Development and Evaluation of Stereo Correspondence Methods*, USC, Summer 2004

SERVICE

- CS Department Seminar Coordinator (Spring 2009-present)
- M.S. Advisor (Fall 2009-present)
- Member of CS Faculty Search Committee (2009-10, 2010-11)

- Member of CS Ph.D. Committee (2010-present)
- Member of CS IT Committee (2010-present)
- Member of Institute Undergraduate Promotions Committee (2011-13)

PROFESSIONAL AFFILIATIONS AND SERVICE

- Member of the Editorial Board of the Image and Vision Computing Journal (IVCJ)
- National Science Foundation (NSF) panelist, 2011
- Member of the Interest Group on 3D Rendering, Processing and Communications of the IEEE Multimedia Communication Technical Committee.
- Chair of local organization for the Third International Symposium on 3-D Data Processing, Visualization and Transmission, Chapel Hill, North Carolina, 2006.
- Program chair of the Vision and Graphics Computing for Multimedia Communications workshop held in conjunction with ICME 2011.
- Chair of the Seventh Workshop on Perceptual Organization in Computer Vision in conjunction with CVPR 2010.
- Program chair for the Search in 3D and Video workshop in conjunction with ICCV 2009.
- Program chair for the Search in 3D workshop in conjunction with CVPR 2008.
- Arrangements chair for the Sixth Workshop on Perceptual Organization in Computer Vision in conjunction with CVPR 2008.
- Member of the IEEE and the IEEE computer society since 2001
- Journal reviewer:
 - IEEE Transactions on Pattern Analysis and Machine Intelligence
 - IEEE Transactions on Image Processing
 - IEEE Transactions on Neural Networks
 - IEEE Transactions on Robotics
 - IEEE Transactions on Circuits and Systems for Video Technology
 - IEEE Transactions on Knowledge and Data Engineering
 - IEEE Transactions on Visualization and Computer Graphics
 - International Journal of Computer Vision (IJCV)
 - Computer Vision and Image Understanding Journal (CVIU)
 - Image and Vision Computing Journal (IVCJ)
 - Computer Graphics Forum
 - The Journal of Real-Time Image Processing

- Machine Vision and Applications Journal (MVA)
- Journal of Mathematical Imaging and Vision
- Presence
- EURASIP Journal of Image and Video Processing
- The Visual Computer
- Elsevier journal on Signal Processing
- Elsevier journal on Computers & Geosciences
- IEE Electronic Letters
- International Journal of Digital Multimedia Broadcasting
- Conference reviewer/member of program committee:
 - SIGGRAPH Asia, 2011
 - International Conference on Computer Vision (ICCV), 2011
 - Mediterranean Conference on Control and Automation (MED), 2011
 - 3DTV Conference, 2011
 - IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2011
 - International Conference on Robotics and Automation (ICRA), 2011
 - European Conference on Computer Vision (ECCV), 2010
 - Asian Conference on Computer Vision (ACCV), 2010
 - Multimodal Pervasive Video Analysis (MPVA), 2010
 - IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2010
 - 3DTV Conference, 2010
 - International Conference on Pattern Recognition (ICPR), 2010
 - International Conference on Robotics and Automation (ICRA), 2010
 - International Conference on Computer Vision Theory and Applications (VISAPP), 2010
 - International Conference on Image and Signal Processing (ICISP), 2010
 - Reconstruction and Modeling of Large-Scale 3D Virtual Environments (RMLE), 2010
 - International Conference on Computer Vision (ICCV), 2009
 - Asian Conference on Computer Vision (ACCV), 2009
 - Robotics Science and Systems (RSS), 2009
 - Demo awards committee for CVPR 2009
 - IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2009
 - 3DTV Conference, 2009

- International Conference on Robotics and Automation (ICRA), 2009
- European Conference on Computer Vision (ECCV), 2008
- SIGGRAPH Asia 2008
- Fourth International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT), 2008
- Technical Demonstrations of ACM Multimedia, 2008
- International Conference on Robotics and Automation (ICRA), 2008
- IEEE International Conference on Multimedia & Expo (ICME), 2008
- International Conference on Computer Vision (ICCV), 2007
- Virtual Representations and Modeling of Large-scale environments (VRML), 2007
- Asian Conference on Computer Vision (ACCV), 2007
- ACM Symposium on Solid and Physical Modeling, 2007
- International Conference on Computer Vision and Pattern Recognition (CVPR), 2007
- European Conference on Computer Vision (ECCV), 2006
- Fourth Workshop on Perceptual Organization in Computer Vision (POCV), 2004