

# Jason J. Corso

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## Education

**Ph.D. in Computer Science**, The Johns Hopkins University, 2005

Advisor: Dr. Gregory D. Hager

Dissertation Title: Techniques for Vision-Based Human-Computer Interaction.

**M.S.E. in Computer Science**, The Johns Hopkins University, 2002

Project 1 Advisor: Dr. Gregory D. Hager, Computational Interaction and Robotics Lab (CIRL)

Project 1 Title: Planar Surface Tracking Using Direct Stereo

Project 2 Advisor: Dr. Jonathan Cohen, Graphics Lab

Project 2 Title: Out-Of-Core Voxelizeation of Large Scalar Fields for Interactive Multiresolution Volume Rendering

**B.S. in Computer Science**, *Cum Laude*, Loyola College in Maryland, 2000

Advisor: Dr. Roger Eastman

**Chaminade High School**, Mineola, New York

## Publications

### Journal Articles

- 1 J. Corso, G. Ye, and G. Hager. Analysis of Multi-Modal Gestures with a Coherent Probabilistic Graphical Model. *Virtual Reality*, 2005. (to appear)
- 2 D. Burschka, J. Corso, M. Dewan, W. Lau, M. Li, H. Lin, P. Marayong, N. Ramey, G. Hager, B. Hoffman, D. Larkin, and C. Hasser. Navigating Inner Space: 3-D Assistance for Minimally Invasive Surgery. *Robotics and Autonomous Systems*, 2005. (to appear)
- 3 G. Ye, J. Corso, D. Burschka, and G. Hager. VICs: A Modular HCI Framework Using Spatio-temporal Dynamics. *Machine Vision and Applications*, 16(1):13-20, 2004.

### Conference Publications

- 4 J. Corso and G. Hager. Coherent Regions for Concise and Stable Image Description. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2:184-190, 2005.
- 5 J. Corso, M. Dewan and G. Hager. Image Segmentation Through Energy Minimization Based Sub-space Fusion. In *Proceedings of 17th International Conference on Pattern Recognition (ICPR 2004)*, 2004.

- 6 W. Lau, N. Ramey, J. Corso, N. Thakor, and G. Hager. Stereo-Based Endoscopic Tracking of Cardiac Surface Deformation. In *Proceedings of Seventh International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2004. Poster Presentation.
- 7 G. Ye, J. Corso, G. Hager, and A. Okamura. VisHap: Augmented Reality Combining Haptics and Vision. In *Proceedings of 2003 IEEE International Conference on Systems, Man & Cybernetics*, October 2003.
- 8 J. Corso, D. Burschka, and G. Hager. Direct Plane Tracking in Stereo Images for Mobile Navigation. In *Proceedings of 2003 IEEE International Conference on Robotics and Automation*, September 2003.
- 9 G. Ye, J. Corso, D. Burschka, and G. Hager. VICs: A Modular Vision-Based HCI Framework. In *Proceedings of 3rd International Conference on Computer Vision Systems (ICVS)*, April 2003. Pages 257–267.
- 10 J. Leven, J. Corso, J. Cohen, and S. Kumar. Interactive Visualization of Unstructured Grids Using Hierarchical 3D Textures. In *Proceedings of IEEE/SIGGRAPH Symposium on Volume Visualization and Graphics*, October 2002. Pages 37–44.
- 11 J. Corso, J. Chhugani, and A. Okamura. Interactive Haptic Rendering of Deformable Surfaces Based on the Medial Axis Transform. In *Proceedings of Eurohaptics*, July 2002. Pages 92–98.

## Book Chapters

- 12 G. Ye, J. Corso and G. Hager. *Real-Time Vision for Human-Computer Interaction*. Chapter 7: Visual Modeling of Dynamic Gestures Using 3D Appearance and Motion Features. Pages 103–120. Springer-Verlag. 2005.
- 13 J. Corso. Vision-Based Techniques for Dynamic, Collaborative Mixed-Realities. In *Research Papers of the Link Foundation Fellows*. Volume 4. Ed. Brian J. Thompson. University of Rochester Press, 2004. (Invited report)

## Workshops

- 14 G. Ye, J. Corso and G. Hager. Gesture Recognition Using 3D Appearance and Motion Features. In *Proceedings of Workshop on Real-time Vision for Human-Computer Interaction (at CVPR 2004)*, 2004.
- 15 N. Ramey, J. Corso, W. Lau, D. Burschka and G. Hager. Real Time 3D Surface Tracking and Its Applications. In *Proceedings of Workshop on Real-time 3D Sensors and Their Use (at CVPR 2004)*, 2004.
- 16 J. Corso, D. Burschka, and G. Hager. The 4D Touchpad: Unencumbered HCI With VICs. 1st IEEE Workshop on Computer Vision and Pattern Recognition for Human Computer Interaction, CVPRHCI. June 2003.
- 17 J. Corso, G. Ye, D. Burschka, and G. Hager. Software Systems for Vision-Based Spatial Interaction. In *Proceedings of 2002 Workshop on Intelligent Human Augmentation and Virtual Environments*. Chapel Hill, North Carolina, October 2002. Pages D-26 and D-56. Poster Presentation.

## Technical Reports

- 18 D. Burschka, G. Ye, J. Corso, and G. Hager. A Practical Approach for Integrating Vision-Based Methods into Interactive 2D/3D Applications. Technical Report: Computational Interaction and Robotics Lab, Dept. of Computer Science, The Johns Hopkins University. CIRL-TR-05-01. 2005.
- 19 J. Corso, M. Dewan, and G. Hager. Image Segmentation Through Energy Minimization Based Subspace Fusion. Technical Report CIRL-TR-04-01, The Johns Hopkins University, 2004. (Extended version of ICPR 2004 paper.)
- 20 J. Corso, N. Ramey, and G. Hager. Stereo-Based Direct Surface Tracking with Deformable Parametric Models. Technical Report CIRL-TR-03-02, The Johns Hopkins University, 2003.
- 21 J. Corso and G. Hager. Planar surface tracking using direct stereo. Technical Report CIRL-TR-02-01, The Johns Hopkins University, 2002.
- 22 J. Corso and J. Cohen. Out-Of-Core Voxelizeation of Large Scalar Fields for Interactive Multiresolution Volume Rendering. The Johns Hopkins University, 2002. Graphics Lab Technical Report.

## Manuscripts In Preparation

- 1 J. Corso, G. Ye, D. Burschka, and G. Hager. The 4D Touchpad: A Platform for Unencumbered HCI With VICs.
- 2 J. Corso, J. Chhugani, and A. Okamura. A Representation for Efficient Graphic and Haptic Rendering of Deformable Surfaces.
- 3 M. Dewan, J. Corso, and G. Hager. An Energy Minimization Approach for Image Segmentation by Combining Multiple Feature Spaces.
- 4 W. Lau, N. Ramey, J. Corso, N. Thakor, and G. Hager. Stereo-Based Endoscopic Tracking of Cardiac Surface Deformation.

## Presentations and Talks

- 1 Coherent Image Regions; at UCLA Medical Imaging Informatics, May 2005.
- 2 Image Segmentation Through Energy Minimization Based Subspace Fusion; at ICPR, August 2004.
- 3 Direct Plane Tracking in Stereo Images for Mobile Navigation; at ICRA, Sept 2003.
- 4 The 4D Touchpad: Unencumbered HCI With VICs; at CVPRHCI, June 2003.
- 5 Towards Intuitive Vision-Based HCI; at Siemens Corporate Research, May 2003.
- 6 VICs: A Modular Vision-Based HCI Framework; at ICVS, April 2003.
- 7 Interactive Haptic Rendering of Deformable Surfaces Based on the Medial Axis Transform; at Eurohaptics, July 2002.
- 8 Introduction to Haptics and Interactive Haptic Rendering of Deformable Surfaces; Invited Talk at the JHU Student Seminar Series, April 2002.

## Teaching

**Guest Lecturer** - Computer Vision, Cameras and Calibration, Dr. Gregory Hager, Fall 2002.

**Teaching Assistant** - Computer Vision, Dr. Gregory Hager, Fall 2001. Duties included holding weekly office hours, grading homeworks and projects, and preparing review notes.

**Teaching Assistant** - Data Structures, Dr. Jonathan Cohen, Spring 2001. Duties included managing a team of 5 course assistants, holding weekly office hours, grading projects and exams, and holding review sessions.

**Teaching Assistant** - Data Structures, Dr. Subodh Kumar, Fall 2000. Duties included managing a team of 5 course assistants, holding weekly office hours, grading projects and exams, and holding review sessions.

## Professional Activities

**Journal Reviewer:** IEEE Transactions of Pattern Analysis and Machine Intelligence (2003, 2004), Image and Vision Computing (2003), Machine Vision and Applications (2005).

**Conference Reviewer:** IEEE Conference on Computer Vision and Pattern Recognition (2003), IEEE Conference on Robotics and Automation (2005), Medical Image Computing and Computer Aided Intervention (2003).

## Awards

**Link Foundation Fellowship in Advanced Simulation and Training** - 2003

**James D Rozics Computer Science Medal** - Loyola College in Maryland  
Awarded to the computer science student ranked first upon graduation.

**Presidential Scholarship** - Loyola College in Maryland, 1996 - 2000

**Upsilon Pi Epsilon Scholarship**, Computer Science Honor Society - 1998

**Bell Atlantic Scholarship** - 1996 - 2000

**Hauber Summer Science Research Fellowship** - Loyola College in Maryland, 1998

## Positions Held

**Research Assistant** - Dr. Gregory Hager, Summer 2001 - Current  
Project: Developing vision-based techniques enabling dynamic, complex interaction in immersive mixed-reality environments: the VICs project.

**Research Intern** - Siemens Corporate Research, Summer 2003  
Mentor: Dr. Yakup Genc  
Project: Markerless, real-time camera pose tracking using stereo video with applications to Augmented Reality.

**Software Engineer** - Contracted by the Department of Computer Science at The Johns Hopkins University to design and development a SQL-based database and WWW interface for the faculty recruitment/search process. The system is currently in its fourth year of use with no downtime.

**Acting Director Of Technology** - Bionic Box Inc., Spring 2000 - Fall 2000  
Responsible for all internal IT and managed all (participated in some) software development projects.

**Software Engineer** - Alexander and Tom, Inc., Fall 1999 - Spring 2000  
URL: <http://www.alextom.com>  
Responsibilities: Design and development of a broad range of interactive systems including small video-games, database systems, websites, and custom interactive cd-roms.

**Research Intern** - Earth Satellite Corporation, Rockville, Maryland, Summer 1999 - Fall 2000  
URL: <http://www.earthsat.com>  
Project: Modify and deploy NASA software for radiometrical and geometrical distortion correction for the Landsat 7 satellite.

**Research Assistant** - Dr. Keith Gallagher, Loyola College in Maryland, Spring 1999  
Project: Development of an ISO 9000-3 compatible software project management tool.

**Hauber Science Research Fellow** - Dr. Roger Eastman, Loyola College in Maryland, Spring 1999  
Project: Development of an image-processing algorithm for robust registration of retinal nerve images for use in glaucoma diagnosis.

**Database Programmer** - Information Builders, Inc. - Summer 1996, 1997 and Winter 1997.  
URL: <http://www.informationbuilders.com>  
Responsibilities: Fulfill internal database programming needs for information systems using their proprietary database language and development platforms (FOCUS).

## Software Publicly Available

**GUSTO**: System for interactive, hierarchical rendering of large (out-of-core) 3D scalar fields, including unstructured grids, structured grids, and voxels. Initial release 2002, with Joshua Leven, Jonathan D. Cohen, and Subodh Kumar.

**XVision2**: Modular software architecture for real-time vision development. Initial release 2001, with Gregory Hager, Darius Burschka, Sam Lang, and Xiangtian Dai.

## Affiliations

**Association of Computing Machinery**, Member Since 1998

**IEEE Computer Society**, Member Since 1998

**IEEE Robotics and Automation Society**, Member Since 2003

**Upsilon Pi Epsilon**, Computer Science Honor Society, Member Since 1999

**Alpha Sigma Nu**, National Jesuit Honor Society, Member Since 1999