Jason J. Corso

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Computer Science and Engineering	Email: jcorso@cse.buffalo.edu
University at Buffalo, SUNY	Web: http://www.cse.buffalo.edu/∼jcorso
201 Bell Hall	Date of Birth: 6 August 1978
Buffalo, NY 14260	Place of Birth: New York, USA

Prepared on: May 22, 2008

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 Voxelization of Large Scalar Fields for Interactive Multiresolution Volume Rendering

B.S. in Computer Science, *Cum Laude*, Loyola College in Maryland, 2000
Member of the Honors Program.
Advisor: Dr. Roger Eastman

Chaminade High School, Mineola, New York

Positions Held

Assistant Professor - University at Buffalo, SUNY, Aug. 2007 - Current.
Department of Computer Science and Engineering
Research Focus: Develop techniques for automatically learning hierarchical statistical models of complex phenomena and deriving robust efficient inference algorithms for these models.
Application Areas: Computer and medical vision, computational biomedicine, machine intelligence, statistical learning, perceptual interfaces and smart environments.

Post-Doctoral Fellow - UCLA Laboratory of Neuro Imaging, Sept. 2006 - July 2007.
Faculty Mentors: Drs. Alan Yuille and Arthur Toga
Department Affiliations: Neuroscience and Statistics
Primary Focus: Develop automatic, efficient and robust segmentation and recognition techniques for computational neuroimaging problems with coupled statistical learning methods. Implement and deploy software tools based on these algorithms into the research community.

Post-Doctoral Fellow - UCLA Medical Imaging Informatics, Sept. 2005 - Aug. 2006
Faculty Mentors: Drs. Alan Yuille, Song-Chun Zhu, and Ricky Taira
Department Affiliations: Radiological Sciences and Statistics
Primary Focus: Develop automatic segmentation and recognition techniques for medical imaging problems (e.g., brain tumor) by integrating bottom-up detection with top-down models. Quantify statistics of the models' shape and appearance to improve accuracy of diagnosis and treatment.

Research Assistant - Dr. Gregory Hager, Summer 2001 - Summer 2005
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 for 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).

Publications

Dissertation

0 **J. J. Corso**. Techniques for Vision-Based Human-Computer Interaction. Department of Computer Science. The Johns Hopkins University. August 2005.

Journal Articles

1 **J. J. Corso**, G. Ye, D. Burschka, and G. Hager. A Practical Paradigm and Platform for Video-Based Human-Computer Interaction. *IEEE Computer*, 42 (5), 48–55, 2008.

2 **J. J. Corso**, E. Sharon, S. Dube, S. El-Saden, U. Sinha, and A. Yuille. Efficient Multilevel Segmentation with Integrated Bayesian Model Classification. *IEEE Transactions on Medical Imaging*. (in press)

3 **J. J. Corso** and G. Hager. Image Description with Features that Summarize. *Computer Vision and Image Understanding.* (in submission)

4 **J. J. Corso**, G. Ye, and G. Hager. Analysis of Multi-Modal Gestures with a Coherent Probabilistic Graphical Model. *Virtual Reality*, 8(4):242-252, 2005.

5 D. Burschka, **J. 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.

6 G. Ye, **J. 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.

Peer-Reviewed Conference and Workshop Publications (Full Papers)

7 **J. J. Corso**, R. S. Alomari, and V. Chaudhary. Lumbar Disc Localization and Labeling with a Probabilistic Model on both Pixel and Object Features. In *Proceedings of Medical Image Computing and Computer-Aided Intervention (MICCAI)*. 2008 (to appear).

8 I. Nwogu and **J. J. Corso**. Exploratory Identification of Image-Based Bio-markers for Solid Mass Pulmonary Tumors. In *Proceedings of Medical Image Computing and Computer-Aided Intervention (MICCAI)*. 2008 (to appear).

9 **J. J. Corso**. *Discriminative Modeling by Boosting on Multilevel Aggregates.* In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. 2008 (to appear).

10 **J. J. Corso**, A. Yuille, Z. Tu. *Graph-Shifts: Natural Image Labeling by Dynamic Hierarchical Computing.* In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR).* 2008 (to appear).

11 I. Nwogu, **J. J. Corso**. *$(BP)^2$: Beyond Pairwise Belief Propagation, Labeling by Approximating Kikuchi Free Energies.* In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. 2008 (to appear).

12 **J. J. Corso**, Z. Tu, and A. Yuille. MRF Labeling with a Graph-Shifts Algorithm. In *Proceedings of International Workshop on Combinatorial Image Analysis.* LNCS 4958:172–184, 2008.

13 I. Nwogu and **J. J. Corso**. Labeling Irregular Graphs with Belief Propagation. In *Proceedings of International Workshop on Combinatorial Image Analysis.* LNCS 4958:295–305, 2008.

14 **J. J. Corso**, A. Yuille, N. Sicotte, and A. Toga. Detection and Segmentation of Pathological Structures by the Extended Graph-Shifts Algorithm. *Proceedings of International Conference on Medical Image Computing and Computer-Aided Intervention (MICCAI)*, 1:985–994, 2007.

15 **J. J. Corso**, Z. Tu, A. Yuille, and A. Toga. Segmentation of Sub-Cortical Structures by the Graph-Shifts Algorithm. In *Proceedings of Information Processing in Medical Imaging (IPMI)*, 183–197, 2007.

16 **J. J. Corso**, E. Sharon, and A. Yuille. Multilevel Segmentation and Integrated Bayesian Model Classification with an Application to Brain Tumor Segmentation. In *Proceedings of International Conference on Medical Image Computing and Computer Aided Intervention (MICCAI)*, 2:790–798, 2006.

17 **J. J. Corso** and G. Hager. Coherent Regions for Concise and Stable Image Description. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2:184-190, 2005.

18 **J. J. Corso**, M. Dewan and G. Hager. Image Segmentation Through Energy Minimization Based Subspace Fusion. In *Proceedings of 17th International Conference on Pattern Recogntion (ICPR 2004)*, 2004.

19 W. Lau, N. Ramey, **J. 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.

20 G. Ye, **J. 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.

21 N. Ramey, **J. 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.

22 G. Ye, **J. 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.

23 **J. 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 (ICRA)*, September 2003.

24 G. Ye, **J. 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.

25 **J. 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.

26 J. Leven, **J. 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.

27 **J. 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

28 S. Dube, **J. J. Corso**, T. F. Cloughesy, S. El-Saden, A. Yuille, and U. Sinha. *Data Mining Systems Analysis and Optimization in Biomedicine, chapter Automated MR Image Processing and Analysis of Malignant Brain Tumors: Enabling Technology for Data Mining.* American Institute of Physics, 2007.

29 G. Ye, **J. 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.

30 **J. 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)

Other Papers (Abstract Review or No Review)

31 S. Dube, **J. J. Corso**, A. Yuille, T. F. Cloughesy, S. El-Saden, and U. Sinha. Hierarchical Segmentation of Malignant Gliomas Via Integrated Contextual Filter Response. In *Proceedings of SPIE Conference on Medical Imaging.* 2008.

32 C. Arnold, **J. J. Corso**, A. Bui. An Unsupervised Approach to Automatic IMage Annotation. In *NSF Biomedical Informatics Workshop: Expanding Secondary Use of Health Data*. 2007.

33 D. Burschka, G. Ye, **J. 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.

34 **J. 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.)

35 **J. 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.

36 **J. J. Corso** and G. Hager. Planar surface tracking using direct stereo. Technical Report CIRL-TR-02-01, The Johns Hopkins University, 2002.

37 **J. J. Corso** and J. Cohen. Out-Of-Core Voxelization of Large Scalar Fields for Interactive Multiresolution Volume Rendering. The Johns Hopkins University, 2002. Graphics Lab Technical Report.

38 **J. 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.

Manuscripts In Preparation

1 **J. J. Corso**, Z. Tu, A. Yuille. Graph-Shifts: Hierarchical Energy Minimization for Image Segmentation and Labeling. In preparation for submission to IEEE Transactions on Pattern Analysis and Machine Intelligence.

2 M. Dewan, **J. J. Corso**, and G. Hager. An Energy Minimization Approach for Image Segmentation by Combining Multiple Feature Spaces. In preparation for submission to Image and Vision Computing.

Industrial Activities

Co-Founder of NaviGuru.com - Founded April 2006
NaviGuru.com is a Web 2.0 site that unifies social networking with on-line mapping technology. It introduces a new form of web search called *visual query*. Planned launch of site is fourth quarter 2007.

Consultant for Ikona Medical Corp. - Los Angeles, CA - Sept. 2006 - Current
Development of real-time medical video mosaicking algorithms and software.

Consultant for Infinite Biomedical Technologies, LLC - Baltimore, MD - Sept. 2006 - Current
Development of image calibration and dewarping algorithm used in contact endoscopy.

Provisional Patent with Licensable Technology - 2003
Title: 4D Touchpad - VICs based interface to computer systems.
Institute: Johns Hopkins University, Baltimore MD (JHU Ref. DM-4181).

Co-Inventors: Gregory D. Hager and Darius Burschka.
Description: The 4D Touchpad builds a shared perceptual space between the computer user and a set of video cameras. Perceptual gestures are used to directly interact with interface components. The video cameras sense and interpret the gestures and effect automation in the computer system.

Awards

Best New Development - UCLA Laboratory of Neuroimaging, CCB AHM Segmentation Contest - July 2006.

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

Presentations and Talks

1 Graph-Shifts: Dynamic Hierarchical Energy Minimization for Segmentation and Classification.
   - University At Buffalo, SUNY, Dept. of Computer Science and Engineering, March 2007.

2 Multilevel Image Segmentation and Integrated Bayesian Model Classification.
   - Stony Brook University, Dept. of Computer Science, October 2006.
   - IBM TJ Watson Research Center, October 2006.
   - Rutgers University, Center for BioImaging and Modeling, October 2006.
   - Siemens Corporate Research, October 2006.
   - Vanderbilt Institute for Imaging Science, July 2006.
   - UCLA Laboratory of Neuroimaging SIG-STAT Meeting, March 2006.
   - UCLA Statistics Seminar Series, April 2006.
   - JHU ERC Center for Computer-Integrated Surgery Seminar Series, May 2006.

3 Software Tools for Multilevel Segmentation. Laboratory of Neuroimaging, CCB AHM July 2006.

4 A Foundational Methodology of Data Analysis and its Utility in Computational Brain Tumor Imaging. NLM Informatics Training Conference, June 2006.

5 Coherent Image Regions. UCLA Medical Imaging Informatics, May 2005.

6 Image Segmentation Through Energy Minimization Based Subspace Fusion. ICPR, August 2004.

7 Direct Plane Tracking in Stereo Images for Mobile Navigation. ICRA, Sept 2003.

8 The 4D Touchpad: Unencumbered HCI With VICs. CVPRHCI, June 2003.

9 Towards Intuitive Vision-Based HCI. Siemens Corporate Research, May 2003.

10 VICs: A Modular Vision-Based HCI Framework. ICVS, April 2003.

11 Interactive Haptic Rendering of Deformable Surfaces Based on the Medial Axis Transform. Eurohaptics, July 2002.

12 Introduction to Haptics and Interactive Haptic Rendering of Deformable Surfaces. JHU Student Seminar Series, April 2002.

Teaching

Vision as Bayesian Inference - University at Buffalo SUNY, Spring 2008.

Seminar in Medical Image Segmentation - University at Buffalo SUNY, Fall 2007.

Object-Oriented Methods in Software Engineering - UCLA BIOMED 223C, Spring 2006.

Research Experience for Undergraduates Mentorship - Luz Molinelli, Summer 2005.
Project: Retinal disease diagnosis through multidimensional histogram analysis.

Research Experience for Undergraduates Mentorship - Ravi Mody, Summer 2004.
Project: Machine learning to track hand postures.

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. Subodh Kumar in Fall 2000 and Dr. Jonathan Cohen in Spring 2001. Duties included managing a team of 5 course assistants, holding weekly office hours, grading projects and exams, and holding review sessions.

Professional Activities

Workshop Organizer: High Performance Medical Imaging Computing and Computer-Aided Intervention to be held in conjunction with MICCAI 2008; organizing with Prof. Vipin Chaudhary (UB) and Dr. Leiguang Gong (IBM).

Member of Program Committee: Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR 2007), IEEE 7th International Symposium on BioInformatics and BioEngineering (BIBE 2007).

Journal Reviewer: Computer Methods and Programs in Biomedicine (2007), Computer Vision and Image Understanding (2007), IEEE Signal Processing Letters (2008), IEEE Transactions on Knowledge and Data Engineering (2007), IEEE Transactions of Pattern Analysis and Machine Intelligence (2003–04, 2007), IEEE Transactions on Systems, Man, and Cybernetics (2007), Image and Vision Computing (2003), International Journal of Computer Assisted Radiology and Surgery (2008), Machine Vision and Applications (2005–08).

Conference Reviewer: European Conference on Computer Vision (2006), IEEE Conference on Computer Vision and Pattern Recognition (2003, 2006–07), IEEE Conference on Robotics and Automation (2005), IEEE/RSJ International Conference on Intelligent Robots and Systems (2007), International Conference on Computer Vision (2007), International Conference on Multimedia and Expo (2007-8), Medical Image Computing and Computer Aided Intervention (2003, 2006–08).

Session chair: IWCIA 2008.

Software Publicly Available

MuleSeg: Extensible software for multilevel segmentation of 2D and 3D images based on an extended Segmentation by Weighted Aggregation algorithm using the Bayesian model-aware affinity (2006).

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 2003 - 2005.

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

Mathematical Association of America, Member Since 2005.

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