Jane MULLIGAN

Department of Computer Science,
University of Colorado at Boulder,

e-mail: Jane.Mulligan@Colorado.EDU **phone:** 303-492-4591
web: http://www.cs.colorado.edu/∼janem

RESEARCH AREA:

Speed, accuracy and representational issues for real-time stereo reconstruction for telepresence. Modeling human motion and appearance. Constructing sensor systems for autonomous robot navigation by empirical identification of critical information for human teleoperation. The feasibility of telepresence systems as a communications medium for remote collaboration. Experimental analysis and model extraction for robotic tasks.

EDUCATION:

PhD Computer Science 1996
Dissertation: EMPIRICAL EVALUATION OF INFORMATION FOR ROBOTIC MANIPULATION TASKS
University of British Columbia, Vancouver, B.C., CANADA
supervisor: A. K. Mackworth

MSc. Computer Science 1988
Thesis: A COMPUTATIONAL VISION SYSTEM FOR JOINT ANGLE SENSING
University of British Columbia, Vancouver, B.C., CANADA
supervisor: A. K. Mackworth and P. D. Lawrence

Bachelor of Computer Science Honours 1984
Honours Thesis: A COMPILER FOR *PROGRAPH*
Acadia University, Wolfville N.S., CANADA
supervisor: P. T. Cox

RESEARCH EXPERIENCE:

August 2001 - present Research Assistant Professor, Department of Computer Science, University of Colorado at Boulder.

Sept. 1998 - August 2001 Postdoctoral Fellow, GRASP Lab, University of Pennsylvania
Supervisor: Kostas Daniilidis.
Developing a real-time trinocular stereo reconstruction system for networked tele-immersion applications. New approaches to integrating and representing motion and depth data for segmentation and prediction of a dynamic scene.

January 1997 - August 1998 Postdoctoral Researcher, Computer Science, U.B.C.
Supervisor: Alan Mackworth.

September 1990- August 1996 IRIS Research Assistant, Computer Science, U.B.C.
Supervisor: Alan Mackworth.

TEACHING EXPERIENCE:

Graduate Courses Computer Vision CSCI 5722
Introductory graduate course in Computer Vision

PhD thesis Supervisor Wei Xu (2005-present), Soumya Ghosh (2007-present).

Masters thesis Supervisor Simon Wilson (2004), Stephanie Boyles (2005).

Independent study adviser Camille Wall (2004), Sai Xiong (2002).

January 2004 - May 2004 Instructor CS 4229 - Computer Graphics. University of Colorado, Boulder, CO.
Introductory undergraduate course in Computer Graphics.

January 1998 - April 1998 Instructor CS 405 Modeling and Simulation. University of British Columbia, Vancouver, B.C. Canada
Numeric models of dynamic systems, emphasis on discrete stochastic systems.

PROFESSIONAL EXPERIENCE:

August 1984 - August 1986 Member of the Scientific Staff (DMS), Bell Northern Research, Ottawa, Ont.
Software maintenance and development for a digital phone switch in the areas of call processing features and CCS7 trunk interface.

AWARDS:

1997 A. Jean Elder Prize, for outstanding doctoral thesis in the sciences by a women graduate student (1996).

1990 U.B.C. University Graduate Fellowship

1986-1990 NSERC Postgrad Scholarship (PGS 1-4)

1986-1990 Bell Northern Research Postgrad Award

PUBLICATIONS:

Invited Talks:

1. **Jane Mulligan**, A Virtual Exercise Environment with Immersive Panoramic Video, *RERC Rectech State of the Science Conference on Exercise and Recreational Technologies for People with Disabilities*, May 31, 2006, Denver, Colorado.

2. **Jane Mulligan**, Real-time 3D Reconstruction for Telepresence Applications, *York Conference on Computational Vision in Neural and Machine Systems*, June 18, 2005, York University Toronto, Ontario, Canada.

Journal:

[1] **Jane Mulligan**, Xenophon Zampoulis, Nikhil Kelshikar, and Kostas Daniilidis. Stereo-based environment scanning for immersive telepresence. *IEEE Transactions on Circuits and Systems for Video Technology*, 14(3):304–320, March 2004.

[2] **Jane Mulligan**, Volkan Isler, and Kostas Daniilidis. Trinocular stereo: a real-time algorithm and its evaluation. *International Journal of Computer Vision*, 47(1/2/3):51–61, 2002.

[3] **Jane Mulligan**. Fast calibrated stereo vision for manipulation. *Journal of Real-time Imaging*, 3(5), pages 331–341, October 1997.

Book Chapters:

[1] **Jane Mulligan**. Speed versus quality - measuring and optimizing stereo for telepresence. In Laurence Harris and Michael Jenkin, editors, *Computational Vision in Neural and Machine Systems*. Cambridge University Press, 2007.

[2] Nicole Atzpadin and **Jane Mulligan**. Methods for disparity estimation. In O. Schreer, P. Kauff, and T. Sikora, editors, *3D Videocommunication*, chapter 7. Wiley, New York, 2005.

[3] K. Daniilidis, **J. Mulligan**, R. McKendall, G. Kamberova, D. Schmid, and R. Bajcsy. Real-time 3d teleimmersion. In A. Leonardis et al., editor, *The Confluence of Vision and Graphics*. Kluwer Academic Publishers, 2000.

Refereed Conference Proceedings:

[1] G. Grudic and **J. Mulligan**. Outdoor path labeling using polynomial mahalanobis distance. In *Proceedings of Robotics: Science and Systems*, Philadelphia, USA, August 2006.

[2] P. Sambhoos, A. Hasan, R. Han, T. Lookabaugh, and **J. Mulligan**. Weeblevideo: Wide angle field-of-view video sensor networks. In *Workshop on Distributed Smart Cameras (DSC 2006)*, 2006. held in conjunction with ACM SenSys 2006.

[3] Gregory Grudic and **Jane Mulligan**. Topological mapping with multiple visual manifolds. In *Proceedings of Robotics: Science and Systems*, June 2005.

[4] **Jane Mulligan** and Greg Grudic. Topological mapping from image sequences. In *Proceedings of the IEEE Workshop on Learning in Computer Vision and Pattern Recognition (with CVPR05)*, June 2005.

[5] **Jane Mulligan**. Upper body pose estimation from stereo and hand-face tracking. In *Proceedings of the Second Canadian Conference on Computer and Robot Vision (CRV 2005)*, 2005.

[6] Nikhil Kelshikar, Xenophon Zabulis, **Jane Mulligan**, Kostas Daniilidis, Vivek Sawant, Sudipta Sinha, Travis Sparks, Scott Larsen, Herman Towles, Ketan Mayer-Patel, Henry Fuchs, John Urbanic, Kathy Benninger, Raghurama Reddy, , and Gwendolyn Huntoon. Real-time terascale implementation of tele-immersion. In *Proc. of the Terascale Performance Analysis Workshop*, volume LNCS 2660, pages 33–42, Melbourne, Australia, June 2003. In conjunction with ICCS'2003 - International Conference on Computational Science.

[7] Herman Towles, Wei-Chao Chen, Ruigang Yang, Sang-Uok Kum, Henry Fuchs, Nikhil Kelshikar, **Jane Mulligan**, Kostas Daniilidis, Loring Holden, Bob Zeleznik, Amela Sadagic, and Jaron Lanier. 3d tele-collaboration over Internet2. In *Proceedings of the International Workshop on Immersive Telepresence (ITP 2002)*, Juan-les-Pins, France, Dec. 2002.

[8] **Jane Mulligan**, Volkan Isler, and Kostas Daniilidis. Trinocular stereo: a real-time algorithm and its evaluation. In *Proceedings of the IEEE Workshop on Stereo and Multi-Baseline Vision*, Kauai, HI, Dec. 2001.

[9] **Jane Mulligan**, Volkan Isler, and Kostas Daniilidis. Performance evaluation of stereo for tele-presence. In *Proceedings of the Eighth IEEE International Conference on Computer Vision (ICCV'01)*, volume 2, pages 558–565, Vancouver, BC, Canada, July 2001.

[10] **Jane Mulligan** and Kostas Daniilidis. Real time trinocular stereo for tele-immersion. In *Proceedings of the 2001 International Conference on Image Processing*, pages 959–962, Thessaloniki, Greece, October 2001. 4 pages.

[11] **Jane Mulligan** and Kostas Daniilidis. Predicting disparity windows for real-time stereo. In *Proceedings of the 6th European Conference on Computer Vision (ECCV'00)*, volume I, pages 220–235, Dublin, Ireland, June 2000.

[12] **Jane Mulligan** and Kostas Daniilidis. Trinocular stereo for non-parallel configurations. In *Proceedings of the 15th International Conference on Pattern Recognition*, volume 1, pages 567–570, Barcelona, Spain, Sept. 2000.

[13] **Jane Mulligan** and Kostas Daniilidis. View-independent scene acquisition for tele-presence. In *Proceedings of the IEEE and ACM International Symposium on Augmented Reality (ISAR'2000)*, pages 105–108, Munich, Germany, October 2000.

[14] **Jane Mulligan**. Empirical modeling and comparison of robotic tasks. In *Proceedings of the 1998 IEEE-RSJ International Conference on Intelligent Robots and Systems (IROS98)*, volume 1, pages 642–647, Victoria, B.C., CANADA, October 1998.

[15] Ray Burge, **Jane Mulligan**, and Peter D. Lawrence. Using disparity gradients for robot navigation and registration. In *Proceedings of the 1998 IEEE-RSJ International Conference on Intelligent Robots and Systems (IROS98)*, volume 1, pages 539–544, Victoria, B.C., CANADA, October 1998.

[16] **Jane Mulligan** and Alan K. Mackworth. Experimental task analysis. In *Proceedings of the 1997 International Conference on Robotics and Automation (ICRA'97)*, volume 4, pages 3348–3353, Albuquerque, New Mexico, April 1997.

[17] **Jane Mulligan**. Fast calibrated stereo vision for manipulation. In *Proceedings 1996 IEEE International Conference on Robotics and Automation (ICRA'96)*, volume 3, pages 2326–2331, Minneapolis, Minnesota, April 1996.

[18] **J. Mulligan**, A. Mackworth, and P. Lawrence. A Model-based Vision System for Manipulator Position Sensing. In *Proceedings: Workshop on Interpretation of 3-D Scenes*, pages 186–193, Austin, TX, November 1989. IEEE.

[19] P.T. Cox and **I.J. Mulligan**. Compiling the Graphical Functional Language PROGRAPH. In *1985 ACM SIGSmall Symposium on Small Systems*, pages 34–41, Danvers, MA, May 1-3 1985. ACM SIGSMALL/PC.

Poster Presentations

[1] Greg Grudic and Jane Mulligan. The polynomial mahalanobis distance. In *The Learning Workshop (Snowbird'06)*, Snowbird, Utah, April 2006.

[2] Greg Grudic and **Jane Mulligan**. Outlier detection in manifold space: Applications to vision-based human-to-robot skill transfer and one class learning. In *The Learning Workshop (Snowbird'05)*, Snowbird, Utah, April 2005.

Technical Reports:

[1] Wei Xu, John Penners, and Jane Mulligan. Recording real worlds for playback in a virtual exercise environment. Computer Science CU-CS 1013-06, University of Colorado at Boulder, Boulder, CO, 2006.

[2] Jane Mulligan. A proposed framework for characterization of robotic systems. Department of Computer Science 92-29, University of British Columbia, Vancouver, British Columbia, Canada, 1992.

PATENTS:

[1] P.D. Lawrence, A.K. Mackworth, and **I.J. Mulligan**. Manipulator Arm Position Sensing. US Patent No. 4,826,391.
Method for tracking robot/excavator arms with markers and machine vision.

PROFESSIONAL ACTIVITIES:

Guest Editor: Journal of Field Robotics, Special Issue on Machine Learning Based Robotics in Unstructured Environments, Dec 2006 (with Greg Grudic).

Reviewer: IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), IEEE Transactions on Multimedia, IEE Proceedings Vision, Image & Signal Processing, Image and Vision Computing, IEEE Transactions on Visualization and Computer Graphics.

Program Committees: IEEE Computer Society International Conference on Computer Vision and Pattern Recognition (CVPR), IEEE International Conference on Computer Vision (ICCV), Canadian Conference on Computer and Robot Vision (CRV), European Conference on Computer Vision (ECCV), IEEE International Conference on Robotics and Automation (ICRA).