Anthony Tang

CONTACT INFORMATION

Assistant Professor
Department of Computer Science
University of Calgary
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RESEARCH INTERESTS

My research in **Human-Computer Interaction (HCI)** and **Computer Supported Cooperative Work (CSCW)** addresses fundamental questions of how to understand, analyze, and build technologies that enable and support remote and collocated collaboration. I am particularly interested in these questions from the perspective of a socio-technical designer, and in building systems that incorporate novel technology with due consideration to existing work practices. Much of my prior work has involved designing systems for collaboration, and through the use of **Information Visualization (InfoVis)** techniques, understanding how they were used.

My current focus areas include: understanding and building support for audio-media spaces, and applying video media spaces to novel health-related domains. I believe that my work, taken together, has contributed to: (1) our understanding of collaboration, both in collocated and distributed arrangements, (2) the design of novel collaboration systems, and (3) methods for analyzing collocated and remote collaboration.

EDUCATION

May 2010 **PhD in Electrical and Computer Engineering**
University of British Columbia, Vancouver BC
Dissertation: Understanding and Supporting Transitions with Large Display Groupware
Advisor: Dr. Sidney Fels
GPA: 4.33

January 2005 **MSc in Computer Science**
University of Calgary, Calgary AB
Thesis: Embodiments in Mixed Presence Groupware
Advisor: Dr. Saul Greenberg
GPA: 4.0

August 2002 **BSc in Computer Science & Psychology**
Simon Fraser University, Burnaby BC
GPA: 3.82

June 1997   **International Baccalaureate Diploma**
Sir Winston Churchill Secondary, Vancouver BC

Research & Professional Experience

2/2010-6/2011   **Post-Doctoral Research Fellow**
Georgia Institute of Technology: Graphics, Visualization and Usability (GVU) Center
Advisor: Dr. W. Keith Edwards and Dr. Gregory Abowd

5/2010-8/2010   **Research Intern**, Microsoft Research
Advanced Development Team
Manager: Bill Buxton, Kori Inkpen, Michel Pahud
- Responsible for the iterative design, prototyping and evaluation of several teleconferencing+shared workspace systems involving the Microsoft Surface.

5/2004-8/2004   **Research Intern**, Microsoft Research
Adaptive Systems and Interaction Team
Manager: Gina Venolia
- Responsible for the design and implementation of a contextually aware information management tool for programmers.

5/2002-8/2002   **Program Manager Intern**, Microsoft Corp.
Mobile Services
- Responsible for the user experience of PocketMSN, and for fostering and managing inter-team relationships related to its design.

1/2002-4/2002   **Research Assistant**, Department of Psychology
Social and Evolutionary Psychology Group
- Responsible for running subjects in a study about close interpersonal relationships.

5/2001-8/2001   **Program Manager Intern**, Microsoft Corp.
Mobile Services
- Responsible for identifying and analyzing market opportunities for InfoBot, a two-way SMS information retrieval service, and two-way SMS support for MSN Messenger. Guided cross-team design for both applications.

5/2000-8/2000   **Program Manager Intern**, Microsoft Corp.
Visual C++ .NET Group
- Investigated and identified design issues in the user interface of the programming tool Visual C++. Collaborated with usability engineers, designers and software design engineers to implement and test user interface enhancements.

1/1999-4/1999   **Research Co-op Student**, National Research Council
Networking Group
- Implemented a monitoring and deployment tool for a Java-based agent system, modifying the existing infrastructure to allow lightweight encrypted communication and deployment.

Journal Articles

[J.3] Miyaoku, K., **Tang, A.**, and Fels, S. (2007). C-Band: A Ring Tag System Using A Color Pattern Code. *Information Processing Society of Japan Journal*, Vol. 48, No. 3, March, pp: 1361-1371.

[J.2] Jeffrey, P., Blackstock, M., Finke, M., **Tang, A.**, Lea R., Deutscher, M., Miyaoku, K. (2007). Chasing the Fugitive on Campus: Designing a Location-based Game for Collaborative Play. *Loading…*, Vol 1, No. 1.

[J.1] **Tang, A.**, Boyle, M. and Greenberg, S. (2005). Understanding and Mitigating Display and Presence Disparity in Mixed Presence Groupware. *Journal of Research and Practice in Technology,* Volume 37, No. 2, pp: 71-88. (Invited paper.)

Peer-Reviewed Conference Papers

[C.20] Wu, A., Reilly, D., **Tang, A.**, and Mazalek, A. (2011). Tangible Navigation and Object Manipulation in Virtual Environments. *In Proceedings of Tangible, Embodied and Embedded Interaction 2011* (TEI 2011). (January 23-26, Funchal, Portugal). Pp: 37-44. (Acceptance: 65/203 – 32%)

[C.19] **Tang, A.**, Pahud, M., Carpendale, S., and Buxton, B. (2010). VisTACO: Visualizing Tabletop Collaboration. *In Proceedings of Interactive Tabletops and Surfaces (ITS 2010)*. (November 7-10, Saarbrucken, Germany). ACM Press. pp: 29-38. (Acceptance: 32/120 – 26%)

[C.18] Neustaedter, C., **Tang, A.**, and Judge, T.K. (2010). The Role of Community and Groupware in Geocache Creation and Maintenance. *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI 2010). (April 10 – 15, Atlanta, USA). ACM Press. pp: 1757-1766. (Acceptance: 302/1346 – 22%)

[C.17] **Tang, A.**, Pahud, M., Inkpen, K. M., Benko, H., Tang, J. C., and Buxton, W. (2010). Three's Company: Understanding Communication Channels in Three-way Distributed Collaboration. *In Proceedings of the ACM Conference on Computer Supported Cooperative Work (CSCW 2010)*. (February 6 – 10, 2010, Savannah, USA). ACM Press. pp: 271-280. (Acceptance: 58/288 – 20%; **Best Paper Nominee**: top 5%)

[C.16] Wong, N., **Tang, A.,** Livingston, I., Gutwin, C., and Mandryk R. (2009). Character Sharing in World of Warcraft*. In Proceedings of the European conference on Computer Supported Cooperative Work (ESCW 2009).* (September 7-11, 2009, Vienna, Austria). Springer. pp: 343-362. (Acceptance: 19/66 – 29%)

[C.15] **Tang, A.,** Lanir, J., Greenberg, S., and Fels, S. (2009). Supporting Transitions in Work: Informing Large Display Application Design by Understanding Whiteboard Use. *In Proceedings of GROUP 2009.* (May 10-13, 2009, Sanibel Island, USA). ACM Press. pp: 149-158. (Acceptance: 40/110 – 36%)

[C.14] Finke, M., **Tang, A.,** Leung, R., and Blackstock, M. (2008). Lessons Learned: Game Design for Large Public Displays. *In Proceedings of the 3rd international Conference on Digital Interactive Media in Entertainment and*

Arts (DIMEA 2008). (September 10-12, Athens, Greece). ACM Press. pp: 26-33. (Acceptance: 59-77 - 77%)

[C.13]   Isenberg, P., **Tang, A.,** and Carpendale, M. S. T. (2008). Exploratory Study of Visual Information Analysis. *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems(CHI 2008).* (April 5-10, Florence, Italy). ACM Press. pp: 1217-1226. (Acceptance: 157/714 - 22%)

[C.12]   Lanir, J., Booth, K. S., and **Tang, A.** (2008). MultiPresenter: A Presentation System for (Very) Large Display Spaces. *In Proceedings of the 16th international Conference on Multimedia (MULTIMEDIA 2008).* (October 27-November 1, Vancouver, Canada). ACM Press. pp: 149-158. (Acceptance: 56/280 - 20%)

[C.11]   **Tang, A.,** Finke, M., Blackstock, M., Leung, R., Deutscher, M., and Lea, R. (2008). Designing for Bystanders: Reflections on Building a Public Digital Forum. *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems(CHI 2008).* (April 5-10, Florence, Italy). ACM Press. pp: 879-882. (Acceptance: 61/340 - 18%)

[C.10]   **Tang, A.,** Greenberg, S., and Fels, S. (2008). Exploring Video Streams using Slit-Tear Visualizations. *In Proceedings of the working conference on Advanced Visual Interfaces (AVI 2008).* (May 28-30, Napoli, Italy). ACM Press. pp: 191-198. (Acceptance: 32/117 - 27%)

[C.9]   Miyaoku, K., **Tang, A.,** and Fels, S. (2007). C-Band: A Flexible Ring Tag System for Camera-Based User Interface. In *Proceedings of HCI International 2007 (HCII 2007).* (July 22-27, Beijing, China). Springer LNCS 4563. pp: 320-328.

[C.8]   Shoemaker, G., **Tang, A.,** and Booth, K. S. (2007). Shadow Reaching: A New Perspective on Interaction for Large Wall Displays. *In Proceedings of the 20th ACM Symposium on User Interface Software Technology (UIST 2007).* (October 7-10, Newport, RI, USA), pp: 53-56. ACM Press. (Acceptance: 9/66 – 14%).

[C.7]   Fels, S., Hausch, R., and **Tang, A.** (2006). Investigation of Haptic Feedback in the Driver Seat. *In Proceedings of 9th International IEEE Conference on Intelligent Transportation Systems (ITSC 2006).* (September 17-20, Toronto, Canada). (Acceptance: 286/424 – 68%)

[C.6]   Miyaoku, K., **Tang, A.,** and Fels, S. (2006). C-Band: A Flexible Color Ring Tag System. *In Proceedings of Interaction 2006.* (March 2-3, Tokyo, Japan), pp: 3-10.

[C.5]   Siu, N., Iverson, L., and **Tang, A.** (2006). Go with the Flow: Email Awareness and Task Management. *In Proceedings of 2006 ACM Conference on Computer Supported Cooperative Work (CSCW 2006).* (November 4-8, Banff, Alberta, Canada), pp: 441 – 450. ACM Press. (Acceptance: 47/212 – 22%)

[C.4]   **Tang, A.**, Neustaedter, C., and Greenberg, S. (2006). VideoArms: Embodiments for Mixed Presence Groupware. *In Proceedings of 20th British HCI Group Annual Conference (HCI 2006).* (September 11-15, Queen Mary, University of London). (Acceptance: 13/53 – 25%)

[C.3]   **Tang, A.,** Tory, M., Po, B., Neumann, P., and Carpendale, M. S. T. (2006). Collaborative Coupling over Tabletop Displays. *In Proceedings of the SIGCHI*

Conference on Human Factors in Computing Systems(CHI 2006). (April 24-27, Montreal, Canada), pp: 1181-1190. ACM Press. (Acceptance: 118/508 – 23%)

[C.2]   Kruger, R., Carpendale, M.S.T, Scott, S. D., and **Tang, A.** (2005). Fluid Orientation on a Tabletop Display: Integrating Rotation and Translation. *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems(CHI 2005).* (April 2-7, Portland, Oregon), pp: 601-610. ACM Press. (Acceptance: 93/371 – 25%)

[C.1]   **Tang, A.,** McLachlan, P., Lowe, K., Saka, C. R., and MacLean, K. (2005). Perceiving Ordinal Data Haptically Under Workload. *In Proceedings of the Seventh International Conference on Multimodal Interfaces (ICMI 2005).* (October 4-6, Trento, Italy), pp: 317-324. ACM Press. (Acceptance: 24/97 – 25%; **Best Paper Award**)

Refereed Conference Videos

[V.3]   **Tang, A**., Greenberg, S., and Fels, S. (2009). Exploring Video Streams Using Slit-Tear Visualizations. *In Proceedings of the 27th international Conference Extended Abstracts on Human Factors in Computing Systems (CHI 2009).* (April 4-9, 2009, Boston, USA). ACM Press. pp: 3509-3510. (**Best Research Video Nominee**)

[V.2]   **Tang, A**., Pattison, E. and Greenberg, S. (2005). DartMail: Digital Information Transfer through Physical Surrogates. In *Video Proceedings of the Ninth European Conference on Computer Supported Cooperative Work (ECSCW 2005).* (September 18-22, Paris, France). ACM Press, duration 4:39.

[V.1]   **Tang, A.,** Neustaedter, C. and Greenberg, S. (2004). VideoArms: Supporting Remote Embodiment in Groupware. *In Video Proceedings of the ACM CSCW Conference on Computer Supported Cooperative Work (CSCW 2004).* (November 6-10, Chicago, Illinois). ACM Press, duration 5:20.

Other Refereed Contributions

[DC.1] **Tang A**. (2006). Surface Use in Meeting Room Collaboration. In *Conference Companion of of 2006 ACM Conference on Computer Supported Cooperative Work (CSCW 2006).* (November 4-8, Banff, Alberta, Canada), pp: 43-44. ACM Press. (Doctoral Colloquium)

[P.1]   **Tang, A.,** Parker, J. K., Lanir, J., Booth, K. S. and Fels, S. (2006). Studying Collaborative Surface Use to Guide Large Display Interaction Design. In *Conference Companion of of 2006 ACM Conference on Computer Supported Cooperative Work (CSCW 2006).* (November 4-8, Banff, Alberta, Canada), pp: 219-220. ACM Press. (Poster)

[OW.1] Judge, T., Neustaedter, C., **Tang, A.** and Harrison, S. (2010). Bridging the Gap: Moving from Contextual Analysis to Design. *Workshop at ACM 2010 Conference on Human Factors in Computing Systems(CHI 2010)*, Atlanta, USA, April 2010. (Organized Workshop)

Dissertation and Thesis

[D.1]   **Tang, A.** (2010). Understanding and Supporting Transitions with Large Display Applications. Ph.D. Thesis. University of British Columbia, Vancouver, BC. May, 2010.

[T.1]   **Tang, A**. (2005). Embodiments in Mixed Presence Groupware. M.Sc. Thesis. University of Calgary, Calgary, AB. Februrary, 2005.

Workshop Papers

[W.7]   Reilly, D., **Tang, A.,** Wu, A., Echenique, A., Massey, J., Mathiasen, N., Mazalek, A., and Edwards, W. K. (2011) Organic UIs and Cross-Reality Spaces. *TEI 2011 Workshop: 2nd International Workshop on Organic User Interfaces (OUI).* Organized by Girouard, A., Vertegaal, R., and Poupyrev, I.

[W.6]   Lanir, J., Booth, K. S., and **Tang, A.** (2010). Enabling Student Control of a Classroom's Shared Screen. *ACM CHI 2010 Workshop on Next Generation of HCI and Education: Workshop on UI Technology and Educational Pedagogy*. Organized by Tse, E., Schöning, J., Rogers, Y., Shen, C., and Morrison, G.

[W.5]   **Tang, A.,** Genest, A., Shoemaker, G., Gutwin, C., Fels, S., and Booth, K. S. (2010). Enhancing Expressiveness in Reference Space. *ACM CSCW 2010 Workshop on New Frontiers in Telepresence*. Organized by Venolia, G., Inkpen, K., Olson, J., and Nguyen, D.

[W.4]   **Tang, A.** and Fels, S. (2008). Four Lessons from Traditional MDEs. *ACM CSCW 2008 Workshop on Beyond the Laboratory: Supporting Authentic Collaboration with Multiple Displays*. Organized by Biehl, J., Golovchinsky, G., and Lyons, K.

[W.3]   **Tang, A.,** Finke, M., Blackstock, M., Leung, R., Deutscher, M., Tain, G., and Giesbrecht, C. (2008). Designing for Bystanders: Reflections on Building a Public Digital Forum. *ACM CHI 2008 Workshop on Designing and Evaluating Mobile Phone-based Interaction with Public Displays*. Organized by Sas, C., and Dix, A.

[W.2]   **Tang, A.** and Neustaedter, C. (2006). Visualizing Egocentric Relationships in Instant Messaging. *ACM CHI 2006 Workshop on Social Visualization: Exploring Text, Audio and Video Interactions*. Organized by Karahalios, K. and Viegas, F.

[W.1]   **Tang, A.** and Greenberg, S. (2005). Supporting Awareness in Mixed Presence Groupware. *ACM CHI 2005 Workshop on Awareness Systems: Known Results, Theory, Concepts and Future Challenges*. Organized by Markopoulos, P., de Ruyter, B., and Mackay, W.

Technical Reports

[TR.4]   **Tang, A.**, Lanir, J., Greenberg, S. and Fels, S. (2008). *Uncovering Activity and Patterns in Video using Slit-Tear Visualizations*. Report UBC CS Technical Report TR-2008-08, Department of Computer Science, University of British Columbia, Vancouver, British Columbia, Canada V6T 1Z4, July.

[TR.3]   **Tang, A.**, and Fels, S. (2006). *"What I Want, Where I Want:" Reference Material Use in Tabletop Work*. Report UBC CS TR-2006-05, Department of

Computer Science, University of British Columbia, Vancouver, British Columbia, Canada V6T 1Z4, March.

[TR.2]   Neustaedter, C., Elliot, K., **Tang, A.** and Greenberg, S. (2004). *Where are you and when are you coming home? Foundations of Interpersonal Awareness.* Report 2004-760-25, Department of Computer Science, University of Calgary, Calgary, Alberta, Canada T2N 1N4, September.

[TR.1]   **Tang, A.**, Kratt, D., Carpendale, S. and Dunning, A. (2003). *Sensing and Visualising Physiological Arousal*. Report 2003-727-30, Department of Computer Science, University of Calgary, Calgary, Alberta, Canada T2N 1N4, July.

Invited Talks

[IT.5]   Ubiquitous collaboration. *Invited Lecture*. University of Calgary. January 5, 2011.

[IT.4]   Tabletop collaboration. *Guest Lecture for Mobile and Ubiquitous Computing CS7470.* Taught by Gregory Abowd and Thad Starner. Georgia Institute of Technology. October 28, 2010.

[IT.3]   From Traditional Surfaces to Interactive Displays: Informing Large Display Application Design by Understanding Traditional Surface Use. *Guest Lecture at FX PAL.* Hosted by Gene Golovchinsky. February 20, 2009.

[IT.2]   Mixed presence groupware: Sharing a visual workspace with distributed teams. *Challenging Groupware: Emerging configurations for distributed interactions.* Organized by Dylan Tutt and Michael Fraser. Commonwealth Club, London, UK. February 12, 2008.

[IT.1]   How and why wall and table displays will be used. *MAGIC Workshop on Large Displays*. Organized by Mattias Finke and Rodger Lea. University of British Columbia, Vancouver, BC. March 29, 2007.

TEACHING AND SUPERVISION

Supervision/Mentorship

Jonathan Massey, *Communication and Coordination in First Person Shooters*, B.Sc. project, 2010.

Lana Yarosh, *ShareTable: Shared Workspace for Separated Families,* PhD project, 2010.

Andy Wu, *Tangible and Tracked Navigation in Virtual Environments*, PhD project, 2010 (co-supervised with Derek Reilly).

Clement Leung, *Object Detection in Slit-Tear Visualizations,* ECEE 496 project, 2008.

Roujiar Manouchehri & Rimalda van Beurden, *Investigating Information Sharing between Tabletop and Upright Displays*, Undergraduate internship, 2007.

Gregory Mason, *Shadow Touch: Interaction with Large Wall Displays*, ECEE 496 project, 2007 (co-supervised with Garth Shoemaker).

Nelson Siu, *Email awareness and task management*, MSc project, 2006.

Teaching Experience

6/2008-8/2008   **Teaching Assistant**, Computer Science Department
                Models of Computation (CS121)

Provided 1-1 help to students in first and second year CS classes, and graded exams and assignments for a first year discrete mathematics course.

5/2006-8/2006	**Curriculum Development**, Computer Science Department

Advanced Methods for Human-Computer Interaction (CS444)
Developed two tutorials for new fourth year HCI class covering field study methods.

9/2000-12/2000	**Teaching Assistant**, School of Computer Science

Introduction to Artificial Intelligence (CS 311)
Graded assignments and exams, and provided 1-1 help to students in third year AI class.

AWARDS AND DISTINCTIONS

2010-2012	NSERC Postdoctoral Fellowship Award (National/Research: $40,000/year for 2 years)
02/2010	ACM Conference on Computer Supported Cooperative Work – **Best Paper Nominee**
11/2009	ACM Interactive Tabletops & Surfaces Application Design Contest (co-winner)
04/2009	SIGCHI Conference on Human Factors in Computing Systems – **Best Research Video Nominee**
2007-2009	Pacific Century Graduate Scholarship (Provincial/Research: $17,500/year for 2 years)
10/2005	International Conference on Multimodal Interfaces – **Best Paper**
2005-2007	NSERC Post-Graduate Scholarship D (National/Research: $22,000/year for 2 years)
2002-2004	NSERC Post-Graduate Scholarship A (National/Research: $18,000/year for 2 years)
2002-2004	iCore Post-Graduate Scholarship (Provincial/Research: $15,000/year for 2 years)
2002	Dean's Excellence in Research (Institutional/Research: $3,000)
2002	C.D. Nelson Memorial Graduate Scholarship (Institutional/Research: $17,500/year for 2 years) – declined
2001-1, 2000-3	University Honour Roll (Institutional/Academic)
1997-2001	Applied Science Dean's Honour Roll (Institutional/Academic)
2000, 1998-2	Open Undergraduate Scholarship (Institutional/Academic: full tuition)

SERVICE

Program Committee

- Personal and Public Displays (PPD) Workshop: Program Committee (2011)
- CRIWG Conference on Collaboration and Technology: Program Committee (2011)

- ACM International Conference on Interactive Tabletops and Surfaces 2011, 2010: Program Committee
- ACM SIGCHI Conference on Human Factors in Computing Systems (CHI): Program Committee for Media Showcase (2011); Program Committee for Media Showcase (2010); Program Committee for Works-in-Progress (2009)

Organizing Committee

- ACM International Conference on Interactive Tabletops and Surfaces (ITS): Posters Chair (2011)
- ACM SIGCHI Conference on Human Factors in Computing Systems (CHI): Posters Chair (2011)
- ACM Conference on Supporting Group Work (GROUP): Web & Publicity Co-Chair (2007)

Reviewing

- Journals, Magazines
  - International Journal of Human-Computer Studies: 2009
  - IEEE Computer Graphics & Applications: 2006
  - Interacting with Computers: 2009
- Conferences
  - ACM SIGCHI Conference on Human Factors in Computing Systems (CHI): 2005 (short papers), 2006, 2007, 2008, 2009, 2010, 2011
  - ACM Conference on Computer Supported Cooperative Work (CSCW): 2006, 2008, 2010, 2011
  - ACM Conference on User Interface Software Technology (UIST): 2009, 2011
  - ACM SIGCHI Conference on Tangible, Embedded and Embodied Interaction (TEI): 2011
  - IEEE Symposium on 3D User Interfaces (3DUI): 2011
  - International Conference on Ubiquitous Computing (UbiComp): 2005, 2008, 2009, 2011
  - ACM Conference on Supporting Group Work (GROUP): 2005, 2007
  - Graphics Interface: 2006, 2007, 2010
  - IEEE Information Visualization Conference (InfoVis): 2008, 2010
  - ACM Conference on Interactive Tabletops and Surfaces (ITS, Tabletop): 2008, 2009
  - BCS Conference on Human Computer Interaction (BCS-HCI): 2006
  - New Interfaces for Musical Expression (NIME): 2006, 2007
  - International Conference on Multimodal Interfaces (ICMI): 2005
  - HCI International Conference (HCI): 2005

University Service

- Judge, College of Computing Undergraduate Research Symposium (GeorgiaTech, April, 2010)
- Judge, CPSC 444 (HCI) Term Design Project Presentations (UBC, April 2007)

- Vice President of Social Activities, Computer Science Graduate Society (University of Calgary, 2003-2004)
- Orientation Leader, Discover Simon Fraser University (SFU 1998-2001)

Student Volunteer

- ACM SIGCHI Conference on Human Factors in Computing Systems (CHI): 2001, 2002, 2003, 2007, 2009, 2010
- ACM Conference on Computer Supported Cooperative Work (CSCW): 2008
- BCS Conference on Human Computer Interaction (BCS-HCI): 2006
- International Conference on Ubiquitous Computing (UbiComp): 2003

Community Volunteering

- High School Volleyball Head Coach (2004, 2006)

Art Shows

- iWorks: Nickle Arts Museum, University of Calgary, Calgary AB, 2004