

Chih-Sung (Andy) Wu

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Research interests

My research in **Human-Computer Interaction (HCI)** focuses on **Tangible User Interface (TUI)**, **Information Visualization (InfoVis)** and **user-centered design**. I am particularly interested in tangible Interactions on interactive surfaces. My current research focus is building natural user interfaces to support visualizations.

Education

Ph.D., Digital Media Georgia Institute of Technology, Atlanta, GA Advised by Dr. Ali Mazalek	2007 – 2012
Masters of Science, Human-Computer Interaction Georgia Institute of Technology, Atlanta, GA Advised by Dr. Ali Mazalek	2005 - 2007
Masters of Science, Electrical Engineering Yuan-Ze University, Tao-Yuan, Taiwan Advised by Dr. Chulung	2000 - 2002
Bachelors of Science, Electrophysics National Chiao Tung University, Hsin-Chu, Taiwan	1993 - 1997

Skills

HCI & UX

Usability testing, task analysis, evaluation, prototyping, experimental design

Computer

Java, C, Perl, C++, PHP/MySQL, HTML5, XML, Linux programming, Linux kernel/application/shell programming, Linux system administration, mobile web app design

Prototyping

Electronics, Arduino, 3D printer, laser cutter

Multimedia design

Web design, Illustrator, Photoshop, 3D modeling

Languages

English, Mandarin Chinese

Research and Professional Experience

Natural User Interface Researcher, UX Innovation Lab, Software Center GE Global Research, San Ramon Developing and designing natural user interfaces	Jan. 2013 –
Graduate Research Intern, UX Innovation Lab, Software Center GE Global Research, San Ramon Developed and designed HTML5 interfaces	May 2012 – Nov. 2012
Graduate Research Assistant GVU Center, Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA Project: Physical and Digital Design for Fluid Collaboration Advised by Dr. Ali Mazalek	Aug. 2008 – May 2011

Developed and designed the software and the hardware of the interactive tabletop displays

Graduate Research Assistant

GVU Center, Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA
Project: InSpace

Advised by Dr. Derek Reilly, Dr. Ali Mazalek and Dr. Keith Edwards

Designed tangible user interfaces for collaborative virtual environment and conducted evaluations

**Jan. 2007 –
July 2008**

Graduate Research Assistant

GVU Center, Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA
Project: Human-Centered Computing Education Digital Library

Website: <http://hccedl.cc.gatech.edu>

Advised by Dr. Jim Foley

Developed and designed Human-Centered Computing Education Digital Library website

**Apr. 2006 –
July 2007**

(Senior) Software Engineer

Software research and development department, ICP Electronics Inc. (IEI), Taipei, Taiwan

Developed Network Attached Storage (NAS) applications and web interfaces; Designed the Real-Time Remote Replication mechanism for the company's high-end NAS servers

**July 2002 –
May 2005**

Graduate Research Assistant

Department of Electrical Engineering, Yuan-Ze University, Tao-Yuan, Taiwan

Project: Investigation of optimal designs for liquid crystal correlation filters

Advised by Dr. Chulung Chen

Developed a new algorithm, which improved the efficiency of optical color pattern recognition using a Non-zero Order Joint Transform Correlator

**Sept. 2000 –
June 2002**

Commissioned Officer, Assistant Intelligence Officer, Second Lieutenant, Taiwan Army

193rd Artillery Regiment, Matzu, Taiwan

Commanded an M1 240mm howitzer platoon of 32 soldiers

**July 1997 –
June 1999**

Teaching Experience

Instructor

Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA

Class: LCC3404 – Design for the Internet

Website: <http://theauk.net/classes/lcc3404>

Designed the class website and developed a new course syllabus focusing on PHP, HTML5, XML, database design, and web application design

**Jan. 2012 –
May 2012**

Instructor

Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA

Class: LCC3705 –Principles of Informational Design

Website: <http://theauk.net/classes/lcc3705>

Designed the class website and developed a new course syllabus focusing on PHP, HTML5, database design, and mobile web design principles

**Aug. 2011 –
Dec. 2011**

Teaching Assistant

Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA

Class: LCC6318/4730 – Experimental Media and Digital Art

**Jan. 2012 –
May 2012**

Teaching Assistant

Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA

Class: LCC6318/4730 – Experimental Media and Digital Art

Taught electronics, Arduino and assisted in designing the course syllabus

**Jan. 2011 –
May 2011**

Teaching Assistant

Jan. 2010 –

Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA **May 2010**
Class: LCC6318/4730 – Experimental Media and Digital Art
Taught electronics, Arduino and assisted in designing the course syllabus

Teaching Assistant **Jan. 2009 – May 2009**
Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA
Class: LCC6650 – Project Studio
Helped Dr. Ali Mazalek direct the Synaesthetic Media Lab while she took sabbatical

Guest Lecturer **Aug. 2008**
Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA
Class: LCC2720 – Principles of Visual Design
Taught Illustrator and visual design principles

Teaching Assistant **Jan. 2008 – May 2008**
Georgia Institute of Technology Georgia Institute of Technology, Atlanta, GA
Class: LCC6318/4730 – Experimental Media and Digital Art
Taught programming on an interactive tabletop display

Teaching Assistant **Sept. 2000 – June 2002**
Department of Electrical Engineering, Yuan-Ze University, Tao-Yuan, Taiwan
Helped teaching Electromagnetism

Journal articles

Wu, A., Joyner, D., and Do, E. Y., Move, Beam, and Check! Imagineering Tangible Optical Chess on An Interactive Tabletop Display, *ACM Computers in Entertainment*, Volume 8, Issue 3, Article 20, 15 pages, 1-15, 2010.

C. Chen, and **C. Wu**, Polychromatic pattern recognition using the non-zero order joint transform correlator with cross-correlation peak optimisation, *Journal of Modern Optics*, vol. 50(9), 1353 - 1364, 2003.

C. Wu, and C. Chen, Performance comparison between multi-channel polychromatic and conventional joint transform correlators, *Optical Engineering*, vol. 42(6), 1758 - 1765, 2003.

C. Wu, C. Chen, and J. Fang, Linearly constrained color pattern recognition with a non-zero order joint transform correlator, *Optics Communications*, vol. 214, 65 - 75, 2002.

C. Wu, C. Chen, and J. Fang, Constrained optimization for color pattern recognition with a non-zero order joint transform correlator, *Microwave and Optical Technology Letters*, vol. 33(5), 385 - 388, 2002.

Conference papers

Mazalek, A., Nitsche, M., Rébola, C., Clifton, P., **Wu, A.**, Poirier, N. and Peer, F., Pictures at an Exhibition: Design of a Hybrid Puppetry Performance Piece, *Springer, Heidelberg, ICEC 2012*, p. 130-143, 2012.

Wu, A., Mendenhall, S., Jog, J., Hoag, L. S., and Mazalek, A Nested API Structure to Simplify Cross-Device Communication, *ACM Press, Proceedings of Tangible and Embedded Interaction 2012 (TEI '12)*, p. 225-232, 2012.

Wu, A., Yim, J.-B., Caspary, E., Mazalek, A., Chandrasekharan, S., and Nersessian, N. J, Kinesthetic Pathways: A Tabletop Visualization to Support Discovery in Systems Biology, *ACM Press, Proceedings of Creativity and Cognition 2011 (C&C '11)*, 21 - 30, 2011.

Wu, A., Jog, J., Mendenhall, S., and Mazalek, A., A Framework Interweaving Tangible Objects, Surfaces and Spaces, *Springer, Heidelberg, Proceedings of Human-Computer Interaction, Part II, HCII 2011, LNCS 6762*, 148 - 157, 2011.

Wu, A., Reilly, D., Tang, A., and Mazalek, A., Tangible Navigation and Object Manipulation in Virtual Environments, *ACM Press, Proceedings of Tangible and Embedded Interaction 2011 (TEI '11)*, 37 - 44, 2011.

Wu, A., Joyner, D. and Do, E. Y., Move, Beam, and Check! Imagineering Tangible Optical Chess on An Interactive Tabletop Display, *ACM Press*, International Conference on Advances in Computer Entertainment Technology 2010 (ACE '10), 2010. **(ACE 2010 Best paper golden award)**

Reilly, D. F., Rouzati, H., **Wu, A.**, Hwang, J. Y., Brudvik, J. and Edwards, W. K., TwinSpace: An Infrastructure for Cross-Reality Team Spaces, *ACM Press*, Proceedings of the 23rd ACM Symposium on User Interface Software and Technology 2010 (UIST '10), 119 - 126, 2010.

Mazalek, A., Winegarden, C., Al-Haddad, T., Robinson, S., and **Wu, C.S.**, Architales: physical/digital co-design of an interactive story table, *ACM Press*, Proceedings of Tangible and Embedded Interaction 2009 (TEI '09), 241 - 248, 2009.

Wu, C.S., Robinson, S.J., and Mazalek, A., Turning a page on the digital annotation of physical books, *ACM Press*, Proceedings of Tangible and Embedded Interaction 2008 (TEI '08), 109 - 116, 2008.

Short papers, workshop papers, and posters

Reilly, D., Tang, A., **Wu, A.**, Mathiasen, N., Echenique, A., Massey, J., Rouzati, H. and Chamoli, S., Rapid Prototyping of Physical Interfaces for Multiplayer Gaming: Issues and Experiences, Springer, IECE 2011, p. 428 - 431, 2011.

Wu, A., Mendenhall, S., Jog, J., and Mazalek, A., Creativity in Software Development in an Academic Research Lab, *ACM Press*, Proceedings of Creativity and Cognition (C&C '11), 401 - 402, 2011.

Lu, S.-C., **Wu, A.**, and Do, E. Y.-I., mediPuppet: An Interactive Comforting Companion for Children While Visiting a Doctor, *ACM Press*, Proceedings of Creativity and Cognition (C&C '11), 367 - 368, 2011.

Reilly, D., Tang, A., **Wu, A.**, Echenique, A., Massey, J., Mathiesen, N., Mazalek, A., and Edwards, W. K., Organic UIs in Cross-Reality Spaces, *ACM Press*, Proceedings of Tangible and Embedded Interaction 2011 (TEI '11), 2011.

Wu, A., Tangible Visualization, *ACM Press*, Proceedings of Tangible and Embedded Interaction 2010 (TEI '10), 317 - 318, 2010.

Robinson, S.J., Razza, D., Christensen, B., **Wu, A.**, Mazalek, A., KinoPuzzle: Grasping Realities through Tangible Tabletop Documentaries, , 15th International Symposium on Electronic Art 2009 (ISEA '09), 2009.

Joyner, D., **Wu, A.**, and Do, E. Y., Tangible optical chess: a laser strategy game on an interactive tabletop, *ACM Press*, Proceedings of the 8th international Conference on interaction Design and Children (IDC '09), 278 - 279, 2009.

Wu, A., and Mazalek, A., Tangible Tracking Table: an interactive tabletop display, *IEEE*, IEEE Workshop on Tabletops and Interactive Surfaces '08, 2008.

Mazalek, A., Winegarden, C., Al-Haddad, T., Robinson, S., **Wu, C.S.**, Architales: physical/digital co-design of an interactive story table, *IEEE*, IEEE Workshop on Tabletops and Interactive Surfaces '08, 2008.

Lee, H.J., **Wu, C.S.**, Shen, Y.T., Mazalek, A., Moons over you: the poetic space of virtual and real, *ACM Press*, ACM SIGGRAPH 2008 (SIGGRAPH '08), Article No. 24, 2008.

Wu, C.S., and Mazalek, A., WikiTUI, *ACM Press*, International Conference on Computer Graphics and Interactive Techniques 2007 (SIGGRAPH '07), 2007.

Wu, C.S., Robinson, S.J., and Mazalek, A., WikiTUI: Leaving Digital Traces in Physical Books, *ACM Press*, Proceedings of the International Conference on Advances in Computer Entertainment Technology 2007 (ACE'07), 264 - 265, 2007.

W. Wu, C. Chen, **Wu, C.S.**, J. Fang, M. Chang, Color Blindness Plate Recognition with the Non-Zero Order Joint Transform Correlator, 15th Conference on Computer Vision, Graphics and Image Processing (IPPR '02), 829 - 834, 2002.

Wu, C.S., C. Chen, and J. Fang, Color pattern recognition by the joint transform correlator to remove all unwanted correlation terms, *Optics in Computing '02 (OC '02)*, 45 - 47, 2002.

Wu, C.S., C. Chen, and J. Fang, Color pattern recognition with non-zero order joint transform correlators, *Optics and Photonics Taiwan '01*, 748 - 750, 2001. **(best paper nominee)**

Demos, performances and exhibitions

Lu, S.-C., Hsiao, C.-P., Ahn, S., and **Wu, A.**, *Hawl, ACM Press, Proceedings of Tangible and Embedded Interaction 2011 (TEI '11)*, 2011.

Mazalek, A., Nitsche, M., Rebola, C., **Wu, A.**, Clifton, P., Peer, F., and Drake, M., *Pictures at an Exhibition: a physical/digital puppetry performance piece, ACM Press, Proceedings of Creativity and Cognition (C&C '11)*, 441 - 442, 2011.

Reilly, D., Tang, A., **Wu, A.**, Echenique, A., Chamoli, S., Massey, J. and Edwards, W.K., *Or de l'Acadie: a TwinSpace demo, ACM Press, The 23rd ACM Symposium on User Interface Software and Technology 2010 (UIST '10)*, 2010.

Wu, A., Reilly, D., Hwang, J.Y., Echenique, A., Santos, E., and Edwards, W. K., *A tangible, cross-reality supermarket interface. (contest demo and video), 3DUI '10*, 317 - 318, 2010.

Thesis

Master's thesis

Chih-Sung Wu, "Optoelectronic Color Image Recognition By The Joint Transform Correlator With Liquid Crystal Panels", Institute of Electrical Engineering, Yuan-Ze University, Tao-Yuan, Taiwan
Thesis advisor: Dr. Chulung Chen

Dissertation

Ph.D. dissertation

Chih-Sung Wu, " Designing Tangible Tabletop Interactions to Support the Fitting Process in Modeling Biological Systems", Digital Media PhD Program, School of Literature, Media and Communication, Ivan Allen College, Georgia Institute of Technology.

Thesis advisor: Dr. Ali Mazalek

Committee: Dr. Ellen Yi-Luen Do, Dr. Carl DiSalvo, Dr. Jim Foley, Dr. Michael Nitsche

Patents

"Real-time Remote Backup System and Related Method", **Chih-Sung Wu**, Taiwan Patent 200522585, 2005.

"Real Time Remote Backup System and its Backup Method", **Chih-Sung Wu**, Japan Patent 2005-196726, 2005.

"Real-time Remote Backup System and Related Method", **Chih-Sung Wu**, U.S. Patent 7315959, 2008.

Invited talks

Wu, C.S., "ROSS, Responsive Objects, Surfaces & Spaces", Whirlpool, Benton Harbor, Michigan, November 11, 2008.

Wu, C.S., "Tangible Tracking Table - an interactive tabletop display", Aware Home Seminar, GVU Center, Georgia Institute of Technology, September 26, 2008.

Service

Reviewer

CHI '09, '10, '11, '12, '13; DiGRA '09, TEI '09, '10, '11, '12, '13; ITS '08, '09, '10, '11; DIS '10; C&C '11; AIEDAM;

2007 – Present

Student Volunteer

Siggraph '07; TEI '08; HCII '11

2005 - Present