

## Hao-Hua (Hao) Chu

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Dept of Computer Science & Information Engineering  
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Last update: April 26, 2013

### EDUCATION

University of Illinois at Urbana Champaign, Urbana, IL 1999  
Ph.D., Computer Science (supervisor: Klara Nahrstedt)  
Cornell University, Ithaca, NY 1993  
B.S., Computer Science

### EMPLOYMENT

Department of Computer Science and Information Engineering 2003-current  
Graduate Institute of Networking and Multimedia  
National Taiwan University, Taipei, Taiwan  
*Professor (2010-)*  
*Department Vice Chair (2012)*  
*Associate Professor (2004-2009)*  
*Assistant Professor (2003-2004)*  
Department of Electrical Engineering and Computer Science 2011  
Berkeley Institute of Design (BiD)  
U.C. Berkeley, Berkeley, CA  
*Visiting Scholar*  
NTT DoCoMo USA Labs, San Jose, CA 2000-2003  
*Project Manager*  
Intel Architecture Lab, Hillsboro, OR 1999-2000  
*Senior Software Engineer*  
Validation Technology, Intel Corporation, Folsom, CA 1997  
*Summer Intern*  
Design Research Institute (DRI), Xerox Corporation, Ithaca, NY 1994  
*Software Engineer*

### RESEARCH INTERESTS

Ubiquitous computing, sensor network, persuasive computing, human computer interaction

### REFEREED PUBLICATIONS (Google citation count: 2000+)

#### Peer-Reviewed Top-Tier Conference Papers (acceptance rate)

Chien-Nan Chen, Cing-Yu Chu, Su-Ling Yeh, Hao-Hua Chu, and Polly Huang. **Modeling the QoE of Rate Changes in SKYPE/SILK VoIP Calls**. ACM Multimedia 2012. 20%

Ted Tsung-Te Lai, Wei-Ju Chen, Kuei-Han Li, Polly Huang, and Hao-Hua Chu. **TriopusNet: Automating Wireless Sensor Network Deployment and Replacement in Pipeline Monitoring**. ACM/IEEE IPSN 2012. (Best Paper Award) 15%

Bo-Jhang Ho, Hsin-Liu (Cindy) Kao, Nan-Chen Chen, Chuang-Wen You, Hao-Hua Chu, and Ming-Syan Chen. **HeatProbe: A Thermal-based Power Meter for Accounting Disaggregated Electricity Usage**. ACM UbiComp 2011. 16%

Tsung-Te (Ted) Lai, Yu-Han (Tiffany) Chen, Polly Huang, and Hao-Hua Chu. **PipeProbe: A Mobile Sensor Droplet for Mapping Hidden Pipeline**. ACM SenSys 2010. (Best Presentation Award) 17%

Meng-Chieh Chiu, Shih-Ping Chang, Yu-Chen Chang, Hao-hua Chu, Cheryl Chia-Hui Chen, Fei-Hsiu Hsiao, and Ju-Chun Ko. **Playful Bottle: a Mobile Social Persuasion System to Motivate Healthy Water Intake**. ACM UbiComp 2009. 12%

Kai-Yi Zhen, Sheng-Jie Liu, Bing-Yu Chen, and Hao-Hua Chu. **SmartPlayer: User Centric Video Fast-Forwarding**. ACM CHI 2009. 24%

Ho-lin Chang, Jr-Ben (Ben) Tian, Tsung-Te Lai, Hao-Hua Chu, and Polly Huang. **Spinning Beacons for Precise Indoor Localization**. ACM SenSys 2008. 16%

Yu-Chen Chang, Jin-Ling Lo, Chao-Ju Huang, Nan-Yi Hsu, Hao-Hua Chu, Hsin-Yen Wang, Pei-Yu Chi, and Ya-Lin Hsieh. <b>Playful Toothbrush: Ubicomp Technology for Teaching Tooth Brushing to Kindergarten Children.</b> ACM CHI 2008.	22%
Jin-Ling Lo, Tung-Yun Lin, Hao-Hua Chu, Hsi-Chin Chou, Jen-Hao Chen, Jane Yung-Jen Hsu, and Polly Huang. <b>Playful tray: adopting UbiComp and persuasive techniques into play-based occupational therapy for reducing poor eating behavior in young children.</b> ACM UbiComp 2007.	19%
Li-Wei Chan, Ji-Rung Chiang, Yi-Chao Chen, Chia-Nan Ke, Jane Hsu, and Hao-Hua Chu. <b>Collaborative localization - enhancing WiFi-based position estimation with neighborhood links in clusters.</b> Pervasive 2006.	13%
Keng-Hao Chang, Shih-Yen Liu, Hao-Hua Chu, Jane Yung-Jen Hsu, Cheryl Chen, Tung-Yun Lin, Chieh-Yu Chen, and Polly Huang. <b>Diet-Aware Dining Table: Observing Dietary Behaviors over Tabletop Surface.</b> Pervasive 2006.	13%
Henry Song, Hao-Hua Chu, Nayeem Islam, Shoji Kurakake, and Masaji Katagiri. <b>Browser state repository service.</b> Pervasive 2002.	12%
Chih-Han Lin, Hao-Hua Chu, and Klara Nahrstedt. <b>A soft real-time scheduling server on the Windows NT.</b> 2 <sup>nd</sup> USENIX Windows NT Symposium, August 1998.	26%

### Peer-Reviewed SCI Journals

- Meng-Chieh Chiu, Cheryl Chia-Hui Chen, Shih-Ping Chang, Charlotte Wang, Fei-Hsiu Hsiao, Polly Huang, Hao-Hua Chu. **Motivating the Motivators: Lessons Learned from the Design and Evaluation of a Social Persuasion System.** Elsevier Pervasive and Mobile Computing (PMC), to be published, 2013.
- Chuang-Wen You, Hsin-Liu (Cindy) Kao, Bo-Jhang Ho, Yu-Han Chen, Wei-Fehng Wang, Lien-Ti Bei, Hao-Hua Chu, Ming-Syan Chen. **ConvenienceProbe: A Phone-based Data Collection and Access System for Retail Trade Area Analysis.** Preprint, IEEE Pervasive Computing, 08 Jan. 2013.
- Ted Tsung-Te Lai, Wei-Ju Chen, Yu-Han Tiffany Chen, Polly Huang, and Hao-Hua Chu. **Mapping Hidden Water Pipelines using a Mobile Sensor Droplet.** ACM Transactions on Sensor Networks, Volume 9, Issue 3, August 2013.
- Chien-nan Chen, Cing-yu Chu, Su-ling Yeh, Hao-hua Chu, and Polly Huang. **Measuring the Perceptual Quality of SKYPE Sources.** ACM SIGCOMM Computer Communication Review - Special October Issue SIGCOMM '12 Volume 42 Issue 4, October 2012.
- Chuang-Wen You, Chih-Chiang Wei, Yi-Ling Chen, Hao-Hua Chu, and Ming-Syan Chen. **Using Mobile Phones to Monitor Shopping Time at Physical Stores.** IEEE Pervasive Computing, vol. 10, no. 2, pp. 37-43, Apr-June. 2011.
- Sheng-Hsiang Yu, Li-Shan Wang, Hao-Hua Chu, Sue-Huei Chen, Cheryl Chai-Hui Chen, Chuang-Wen You, and Polly Huang. **Mobile Mediation Tool for Improving Interaction between Depressed Individuals and Caregiver.** Springer/ACM Personal and Ubiquitous Computing, December 2010, pp. 1-12.
- Hsiu-Hsin Tsai, Yun-Fang Tsai, Hsiu-Hung Wang, Yue-Cune Chang, and Hao-Hua Chu. **Videoconference program enhances social support, loneliness, and depressive status of elderly nursing home residents.** Aging & Mental Health, Vol. 14, Issue 8, November 2010, pp 947-954.
- Arvin Wen Tsui Tsui, Wei-Cheng Lin, Wei-Ju Chen, Polly Huang, and Hao-Hua Chu. **Accuracy Performance Analysis between War Driving and War Walking in Metropolitan WiFi Localization.** IEEE Transactions on Mobile Computing, vol. 9, no.11, November 2010, pp. 1551-1562.
- Jen-Hao Chen, Pei-Yu Peggy Chi, Hao-Hua Chu, Cheryl Chia-Hui Chen, and Polly Huang. **Pervasive Computing in a Smart Kitchen for Nutrition-Aware Cooking.** IEEE Pervasive Computing, Vol. 9, No. 4, Oct-Dec 2010, pp. 58-65.
- Jin-Ling Lo, Pei-yu Peggy Chi, Hao-Hua Chu, Hsin-Yen Wang, and Seng-cho T. Chou. **Pervasive Computing in Play-based Occupational Therapy for Young Children.** IEEE Pervasive Computing, Vol 8, No. 3, July-Sept, 2009, pp. 66-73.
- Arvin Tsui, Yu-Hsiang Chuang, and Hao-Hua Chu. **Unsupervised Learning for Solving RSS Hardware Variance Problem in WiFi Localization.** Springer/ACM Mobile Networks and Applications (MONET), Vol. 14, Issue 5, January 2009, pp 677-691.

Kuan-Ta Chen, Jih-Wei Jiang, Polly Huang, Hao-Hua Chu, Chin-Laung Lei, and Wen-Chin Chen. **Identifying MMORPG Bots: A Traffic Analysis Approach**. EURASIP Journal on Advances in Signal Processing, Volume 2009, 2009.

Tsung-Han Lin, Polly Huang, Hao-Hua Chu, and Chuang-Wen You. **Energy-Efficient Boundary Detection for RF-Based Localization Systems**. IEEE Transactions on Mobile Computing, Volume 8, Issue 1, January 2009, pp 29-40.

Ling-Jyh Chen, Chen-Hung Yu, Cheng-Long Tseng, Hao-Hua Chu, and Cheng-Fu Chou. **A Content-Centric Framework for Effective Data Dissemination in Opportunistic Networks**. IEEE Journal on Selected Areas in Communications (JSAC), Delay and disruption tolerant wireless communication, Vol. 26, No. 5, June 2008, pp 761-772.

Chuang-Wen You, Polly Huang, Hao-Hua Chu, Yi-Chao Chen, Ji-Rung Chiang, and Seng-Yong Lau. **Impact of Sensor-Enhanced Mobility Prediction on the Design of Energy-Efficient Localization**. Elsevier Ad Hoc Networks, Vol. 6, Issue 8, 2008, pp 1211-1237.

Shun-Yuan Yeh, Keng-Hao Chang, Chon-In Wu, Hao-Hua Chu, and Jane Yung-Jen Hsu. **GETA sandals: a footprint location tracking system**. Springer/ACM Personal and Ubiquitous Computing (PUC), Volume 11, Issue 6, August 2007, pp 461-463.

Chon-In Wu, Chao-Ming James Teng, Yi-Chao Chen, Tung-Yun Lin, Hao-Hua Chu, and Jane Yung-Jen Hsu. **Point-of-capture archiving and editing of personal experiences from a mobile device**. Springer/ACM Personal and Ubiquitous Computing (PUC), Volume 11, Issue 4, April 2007, pp 235-249.

Hao-hua Chu, Henry Song, Candy Wong, Shoji Kurakake, and Masaji Katagiri. **Roam, A seamless application framework**. Journal of Systems and Software, Volume 69(3), pp. 209-226, January 2004.

Hao-hua Chu Lintian Qiao, and Klara Nahrstedt. **A secure multicast protocol with copyright protection**. ACM Computer Communication Review, Volume 32, Issue 2, pp. 42-60, April 2002.

C.S. Potter, Hao-hua Chu, B. Frey, C. Green, N. Kisseberth, T.J. Madden, K.L. Miller, Klara Nahrstedt, J. Pulokas, A. Reilein, D. Tchong, D. Weber, and B. Carragher. **Leginon: A system for fully automated acquisition of 1000 electron micrographs a day**. Ultramicroscopy Journal, vol. 77, pp. 153-161, North-Holland Publisher, July 1999.

Klara Nahrstedt, Hao-hua Chu, and Srinivas Narayan. **QoS-aware resource management for distributed multimedia applications**. Journal of High Speed Networks, Special Issue on Multimedia Networking, Volume 7(3,4): 229-258, IOS Press, March 1998.

#### Other Peer-Reviewed Publications

Please check <http://mll.csie.ntu.edu.tw/publications.php>.

#### U.S. PATENTS

##### Granted Patents

Polly Huang, Hao-Hua Chu, and Chuang-Wen You. **Energy-efficient indoor localization system and a method of reducing power consumption of a radio badge in the indoor localization system**. U.S. Patent 8159333, Issued Apr 2012.

Polly Huang, Tsung-Han Lin, and Hao-Hua Chu. **Method of reducing power consumption of a radio badge in a boundary detection localization system**. U.S. Patent 8130103, Issued Mar 2012.

Hoi Lee Candy Wong, Hao-Hua Chu, and Masaji Katagiri. **Running state migration of platform specific graphical user interface widgets between heterogeneous device platforms**. U.S. Patent 7934162, Issued Apr 2011.

Hoi Lee Candy Wong, Hao-Hua Chu, and Masaji Katagiri. **Layout of platform specific graphical user interface widgets migrated between heterogeneous device platforms**. U.S. Patent 7895522, Issued Feb 2011.

Hao-Hua Chu, Shun-Yuan Yeh, Chon-In Wu, and Kenji Okuda. **Footprint localization system**. U.S. Patent 7671734, Issued Mar 2010.

Hoi Lee Candy Wong, Hao-Hua Chu, and Masaji Katagiri. **Transformation of platform specific graphical user interface widgets migrated between heterogeneous device platforms**. U.S. Patent 7392483, Issue Jun 2008.

Yu Song, Hao-Hua Chu, Nayeem Islam, and Masaji Katagiri. **Application mobility service**.

U.S. Patent 7386855, Issued Jun 2008.

Hao-Hua Chu, Hoi Lee Candy Wong, Yu Song, and Shoji Kurakake. **Dynamic adaptation of GUI presentations to heterogeneous device platforms**. U.S. Patent 7234111, Issued Jun 2007.

Yu Song, Hao-Hua Chu, Shoji Kurakake. **Secure sharing of personal devices among different users (I)**. U.S. Patent 7143443, Issued in Feb. 2006.

Yu Song, Hao-Hua Chu, Shoji Kurakake, **Secure sharing of personal devices among different users (II)**. U.S. Patent 7380282, Issued Nov 2006.

Hao-Hua Chu, Shoji Kurakake. **Method and system for effecting migration of application among heterogeneous devices**. U.S. Patent 7080159, Issued Jul 2006.

Hao-Hua Chu, Yu Song, Shoji Kurakake. **Communication socket migration among different devices**. U.S. Patent 6920501, Issued Jul 2005.

#### Pending Patents

18 U.S. Patent Applications (<https://www.google.com/?tbs=pts>)

#### TEACHING EXPERIENCE

Introduction to Computer Programming	Fall 2012, Spring 2012-2013
Pervasive and Ubiquitous Computing	Spring 2003-2005, 2008, 2009, 2012
Database Systems	Fall 2004-2012
Systems Programming	Spring 2006
Advanced Systems Programming	Fall 2005
Operating Systems	Fall 2008

#### PROFESSIONAL ACTIVITIES

ACM UbiComp: PC-Co-Chair (2012), PC (2006, 2008-2011), Poster Co-Chair (2010)

ACM SenSys: PC (2012)

Pervasive: PC (2011-2012), Video Co-Chair (2007)

IEEE PerCom: PC (2005, 2006, 2008, 2009), Workshop Co-Chair (2009)

Pervasive Healthcare: PC (2011)

ACM Mobisys: General Co-Chair (2013), PC (2003)

WWW: PC(2002, 2003)

ACM Multimedia: PC(2000)

#### ACADEMIC ADVISING

##### Doctoral Students

Kelvin Li (李爭原). **Sensing forks to detect food and eating actions**. 2011-now

Yu-Te Huang (黃有德). **Delay-tolerant networks**. (Co-advised with Ling-Jyh Chen, Academic Sinica) 2011-now

Ted Tsung-Te Lai (賴宗德). **Single-release point sensing for wireless sensor networks**. 2008-now

##### Graduated Doctoral Students

Wen Arvin Tsui (崔文). **Accuracy Analyses and Improvements on Metropolitan-Scale Wi-Fi Localization**. Now a research manager @ ITRI. 2007-2012

Chuang-Wen Bing You (游創文). **Enabling Energy-Efficient Localization Services on Sensor Network Positioning System**. Now a Postdoc @ Dartmouth. 2004-2008

##### Masters Students

Zoe Hung (洪明彤). **Phone-based alcoholic drinking sensing and feedback**. 2012-now

Stanley Wang (王國丞). **Phone-based alcoholic drinking sensing and feedback**. 2012-now

Yi-Hsuan Hsieh (謝宜軒). **Phone-based driving behavior sensing**. 2011-now

Cindy Kao (高新綠). <b>Activity-Level Energy Metering.</b>	2010-now
<b>Graduated Masters Students</b>	
Chien-Nan Chen (陳建男). <b>Modeling the QoE of Rate Changes in SKYPE/SILK VoIP Calls.</b> Now a PhD Student @ UIUC. (Co-advised with Polly Huang, NTU EE)	2010-2012
David Hsu (徐廷倫). <b>A wearable device to detect reading distance of school-age children.</b> Now an engineer @ RealTek.	2010-2012
Kuei-Han Craig Li (李奎翰). <b>Pipeline Mapping.</b> Now an engineer @ TSMC.	2010-2012
Meng-Chieh Chiu (邱孟傑). <b>Playful Bottle: a mobile social persuasion system.</b> Now a PhD student @ U. Mass. Amherst.	2008-2010
Yi-Tsai Liao (廖宜財). <b>On Statistical Approaches to Online Game Bot Detection.</b> Now a lecturer @ III Digital Content Institute.	2007-2009
Pei-Yu Peggy Chi (紀佩妤). <b>Enabling Calorie-Aware Cooking in a Smart Kitchen.</b> Now a PhD student @ U.C. Berkeley.	2006-2008
Jen-Hao Arthur Chen (陳人豪). <b>Designing User Interface for Health-aware Cooking in a Smart Kitchen.</b> Now an engineer @ Corel Draw.	2006-2008
Li-Shan Wang (王麗珊). <b>A Mobile Mediation Tool for Enhancing Interaction between Depressed Person and Caregiver.</b> First job an engineer @ HTC.	2006-2008
Ho-Lin Henry Chang (張鶴齡). <b>Spinning Beacons for Precise Indoor Localization.</b> First job an engineer @ Garmin.	2006-2008
Pei-Yao Hung (洪培堯). <b>A Computer Cutting Game to Train Hand Function for Children.</b> Now a PhD student @ U. Michigan Ann Arbor.	2006-2008
Tung-Yun Dori Lin (林東昀). <b>Playful tray: adopting Ubicomp and persuasive techniques into play-based occupational therapy for correcting poor eating behaviors in young children.</b> Was a student @ MIT Media Lab, now a designer @ W+K Shanghai.	2005-2007
Chen-Hung Yu (游鎮鴻). <b>Effective data and video file transfer in opportunistic networks.</b> Now an engineer @ MediaTek. (Co-advised with Ling-Jyh Chen, Academic Sinica)	2005-2007
Hao-Ji Wu (吳昊極). <b>Modeling and optimizing positional accuracy based on hyperbolic geometry for the adaptive radio interferometric positioning system.</b> Now an engineer @ Trend Micro.	2005-2007
Chu-feng Burt Lien (連炬鋒). <b>Performance comparison between GSM and Wi-Fi localization in both indoor and outdoor environments.</b> Now an engineer @ Foxconn.	2005-2007
Keng-Hao Chang (張耿豪). <b>Diet-aware dining table – a smart surface to observe tabletop dietary behaviors.</b> Was a PhD student @ UC Berkeley Computer Science, now @ Microsoft, CA.	2004-2006
Jr-Ben Tian (田知本). <b>Modeling and Comparison of Two Time Synchronization Protocols.</b> Now an engineer @ HTC.	2004-2006
Yi-Chao Chen (陳奕超). <b>Sensor-assisted Wi-Fi indoor location system for adapting to environmental dynamics.</b> Now a PhD student @ U. of Texas, Austin.	2004-2006
Shun-Yuan Yeh (葉舜元). <b>GETA sandals: wearable indoor self-location tracking system.</b> Now an engineer @ HTC.	2004-2006
Ji-Rung Willy Chiang (蔣季融). <b>Collaborative localization: enhancing WiFi-based position estimation with neighborhood links in clusters.</b> Now an engineer @ HTC.	2004-2006
Shin-Jan Wu (吳欣展). <b>RFID-assisted physical object location tracking system.</b> Now an engineer @ Taiwan Mobile.	2004-2006
Kenji Okuda. <b>GETA sandals: a footprint location tracking system.</b> Now an engineer @ HTC.	2003-2005
Chon-In Sylphid Wu (吳忠穎). <b>Point-of-capture archiving and editing of</b>	2003-2005

**personal experiences from a mobile device.** Was a M.S. Student at Columbia U., now a developer @ Bank of America Merrill Lynch, NY.

#### Senior Undergraduate Students

Nan-Chen Chen. <b>Phone-based nose symptom sensing.</b>	2011-now
Yu-Han Tiffany Chen (陳予涵). <b>The PipeProbe system.</b> Now a PhD Student @ MIT CSAIL.	2009-2011
Erh-Li Shen (沈而立). <b>Double-side multi touch interaction.</b> Now a Masters student @ UCSD.	2008-2011
Chih-Chiang Wei (魏志強). <b>Phone-based shopping sensing.</b> Now a Masters student @ Stanford.	2009-2011
Shih-Ping Kerry Chang (張詩平). <b>Playful bottle.</b> Now a PhD Student @ CMU.	2008-2010
Shih-Yen Sean Liu (劉詩彥). <b>Diet-Aware dining table.</b> Was a PhD student @ U. of Washington CS, now a trader @ Deutsch Bank.	2006-2007

#### Research Assistant

Chao-Ming James Teng (鄧兆旻). Was a student @ MIT Media Lab, now an independent artist.	2003-2004
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#### GOVERNMENT RESEARCH GRANTS

**National Research Council**, NT\$1,880,999, 5/1/2011-7/31/2014  
Pervasive Location Sensing: Sensing Techniques, with Polly Huang, Ling-Jyh Chen

**National Research Council**, NT\$7,724,000, 11/1/2009 – 12/31/2011  
YushanNet: An Opportunistic Wireless Sensor Network based Hiking Information System for Yushan National Park, with Polly Huang, Ling-Jyh Chen

**National Research Council**, NT\$2,253,000, 8/1/2007 – 7/31/2010  
iCare 2.0: Enabling Next Generation e-Services for Digital Living

**National Research Council**, NT\$1,891,000, 10/1/2004 – 9/30/2007  
iCare community-supported intelligent care for successful aging in place

**National Research Council**, NT\$22,078,000, 11/1/2005 – 10/31/2008  
Human-centric robot-assisted recovery environment, with Li-Chen Fu, Jane Hsu, Bob Wang, Yi-ping Hung, Polly Huang, Cheryl Chen, and others.

**National Research Council**, NT\$14,094,900, 8/1/2004 – 10/31/2006  
Industrial-academic collaboration project: experience fusion: secure and scalable human centric computing, with CML faculty members

#### INDUSTRIAL GIFTS

**Intel Corporation**, US\$322,000, 8/1/2005-7/31/2011, 2012-2013  
Digital Healthcare, with Polly Huang, Jane Hsu, Li-Chun Fu, Bob Wang.

**Microsoft Research**, NT\$ 448,000, 2010  
Convenience Probe.

**Microsoft Research**, NT\$ 580,000, 2012  
Linking energy to behavior: activity-level energy metering, with Polly Huang.

**IBM Taiwan**, NT\$1,500,000 7/1/2005 – 8/1/2006  
Location-aware emergency care, with Polly Huang.