

XIAOFAN FRED JIANG

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EDUCATION

University of California, Berkeley 8/2005–9/2010

- Ph.D. in Computer Science, completed 9/2010
- Dissertation topic: “High-Fidelity Wireless Building Energy Monitoring Architecture”
- M.S. in Electrical Engineering and Computer Science, completed in 12/2007
- Ph.D. Advisor: David E. Culler

University of California, Berkeley 9/2001–12/2004

- B.Sc. in Electrical Engineering and Computer Science, Summa Cum Laude
- Minor in Business Administration, Haas School of Business
- Cumulative GPA 3.8, technical GPA 3.9

INDUSTRIAL EXPERIENCE

Columbia University in the City of New York, New York 7/2015–Present
Assistant Professor (Tenure-track)

- Teaching undergraduate and graduate courses in the School of Engineering (SEAS).
- Director of *Intelligent and Connected Systems Lab*, working on research in the areas of smart and sustainable buildings, mobile and wearable systems, and connected health & fitness.

Co-Chair of Smart Cities Center in the Data Science Institute (DSI)

- Tackling old and new problems in cities; improving the quality of urban living.

Air Scientific Inc., Beijing 7/2014–3/2015
Co-Founder and CTO

- Air Scientific Inc. is a startup incubated by Intel IoT Joint Labs along with angels and strategic investors to commercialize the air-quality monitoring and analytics project.
- Manages the overall operation of a 15-person startup, including research, manufacturing, marketing, and operations.
- First high-density deployment of IoT air-quality monitors in collaboration with the Beijing municipal government to provide data analysis, visualization, and pollution source tracking.

Intel Labs China, Beijing 9/2012–7/2014
Director, Analytics and IoT Research Laboratory

- Manages the Analytics and IoT Research Lab (AIR Lab), with projects in energy and environment, smart manufacturing, wearable and context-aware systems

Chief Architect, China Intel IoT Joint Labs

- Principle Investigator for several research projects, including PAM, VeriCloud, QiLoc, and SmartRetail (detailed descriptions in the PROJECTS section)
- PAM project is successfully incubated into a startup – Air Scientific Inc. by Intel IoT Labs and Chinese Academy of Sciences

- High-profile media exposures including China Central Television (CCTV), People's Daily, and Business Times.

Microsoft Research Asia, Beijing

10/2010–9/2012

Researcher

- Accurate indoor location and geo-fencing based on magnetic-induction
- Human-building-computer interaction
- Wireless and mobile systems
- Real-time occupancy detection and energy tracking
- As team leader, 1 U.S. patent granted, 2 under submission

Google, Palo Alto CA

6/2007–8/2007

Engineering Intern

- Designed scheduling and data exchange protocols of a novel CDMA/TDMA hybrid MAC, optimized for a next generation MIMO-based ultra-wideband PHY, targeted at "C" and "whitespace" TV bands.
- As team member, 4 U.S. patents granted

Arch Rock, San Francisco CA

1/2006–5/2006

Technical Consulting

- Worked on the design and implementation of a low power 802.15.4 to Ethernet bridge node. Designed a prototype and wrote the initial firmware in TinyOS.

Intel Corporation, Santa Clara CA

2/2005–7/2005

Component Design Engineer

- Validation of Baseboard Management Controller (BMC) chip using SpecmanElite and Verilog. Constructed infrastructure to validate interrupts to the embedded ARC microcontroller from internal and auxiliary sources. Validated watchdog, SerialIRQ, GPIO, and several other components.

Xilinx, San Jose CA

1/2004–7/2004

Intern Engineer

- Worked on the Gigabit System Reference Design (GSRD) project for high bandwidth systems. Designed part of the Communication Direct Memory Access Controller (CDMAC). Added coalescing interrupts, timers, support for all byte lengths and byte offsets in memory addressing.
- Designed a system to perform 3:2 video pull-down in hardware using ML300 board. Allowed video to be displayed in a moving window with animated background, using virtually no CPU time. It was used to demonstrate bandwidth and CPU utilizing of GSRD.

RESEARCH PROJECTS

An updated list can be found at:

<http://icsl.ee.columbia.edu/projects/> and <http://fredjiang.com/projects/>

- **PAM: Pervasive Air-Quality Monitoring** tackles the challenging problem of accurate and affordable PM2.5 monitoring from a novel cloud-based data analytics perspective. By carefully designing and building our own PM2.5 monitors, we are able to obtain accurate PM2.5 measurement in real-time and at low cost. And by aggregating their data, plus other types of data at the cloud, we are able to learn and create model for particulate matter, which in turn helps us calibrate sensors, and infer PM2.5 concentrations. Link to incubated startup: <http://air-scientific.com>
- **QiLoc: A Qi-Wireless Based Platform for Robust User-Initiated Indoor Location Services.** QiLoc is a simple yet effective way to accurately locate and identify occupants inside buildings. By utilizing the Qi wireless charging protocol, a QiLoc-enabled desk is able to identify a mobile phone placed on it and therefore locate the user. The cloud-side QiLoc server maintains location information of occupants, and provides a set of APIs via standard web services, such as location, ad-hoc group membership, and authentication. We demonstrate a number of smart-building applications, such as an Android app to locate others in the same room, a Windows widget to popup notifications on colleagues' entry/exit events, and a proof-of-concepts integrating precise and live location information with calendar, instant messaging, and email systems.
- **VeriCloud: Cloud-based Smartphone Genuine Verifications.** VeriCloud is an IoT approach to tackling the counterfeit smartphone problem. An Android app is developed to generate unique "fingerprints" for Android smartphones, taking in account of both hardware specs and software information; the Android app also performs benchmarks that complete within 30 seconds. These data are used in combination with an online "signature database" to identify whether a smartphone is counterfeit or genuine. Several techniques are used to grow the database with crowd-source data while maintaining "signature" integrity.
- **LiveSynergy: Bridging the Gap between Virtual and Physical Worlds.** LiveSynergy is a novel magnetic-based wireless proximity detection platform, with accuracy and consistency better than existing solutions such as BLE, WiFi, ZigBee, and long-range RFID. Building on top of this platform, we provide cloud-based APIs that enable real-time and rich interactions between humans and their physical environment. LiveSynergy enables a range of indoor applications such as location-based targeted advertising and presence detection.
<http://research.microsoft.com/en-us/projects/livesynergy/default.aspx>
- **SEPTIMU / MusicalHeart / LifeX.** In this project, we build software and hardware solutions that utilize and/or augment mobile phones to continuously monitor users' wellness without changing their existing lifestyle. Our system consists of HW/SW, apps,

Cloud and social networks and features a closed-loop design with both sensing and actuating capabilities. In particular, instead of solely passive monitoring, we further explore the actuation possibilities, i.e., seek to leverage the social networks to properly motivate the user towards improved health conditions.

<http://research.microsoft.com/en-us/projects/lifex/>

- **PhoneWeb: The Other Social Network.** The PhoneWeb project seeks to enable – through the use of new technologies such as Low-Energy Bluetooth, GPS, Low-Power Wi-Fi, Wi-Fi direct, and etc – handheld devices to continuously and accurately discover all the people around it and to create and maintain a local neighborhood map. We also seek to implement new types of local/social applications based on the PhoneWeb infrastructure. <http://research.microsoft.com/en-us/projects/phoneweb/>
- **Green Soda Project** is a real-time wireless energy monitoring, control, and visualization infrastructure for reducing energy consumption of the computer science building at UC Berkeley. <http://greensoda.cs.berkeley.edu/>
- **ACme: Berkeley Wireless AC Meter/Switch** is an open source hardware and software platform that enables wireless energy/power measurement and control of AC devices. ACme uses an IPv6 based mesh network that enables direct IP communication with individual ACme nodes. <http://acme.cs.berkeley.edu/>
- **LoCal Energy Network** is a cyber overlay on the energy distribution system, including machine rooms, buildings, neighborhoods, isolated generation islands and regional grids. LoCal brings together pervasive information about energy availability and use, interactive load/supply negotiation protocols, controllable loads and sources, and logically packetized energy, buffered and forwarded over a physical energy network. <http://local.cs.berkeley.edu/>
- **SPOT: Scalable Power Observation Tool** enables in situ measurement of nodal power and energy over a dynamic range exceeding four decades (as small as μA) or a temporal resolution of microseconds.
- **Prometheus** is a multi-stage solar powered system architecture that utilizes sensor node's microprocessor to intelligently and efficiently manage energy transfers between multiple storage elements, resulting in near perpetual operation. *Prometheus* is implemented in the Berkeley Trio motes.
- **Ultrasonic Ranging** is a range estimation device I designed for use in the DARPA funded Network Embedded Systems Technology (NEST) project for high-fidelity localization.

AWARDS AND HONORS

- National Science Foundation (NSF) Graduate Fellowship (GRFP). 8/2006 – 8/2009
- Vodafone–US Foundation Fellows Initiative scholarship for research in wireless communications. 8/2004
- Engineering Joint Console Representative. Eta Kappa Nu (HKN) Electrical Engineering and Computer Science honor society. Berkeley 2002

PUBLICATIONS

An updated list of my publications at: <http://fredjiang.com/publications/>

- Yun Cheng, Xiucheng Li, Ji Jia, Peipei Yang, Jixian Zhang, and Xiaofan Jiang, “AirCloud: A Cloud-based Air-Quality Monitoring System for Everyone”, in *Proceedings of the 12th ACM Conference on Embedded Network Sensor Systems (SenSys '14)*, 2014
- Shahriar Nirjon, Robert F. Dickerson, Qiang Li, Philip Asare, John A. Stankovic, Dezhi Hong, Ben Zhang, Xiaofan Jiang, Guobin Shen, Feng Zhao, “MusicalHeart: a hearty way of listening to music”, in *Proceedings of the 10th ACM Conference on Embedded Network Sensor Systems (SenSys '12)*, 2012
- Xiaofan Jiang, Chieh-Jan Mike Liang, Kaifei Chen, Ben Zhang, Jeff Hsu, Jie Liu, Bin Cao, and Feng Zhao, “Design and Evaluation of a Wireless Magnetic-based Proximity Detection Platform for Indoor Applications”, in *Proceedings of the 11th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN'12)*
- Dezhi Hong, Ben Zhang, Qiang Li, Shahriar Nirjon, Robert Dickerson, Guobin Shen, Xiaofan Jiang, John Stankovic, “SEPTIMU: continuous in-situ human wellness monitoring and feedback using sensors embedded in earphones”, in *Proceedings of the 11th international conference on Information Processing in Sensor Networks (IPSN '12)*
- Xiaofan Jiang, Chieh-Jan Mike Liang, Feng Zhao, Kaifei Chen, Jeff Hsu, Ben Zhang, Jie Liu, “Demo: Creating interactive virtual zones in physical space with magnetic-induction”, in *Proceedings of the 9th ACM Conference on Embedded Networked Sensor Systems (SenSys '11)* **Best Demo Award**
- Xiaofan Jiang, Minh Van Ly, Jay Taneja, Prabal Dutta, and David Culler, “Experiences with a High-Fidelity Wireless Building Energy Auditing Network,” In *Proceedings of the Seventh ACM Conference on Embedded Networked Sensor Systems (SenSys'09)*. 2009.
- Xiaofan Jiang, Stephen Dawson-Haggerty, Prabal Dutta, and David Culler, “Design and Implementation of a High-Fidelity AC Metering Network,” In *Proceedings of the 8th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN'09) Track on Sensor Platforms, Tools, and Design Methods (SPOTS'09)*, Apr. 2009.
- Mike M. He, Evan M. Reutzler, Xiaofan Jiang, Randy H. Katz, Seth R. Sanders, David E. Culler, and Ken Lutz, “An Architecture for Local Energy Generation, Distribution, and Sharing,” In *Proceedings of the IEEE Conference on Global Sustainable Energy Infrastructure (Energy2030' 08)*, Nov. 2008.
- Prabal Dutta, Jay Taneja, Jaein Jeong, Xiaofan Jiang, and David Culler, “A Building Block

- Approach to Sensornet Systems,” In *Proceedings of the Sixth ACM Conference on Embedded Networked Sensor Systems (SenSys’08)*, Nov. 5–7, 2008.
- Jaein Jeong, Xiaofan Jiang and David Culler, “Design and Analysis of Micro-Solar Systems for Wireless Sensor Networks,” In *Proceedings of the Fifth International Conference on Networked Sensing Systems (INSS’08)*, Jun. 2008.
 - Xiaofan Jiang, Jay Taneja, Jorge Ortiz, Arsalan Tavakoli, Prabal Dutta, Jaein Jeong, David Culler, Philip Levis, and Scott Shenker, “An Architecture for Energy Management in Wireless Sensor Networks,” In *Proceedings of the First ACM/IEEE International Workshop on Wireless Sensor Network Architecture (WSNA ’07)*, Apr. 2007.
 - Xiaofan Jiang, Prabal Dutta, David Culler, and Ion Stoica, “Micro Power Meter for Energy Monitoring of Wireless Sensor Networks at Scale,” In *Proceedings of the Sixth ACM/IEEE International Conference on Information Processing in Sensor Networks: Special track on Platform Tools and Design Methods for Network Embedded Sensors (IPSN ’07)*. 2007.
 - Kamin Whitehouse, Alec Woo, Xiaofan Jiang, Joseph Polastre, and David Culler, “Exploiting the Capture Effect for Collision Detection and Recovery,” In *Proceedings of the Second IEEE Workshop on Embedded Networked Sensors (EmNetS-II)*, May 2005.
 - Xiaofan Jiang, Joseph Polastre, and David Culler, “Perpetual Environmentally Powered Sensor Networks,” In *Proceedings of the Fourth ACM/IEEE International Conference on Information Processing in Sensor Networks track on Platform Tools and Design Methods for Network Embedded Sensors (IPSN/SPOTS’05)*, Apr. 2005. **Best Paper Award**
 - Kamin Whitehouse, Chris Karlof, Alec Woo, Xiaofan Jiang, and David Culler, “The Effects of Ranging Noise on Multihop Localization: an Empirical Study,” In *Proceedings of the Fourth ACM/IEEE International Symposium on Information Processing in Sensor Networks (IPSN’05)*, Apr. 2005.

PATENTS

- US Patent #US 8,396,086 B1: “Scalable Association Scheme for TV White-space MIMO Wireless System”. Carroll Philip Gossett, Yuan Yuan, Kevin C. Yu, Xiaofan Jiang, Michial Allen Gunter, Emmanouil Koukoumidise. Google Inc.
- US Patent #US 8,565,138 B1: “Random Shuffling Mechanism for MIMO Wireless System”. Yuan Yuan, Kevin C. Yu, Emmanouil Koukoumidise, Xiaofan Jiang, Michial Allen Gunter, Carroll Philip Gossett. Google Inc.
- US Patent #US 8,699,411 B1: “Dynamic TDMA System for TV White Space MIMO Wireless”. Carroll Philip Gossett, Yuan Yuan, Kevin C. Yu, Emmanouil Koukoumidise, Xiaofan Jiang, Michial Allen Gunter. Google Inc.
- US Patent #US 8,559,455 B1: “Dynamic Scheduling Scheme for TV White-space MIMO Wireless System”. Yuan Yuan, Kevin C. Yu, Carroll Philip Gossett, Michial Allen Gunter, Xiaofan Jiang, David James Carmichael. Google Inc.
- US Patent Application, Pub No. US 2013/0073681 A1: “Creating Interactive Zones”, Xiaofan Jiang, Chieh-Jan Mike Liang, Jeff Hsu, Caiquan Liu, Jie Liu, Feng Zhao. Microsoft

TEACHING EXPERIENCE AND SELECTED TALKS

- **Columbia University**, New York 2015 – Present
Created and taught Columbia’s first undergraduate course on Internet-of-Things (IoT)
- **University of Michigan at Ann Arbor**, Ann Arbor 2014
Invited Talk: Air-Quality Monitoring and Data Analytics
- **Intel Developers Forum (IDF)**, Shenzhen 2014
Talk: End-to-end Internet of Things Solutions on Intel® Architecture
- **First Workshop on Internet of Things Applications**, Beijing 2012
Keynote: Intelligent Modules for Building Internet-of-Things
- **Intl. Conference on Human Probes and Smartphone Sensing**, Chiang Mai, 2011
Keynote: People-centric Sensing – from Smartphones to Smartplaces
- **National Taiwan University**, Taipei 2011
Lecture: Bridging the Gap between Humans and the Physical World – A Step Toward Reducing Energy Consumption and Increasing Comfort
- **CCF Advanced Disciplines Lectures**, Beijing 2011
Lecture: Internet of Humans and Things: Connecting Humans to the Physical World with Virtual Zones
- **Emerging CPS Applications Workshop**, Stockholm, 2010
Rethinking the Energy Infrastructure from a Cyber-Physical Perspective
- **Lawrence Berkeley National Laboratory**, Berkeley 2008
Expediting Home Energy Conservation through Innovative Marketing and the Web 2.0 Community
- **University of California, Berkeley**, Berkeley, California
Graduate Student Instructor for “CS61CL: Machine Structures” (Fall Semester 2008), taught by Professor David Culler, Computer Science Division
- **University of California, Berkeley**, Berkeley, California
Guest Lecturer for “EECS152: Computer Architecture and Engineering”
Title: Virtualization (topics include VMM, memory sharing, VTx, Xen VM, VMware ESX)

TECHNICAL REPORTS AND DEMOS

- Xiaofan Jiang, Stephen Dawson-Haggerty, Jay Taneja, Prabal Dutta, and David Culler, “Demo: Creating Greener Homes with IP-Based Wireless AC Energy Monitors,” In *Proceedings of the Sixth ACM Conference on Embedded Networked Sensor Systems (SenSys’08)*, Nov. 2008.
- Stephen Dawson-Haggerty, Jorge Ortiz, Xiaofan Jiang and David E. Culler, “The Effect of Link Churn on Wireless Routing,” *Technical Report No. UCB/EECS-2008-109*, EECS Department, University of California, Berkeley, 2008.
- Kamin Whitehouse, Xiaofan Jiang, Alec Woo, Chris Karlof, and David Culler, “Sensor Field Localization: a Deployment and Empirical Analysis,” *UCB//CSD-04-1349*, April 9, 2004.

PROFESSIONAL SERVICES

- Steering Committee Chair, ACM BuildSys
- TPC co-Chair, ACM BuildSys '14, IoT Expo '16, IEEE SCIE '17, ICCCN '17 HoT
- Publication Chair, ACM SenSys '16, ACM BuildSys '16
- Publicity Chair, ACM SenSys '12, ACM EWSN '16
- Demo Chair, ACM BuildSys '11, ACM/IEEE IPSN '12, ACM/IEEE IPSN '16, ACM SenSys '16
- Web Chair, ACM SenSys '10, '11
- Poster Chair, ACM BuildSys '11

- TPC Member:
 - SenSys '13, '14, '15, '16, '17
 - MobiSys '14
 - Physical Analytics '14
 - MobiCASE '14
 - ASPLOS '14 (external reviewer)
 - RTAS '13
 - DCOSS '13, '14, '15, '16
 - E-Energy '15
 - EWSN '11, '13
 - BuildSys 10, '12, '13
 - HotPower '12
 - IPSN 11', '12
 - IoTDI '17
 - HotMobile '16

BACKGROUND AND SKILLS

- Wireless sensor networks, Internet-of-Things (IoT), and cyber-physical systems
- Human-building-computer interactions and building energy
- Mobile and embedded systems
- Signal processing, system design, control systems, wireless communications
- Digital components and design, FPGA design
- Analog design, integrated circuits, mixed signal design
- Sensors and actuators design, digital-analog interfacing
- RESTful design, IPv6/6LowPAN
- Database systems, PostgreSQL, MySQL, MongoDB
- C, C++, JAVA, Verilog, EDK, PHP, Perl, Python, SPICE, Matlab, Assembly, ModelSIM, Javascript, Scheme, Linux, TinyOS
- Fluent in spoken and written Chinese

PROFESSIONAL SOCIETY MEMBERSHIP

- Association for Computing Machinery (ACM)
- Institute of Electrical and Electronics Engineers (IEEE)