

Exponent®
Engineering & Scientific Consulting

Cathy Chen, Ph.D., P.E.

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Professional Profile

Dr. Cathy Chen assists clients with the design and execution of in-depth engineering analysis and rapid-response evaluations of electronic devices, communications networks, artificial intelligence (AI), Usability, Human Computer Interaction (HCI), and computer systems. Dr. Chen provides clients with critical information for their day-to-day and strategic decisions. Her work has included failure analyses, reverse engineering, as well as infringement and prior art analyses for patent and trade secret matters.

Dr. Chen has a background in electrical and computer engineering, with a focus on computer architecture, embedded systems, consumer electronics, and optical networks. Her expertise includes: multicore systems, pipeline processors, optical interconnection networks (photonic networks), memory systems, artificial intelligence, usability studies, human computer interaction, machine learning, user study design, and the development of network interfaces on field programmable gate arrays (FPGAs).

Dr. Chen completed her Ph.D. in Electrical Engineering at Columbia University in the Lightwave Research Laboratory. Her research focused on the development of FPGA-based test-beds for analyzing photonic networks for applications including: telecommunications, data centers, and heterogeneous utility computing systems. This involved routing and switching in photonic networks, particularly transparent interfaces to electronic communications and designing switching nodes with minimal optical-electronic-optical conversions (OEO). During her time at Columbia University, Dr. Chen was also a teaching assistant for courses in Embedded Systems, Computer Hardware Design, and Fundamentals of Computer Systems.

Prior to her Ph.D. studies, Dr. Chen received her B.S. in Electrical and Computer Engineering from Cornell University with a focus on computer architecture. During this time she worked in the Computer Systems Laboratory on simulations of cache coherence protocols in embedded systems.

Dr. Chen was also a project management intern at the Microsoft Corporation where she developed diagnostic tools and ran usability studies for operating systems. During this time she also assisted in drafting technical documentation for use by outside software and hardware manufacturers in diagnosing issues when interfacing to computer operating systems.

Academic Credentials & Professional Honors

Ph.D., Electrical Engineering, Columbia University, 2015

M.Phil., Electrical Engineering, Columbia University, 2013

B.S., Electrical and Computer Engineering, Cornell University, 2009

IEEE Region 1 Young Professional Award, 2018

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IEEE Women in Engineering International Leadership Conference, Change Maker, 2015

University of California Berkeley Rising Stars in EECS, 2014

National Science Foundation Engineering Research Center for Integrated Access Networks, Student Leadership Council Scholarship 2014

Columbia University School of Engineering and Applied Science Grossman Scholars Program, 2014-2015

Wei Family Private Foundation Special Scholarship, 2014

National Science Foundation Diversity Fellowship, 2011-2014

Licenses and Certifications

Coursera AI for Everyone Certification

Prior Experience

Graduate Research Assistant, Columbia University, 2009-2015

Graduate Teaching Assistant, Columbia University, 2009-2011

Program Management Summer Intern, Microsoft Corporation, 2008

Undergraduate Research Assistant, Cornell University, 2007-2009

Undergraduate Teaching Assistant, Cornell University, 2008-2009

Professional Affiliations

The International Society for Optics and Photonics — SPIE

Senior Member, Institute of Electrical and Electronics Engineers (IEEE) (Young Professionals Chair, New York Section)

The Optical Society — OSA

Society of Women Engineers — SWE

Columbia Engineering Young Alumni (CEYA) - President

Languages

Mandarin Chinese

Cantonese Chinese

Publications

Chen, C. Software Engineering: Artificial Intelligence, Compliance, and Security. Chapter 5, D'Andrade B (ed), Nova Publishers, 2021

Chen, C. The power grid: Smart, secure, green and reliable. Chapters 9 and 10, D'Andrade B (ed), Woodhead Publishing, 2017.

Chen C, An Inside Look at the Inaugural IEEE USA Future Leaders Forum. IEEE New York Monitor, Vol. 63. No. 7, September 2016.

Chen C. Photonic Interconnection Systems for Applications in Herogeneous Utility Computing Systems. Columbia University Academic Commons, May 2015.

Chen C, Chan J, Wang H, Bergman K. A photonic interconnection network for hardware accelerator enabled utility computing. Optical Interconnects Conference 2013 WA2, May 2013.

Wang H, Chen C, Sripanidkulchai K, Sahu S, Bergman K. Dynamically reconfigurable photonic resources for optically connected data center networks. National Fiber Optic Engineering Conference (NFOEC) I1B.2, March 2012.

Garg AS, Wang H, Chen C, Bergman K. Experimental demonstration of attenuation-based all optical time-to-live indicator. European Conference and Exhibition on Optical Communication (ECOC), September 2011.

Wang MS, Wang A, Bathula BG, Lai CP, Baldine I, Chen C, Majumder D, Gurkan D, Rouskas G, Dutta R, Bergman K. Demonstration of QoS-aware video streaming over a metro- scale optical network using a cross-layer architectural design. National Fiber Optic Engineers Conference (NFOEC) NThC4, March 2011.

Presentations

Chen C, Session 4 Speaker, CUNY Engineering Leadership Certificate Program, City University of New York, New York, NY. May 2020.

Chen C, Alumna Keynote, Columbia WISE Conference 2018, New York, NY. September 2018.

Chen C, Gorlatova M, Boekman K, Knoop S, and Schwarz J. Panel: What is the next frontier: A spirited (friendly) debate. Panel, IEEE Women in Engineering International Leadership Conference, San Jose, CA. May 2017.

Chen C, Bergman K. Photonic interconnection network for applications in heterogeneous utility computing. Poster Presentation, UC Berkeley Rising Stars in EECS, Berkeley, CA, November 2014.

Chen C, Wang H, Bergman K. A dynamically reconfigurable optically interconnected architecture for hardware accelerator enabled utility computing. Poster Presentation, Optoelectronics Industry Development Association Workshop on Software Defined Photonic and Data Center Networks, San Francisco, CA, March 2014.

Chen C, Wang H, Chan J, Bergman K. A photonic interconnection network for hardware accelerator enabled utility computing. Poster Presentation, Optoelectronics Industry Development Association Workshop: Future Needs of ‘Scale-Out Data Centers: An OIDA Workshop for Stakeholders, Anaheim, CA, March 2013. Best Poster - 2nd Place.

Chen C, Wang H, Chan J, Bergman K. A photonic interconnection network for hardware accelerator enabled utility computing. Oral Presentation, IEEE Optical Interconnects Conference 2012, Santa Fe,

NM, May 2013.

Chen C, Janak J, Zhang W, Katz E, Ahsan A, Birand B, Bergman K, Schulzrinne H, Zussman G. Demonstration of WiMax client generated video transmitted on a transparent optical network. Poster Presentation, Optoelectronics Industry Development Association Workshop on Metrics for Aggregation Networks and Data Centers, Los Angeles, CA, March 2012.