CURRICULUM VITAE

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Updated May 2022

RESEARCH INTERESTS:

Design, modeling, and simulation of embedded, real-time, cyber-physical systems.

ACADEMIC POSITIONS:

University of California at Berkeley
Professor in the Graduate School and
Distinguished Professor Emeritus,
January 2018 — present

Institut für die Wissenschaften vom Menschen (IWM, Institute for Human Sciences)
Digital Humanism Fellow
May 2-31, 2022, Vienna, Austria.

Technical University of Vienna
Visiting Professor
May 2-31, 2022

University of California at Berkeley
Robert S. Pepper Distinguished Professor,
September 2006 — December 2017

Mälardalen University, Embedded Systems Group, Sweden
Visiting Professor
February 2018 — September 2018

University of California at Berkeley
Vice Chair for Computer, Network and Instructional Labs (CNIL),
EECS Department, July 2008 — June 2011

University of California at Berkeley
Chair of Electrical Engineering and Computer Sciences,
July 2006 — June 2008

University of California at Berkeley
Chair of Electrical Engineering, Associate Chair of EECS,
January 2005 — June 2006

University of California at Berkeley
Professor, July 1994 — December 2017

INRIA, Sophia-Antipolis, France
Visiting Professor, September 1994 — December 1994

University of California at Berkeley
Associate Professor, July 1990 — July 1994

University of California at Berkeley
Assistant Professor, June 1986 — July 1990

MAJOR RESEARCH PROJECTS:

Director: iCyPhy: Industrial Cyber-Physical Systems Center. 2012 — Present.
ICyPhy is a collaborative effort between academia and industry that conducts pre-competitive research on design, modeling, and analysis techniques for cyber-physical systems, with emphasis on industrial applications. Cyber-physical systems integrate computing, networking, and physical components. Applications include transportation systems, industrial automation, security, smart buildings, smart cities, medical systems, energy generation and distribution, water distribution, agriculture, military systems, process control, asset management, and robotics.

Director: TerraSwarm Research Center. January 2013 — December 2017.
This center is addressing the huge potential (and associated risks) of pervasive integration of smart, networked sensors and actuators into our connected world. The center is funded by the STARnet phase of the Focus Center Research Program (FCRP) administered by the Semiconductor Research Corporation (SRC). Funding comes from the Defense Advanced Research Projects Agency (DARPA) and the SRC industry partners, including Applied Materials, GLOBALFOUNDRIES, IBM, Intel Corporation, Micron Technology, Raytheon, Texas Instruments, and United Technologies.

Director: CHESS: Center for Hybrid and Embedded Systems Software. September 2002 — 2016.
This center focuses on developing model-based and tool-supported design methodologies for real-time fault tolerant software on heterogeneous distributed platforms. It bridges the gap between computer science and systems science by developing the foundations of a modern systems science that is simultaneously computational and physical.

Director: Ptolemy Project. January 1990 — December 2021.
Ptolemy is a research project focused on system-level modeling, simulation, and design, with special emphasis on embedded, real-time, and reactive systems such as signal pro-

cessing, communications, and real-time control systems. The key underlying principle in the project is the use of multiple models of computation in a hierarchical heterogeneous design environment.

INDUSTRIAL POSITIONS:

BDTI, Berkeley CA
Vice President, Co-Founder and Senior Technical Advisor (1992 — present)

Institute Advisor, Daegu Gyongbuk Institute of Science and Technology (DGIST), Daegu, Korea (2006-2008).

Bell Telephone Laboratories, Holmdel, NJ
Member of Technical Staff (1979 — 1982)
Advanced Data Communications Laboratory

Consultant for a number of companies.

- BDTI, Inc (1994 — present)
- Airbus (2016)
- United Technologies (2015)
- National Instruments (2009 — present)
- The Mathworks (2000 — 2005)
- Kestrel Institute (2001 — 2002)
- Comdisco Systems (1989 — 1994)
- Hitachi America (1990 — 1992)
- Cypress Semiconductor (1991)
- EDC/Mentor Graphics (1991)
- Star Semiconductor (1990 — 1991)
- Weber Associates (1990)
- Apple Computer (1989)
- Rockwell (1988)
- Bizcomp (1988)
- Micom (1987)
- GTE Government Systems (1986)
- Fujitsu America (1986)
- Telebit (1985)

AWARDS AND HONORS:

- Honorary Doctorate, Technical University of Vienna, May, 2022.
- 2022 European Design and Automation Association (EDAA) Achievement Award.
- 2022 ACM SIGBED Technical Achievement Award.
- 2019 IEEE Technical Committee on Cyber-Physical Systems (TCCPS) Technical Achievement Award, "for pioneering and fundamental contributions to the design, modeling and simulation of cyber-physical systems."
- The Berkeley Citation, February, 2018.
- Paper selected as a best SoSyM paper over the past year to be presented in a special session at MODELS 2018 in Copenhagen, Denmark, 2018.
- Honorary Professor, Amity School of Engineering & Technology, Amity University, Uttar Pradesh, India, Feb. 23, 2018.
- Principles of Modeling: Festschrift Symposium in Honor of Edward A. Lee, Oct. 13, 2017. See https://ptolemy.eecs.berkeley.edu/conferences/17/program.htm
- Best paper award, IoTDI 2017, a CPS Week conference.
- Outstanding Technical Achievement and Leadership Award from the IEEE Technical Committee on Real-Time Systems (TCRTS), 2016.
- Best paper award, IoTDI 2016, a CPS Week conference.
- Robert S. Pepper Distinguished Professorship, UC Berkeley, 2006 – 2017.
- MacKay Professorship, EECS Department, UC Berkeley, 2005
- Electrical Engineering Outstanding Teaching Award, EECS Dept., UC Berkeley, 1999
- Miller Professorhip, 1999
- Frederick Emmons Terman Award for Engineering Education, 1997
- Fellow of the IEEE
- IEEE Signal Processing Society Paper Award, 1990
- NSF Presidential Young Investigator Award, January, 1987
- David J. Sakrison Memorial Prize, U.C. Berkeley, 1986
- IBM Faculty Development Award, August, 1986
- Samuel Silver Memorial Scholarship Prize, U.C. Berkeley, 1985
- Magna Cum Laude, Yale 1979
- Distinction in Engineering and Applied Science, Yale, 1979
- Tau Beta Pi, Yale 1979

EDUCATION:

University of California at Berkeley
Ph.D. in Electrical Engineering, December, 1986
Dissertation title: *A Coupled Hardware and Software Architecture for Programmable Digital Signal Processors*
Advisor: Prof. David Messerschmitt

Massachusetts Institute of Technology
SM in Electrical Engineering, December 1981

Yale University
BS, May 1979, Magna cum Laude
Double Major: Computer Science and Engineering and Applied Science

COURSES TAUGHT:

- CS 24, "An Informal Introduction to Philosophy of Technology," Freshman Seminar
- EECS 149/249A, "Introduction to Embedded Systems" (undergrad/graduate)
- EECS 249B, "Embedded System Design: Modeling, Analysis, and Synthesis" (graduate)
- EECS 219D, Concurrent Models of Computation (graduate)
- edX, EECS149.1x, MOOC on CPS: https://www.edx.org/course/uc-berkeleyx/uc-berkeleyx-eecs149-1x-cyber-physical-1629, May-June 2014. Peak enrollment near 9000.
- EECS 144/244, "Algorithms for System Modeling, Analysis, and Optimization" (undergrad/graduate)
- EECS 20n, "Structure and Interpretation of Signals and Systems" (undergrad)
- EECS 121, "Noise in Communications Systems" (undergrad)
- EECS 123, "Digital Signal Processing" (undergrad)
- EECS 224, "Digital Communication" (graduate)
- EECS 225a, "Digital Signal Processing" (graduate)
- EECS 290n, "Advanced topics in System Theory" (graduate)
- EECS 290t, "Advanced topics in Signal Processing" (graduate)
- EECS 298-13, "Design, Modeling, and Specification of Systems" (seminar)
- EECS 298-20, "Topics in Communications and Signal Processing" (seminar)
- "Digital Signal Processing," National Technological University (televised)
- "Digital Communication," National Technological University (televised)
- "Modern Digital Communication" (short course) Berkeley/Oxford Extension
- "VLSI for Signal Processing" (IEEE tutorial)
- "Communications ICs" (short course) Berkeley Extension
- "Digital Signal Processor Development" (short course) UCSB Extension
- "Telecommunications Applications of Prog. DSPs" (short course) UCSB Extension

INVITED TALKS

- **Invited Talk**, "Deep Neural Networks, Explanations, and Rationality," Nokia Bell Labs, Responsible AI Seminar Series, Online, Nov. 21, 2022.
- **Invited Talk**, "The Vienna Manifesto on Digital Humanism," Columbia University, New York, Nov. 11, 2022.
- **Invited Talk**, (with Reinhard von Hanxleden) "Pragmatics Twelve Years Later: A Report on Lingua Franca," at ISoLA, Rhodes, Greece, Oct. 24, 2022.
- **Keynote**, "Do We Really Want Explainable AI?", at Intelligent Systems, Amsterdam, Sept. 1, 2022.
- **Public Lecture**, "Limits of Machines, Limit of Humans," Vienna, Austria, May 24, 2022.
- **Invited Talk**, "Trading off Consistency and Availability in Cyber-Physical Systems," MDU/Software Center Workshop on Cyber-Security, Vasterås, Sweden, Apr. 27, 2022.
- **Guest lecture**, "Computational Creativity," for UC Berkeley Music 30, Apr. 20, 2022.
- **Invited talk**, "Fundamental Differences Between Humans and Digital Machines," Digital Humanism Workshop, Vienna, Mar. 3, 2022.
- **Invited talk**, "Science and Engineering for Cyber-Physical Systems," The Cyber and the Physical Symbiosis Workshop, Tunis and Dresden, Dec. 3, 2021.
- **Invited talk**, "What Can We Learn about Creativity from Deep Neural Networks," Creativity Talk Series, Porto (Q&A), Dec. 2, 2021.

- **Invited Talk**, “Time for All Programs, Not Just Real-Time Programs,” ISoLA, Rhodes, Greece, Oct. 25, 2021.
- **Keynote**, “Determinism,” IBM PREVAIL 2021, online, Oct. 20, 2021.
- **Keynote**, “Consistency and Availability Tradeoffs in Cyber-Physical Systems,” Symp. on Distributed Simulation and Real Time Applications (DS-RT), online, Sep. 28, 2021.
- **Keynote**, “Determinism,” European Conference on Software Architecture (ECSA), online, Sept. 15, 2021.
- **Keynote**, “Determinism in Time-Sensitive Cyber-Physical Systems,” Int. Conf. on Embedded and Real-Time Computing Systems and Applications (RTCSA), Aug. 19, 2021.
- **Keynote**, “The Coevolution of Humans and Machines, Intelligent Environments (IE),” online and Dubai, June 23, 2021.
- **Invited plenary talk**, “Verifying Parallel and Distributed Systems: The Observer Problem,” Integrated Formal Methods (iFM), online, Nov 18, 2021.
- **Invited Talk**, “Deterministic Actors,” in a Seminar Series organized by TU Dresden, Germany and Univ. of Manouba, Tunisia, online, Oct 15, 2021.
- **Keynote**, “More Deterministic Software for Cyber-Physical Systems,” Forum on Design Languages (FDL) Kiel, Germany, online, Sep 15, 2020.
- **Keynote**, “More Deterministic Software for Cyber-Physical Systems,” Workshop on Automated and verifiable Software sYstem Development (ASYDE), Amsterdam, online, Sept. 15, 2020.
- **Keynote,** “The Coevolution of Humans and Machines,” Conference on Advanced Information Systems Engineering (CAiSE) in Grenoble, France, June 10, 2020.
- **Invited talk**, The Coevolution, Reykjavik University/Gran Sasso Science Institute, May 20, 2020.
- **Invited talk**, The New Urgency of Digital Humanism As We Become Digital Humans, in Workshop on Digital Humanism: Informatics in Times of COVID-19, Vienna, Austria, May 14, 2020.
- **Invited talk**, The Coevolution: The Entwined Futures of Humans and Machines, the Humanist Community of Silicon Valley, May 3, 2020.
- **Invited talk**, Using Time and Timestamps for Deterministic Distributed Software, KTH, Stockholm, Sweden, March 12, 2020.
- **Invited talk**, Using Time and Timestamps for Deterministic Distributed Software, MDH, Västerås, Sweden, March 10, 2020.
- **Invited talk,** A Personal View of Real-Time Computing, Ecole Normale Superieure, Paris, Feb. 26, 2020.
- **Invited talk**, Reactors for Real-Time Systems, Sorbonne Univerity, Paris, Feb. 25, 2020.
- **Invited talk**, Using Timestamps for Deterministic Distributed Software, ISAE, Toulouse, France, Feb. 6, 2020.
- **Invited talk**,The Coevolution of Humans and Machines, LAAS, Toulouse, "Penser les technosciences" series, Feb. 5, 2020.
- **Invited talk** in Digital Humanism series: The Coevolution of Humans and Machines, Vienna, Austria, Dec 18, 2019.
- **Keynote** at Embedded AI Summit in Shenzhen, China, Dec 7, 2019.
- **Invited Talk**: Actors Revisited for Predictable Systems, Dagstuhl, Germany, Oct 29, 2019.

- **Invited talk** about the Vienna Manifesto on Digital Humanism at the Humanist Community in Silicon Valley, Oct 20, 2019.
- **Invited talk** at Model-Based Design of Cyber-Physical Systems (CyPhy), New York, Oct 17-18, 2019.
- **Keynote** at MEMOCODE, San Diego, Oct 9-11, 2019.
- **Keynote** at the sel4 Summit, Virginia, Sep 23-26, 2019.
- **Invited talk** for DAC Special Session on time-critical systems design, Las Vegas, Jun 5, 2019.
- **Keynote** at the Workshop on Software Engineering for Smart Cyber-Physical Systems (SEsCPS), Montreal, Canada, May 28, 2019.
- **Invited talk**, Software Certification Consortium (SCC): "Deterministic Modeling of Uncertain Systems: Implications for Certification," May 3, 2019.
- **Distinguished lecture** at George Washington University, ECE Department: "A Personal View of Real-Time Computing," April 22, 2019.
- **Distinguished lecture** at Boston University, CISE: "A Personal View of Real-Time Computing," April 19, 2019.
- **Keynote**: "Freedom From Choice and the Power of Models," International Symposium on Physical Design (ISPD), San Francisco, April 16, 2019.
- **Academic Keynote** "Intelligence and Computation," Embedded Systems Innovation (ESI) Symposium, at TU Eindhoven, April 9, 2019.
- **Invited Talk** at INRIA, Grenoble, France: "A Personal View of Real-Time Computing," April 2, 2019
- **Invited Talk** at Verimag, Grenoble, France: "Living Digital Beings," April 1, 2019.
- **Keynote**, "A Fundamental Look at Models and Intelligence," DATE 2019, special day on "Model-Based Design of Intelligent Systems," Florence, Italy, March 28, 2019.
- **Keynote**, "Observation and Interaction," Language and Automata Theory and Applications (LATA), St. Petersburg, Russia, March 26, 2019
- **Invited talk**, ITMO University in St. Petersburg: "Actors Revisited for Timing-Critical Systems," March 25, 2019.
- **Invited talk**, TU Eindhoven, "Actors Revisited for Timing-Critical Systems," March 21, 2019.
- **Keynote**, ICT.OPEN 2019, "Living Digital Beings," Hilversum, the Netherlands, March 20, 2019.
- **Invited talk** at Dagstuhl Seminar on Analysis, Design, and Control of Predictable Interconnected Systems, Germany, "Actor-Oriented Models of Computation for Predictable Interconnected Systems," Mar 3-8, 2019.
- **Keynote** at Cognitive Computing, "Is Cognition Digital and Computational?" Herrenhausen Palace, Hannover, Germany, Dec. 18, 2018
- **Invited talk** at New Directions In Software Technology (NDIST), "Is General Intelligence Digital and Computational?" O'ahu, Hawaii, Dec. 11-14, 2018.
- **Invited talk**, Int. Conf. on the Industrial Internet (ICII), Seattle, WA :Deterministic Timing for the Industrial Internet of Things, Oct. 23, 2018.
- **Keynote** at FACS (Formal Aspects of Component Software), Pohang, Korea: "What Good are Models?" Oct. 10, 2018.
- **Invited talk**, Seoul National University, Seoul, Korea: "What Good Are Models? A Focus on Cyber-Physical Systems," Oct. 8, 2018.

- **Invited talk**, Mälardalen University, Västerås, Sweden: “Models of Timed Systems,” Sep. 26, 2018.
- **Invited talk**, Chalmers University, Gothenburg, Sweden: Actor-based Modeling Patterns for Flow Management (with Marjan Sirjani), Sep. 24, 2018.
- **Invited talk** at Halmstad University, Sweden: “Is Humanity Defining Technology? Or is Technology Defining Humanity?” Sep. 21, 2018.
- **Invited talk**, Northwestern Polytechnic University, Xi'an, China: “A Personal View of Real-Time Computing, School of Computer Science,” Sep. 7, 2018.
- **Invited talk**, FORMATS 2018, Beijing, China: Models of Timed Systems, Sep. 4, 2018.
- **Invited talk**, Workshop on Design Automation for Cyber-Physical Systems (DACPS), San Francisco: A Component Architecture for the Internet of Things, June 24, 2018.
- **Invited talk:** What Good Are Formal Models? Summer School on Formal Techniques, Atherton, CA, May 25, 2018.
- **Invited talk**: Symbiosis or Annihilation: A philosophical look at Artificial Intelligence, IDT Open Seminar, Mälardalen University, Västerås, Sweden, May 2, 2018.
- **Invited talk**: TSN as a Game Changer for Cyber-Physical Systems, Workshop on Time-Sensitive Networks, Mälardalen University, Västerås, Sweden, Apr. 27, 2018.
- **Invited talk**: Living Digital Things, DPAC Summit, Mälardalen University, Västerås, Sweden, Apr. 25, 2018.
- **Keynote**: in “Coffee with an Expert” series, KTH, ICES, Stockholm, Sweden, Apr. 19, 2018.
- **Keynote**: Accessors: A Software Architecture for IoT, Global IoT Conference, Santa Clara, CA, Apr. 2, 2018.
- **Invited Talk**: A Personal View of Real-Time Computing, SPIN, Noida, India, Feb. 22, 2018.
- **Invited Talk**: Symbiosis or Annihilation? How Humans and Technology Coevolve, CafeX Series of Fireside Chats with Dean Ishwar Puri, McMaster University, Hamilton, Ontario, Canada, Jan. 30, 2018.
- **Distinguished Lecture**: Resurrecting Laplace's Demon: The Case for Deterministic Models, Department of Computing and Software at McMaster University, Hamilton, Ontario, Canada, Jan. 29, 2018.
- **Radio Interview**: Tech Nation, NPR, on Plato and the Nerd, Dec. 7, 2017.
- **Invited Award Talk**: “A Personal View of Real-Time Computing,” Real-Time Systems Symposium (RTSS), Paris, France, Dec. 6, 2017.
- **Invited Talk**: “Plato and the Nerd,” Microsoft Tech Talk Series, Sunnyvale, CA, Nov. 8, 2017.
- **Invited Talk**: “Plato and the Nerd, Noblis Technology Speaker Series,” In partnership with Hooks Book Events, Reston VA, Oct. 31, 2017.
- **Keynote**: “Living Digital Things,” at IEEE Int. Conf. on Collaboration and Internet Computing (CIC), Oct. 15, 2017.
- **Invited talk**: "Symbiosis or Annihilation? How Humans and Technology Coevolve," EECS Department Colloquium, UC Berkeley, Sep. 27, 2017.
- **Invited talk:** "Resurrecting Laplace's Demon: The Case for Deterministic Models," CS Department Colloquium, University of Houston, Sep. 22, 2017.
- **Invited talk**: "Resurrecting Laplace's Demon: The Case for Deterministic Models," CS Department Colloquium, Rice University, Sep. 21, 2017.

- **Keynote talk**: “Resurrecting Laplace's Demon: The Case for Deterministic (Timing) Models,” ISPCS, Monterey, CA, Aug. 30, 2017.
- **Invited talk**: “Resurrecting Laplace's Demon: The Case for Deterministic Models,” KTH Royal Institute of Technology, Stockholm, Sweden, Apr. 25-26, 2017.
- **Invited Talk**: “Fundamental Limits of Cyber-Physical and Hybrid System Modeling,” at Symbolic and Numerical Methods for Reachability Analysis (SNR), collocated with European Joint Conferences on Theory and Practice of Software (ETAPS) in Uppsala, Sweden, April 22, 2017.
- **Invited talk**: “Resurrecting Laplace's Demon: The Case for Deterministic Models,” Mälardalen University, Västerås, Sweden, Apr. 20, 2017.
- **Invited talk**: “Accessors: An Open Architecture for the Internet of Things,” Google, Mountain View, CA, USA, Mar. 30, 2017.
- **Invited talk**: “Resurrecting Laplace's Demon: The Case for Deterministic Models,” Distinguished Lecture Series, Computer and Information Science Department, University of Pennsylvania, Philadelphia, PA, USA, Jan. 26, 2017.
- **Invited talk**: “Accessors: A Software Architecture for the Internet of Things,” Fortiss - An-Institut of TU Munich, Munich, Germany, Dec. 9, 2016.
- **Keynote**: “Resurrecting Laplace's Demon: The Case for Deterministic Models,” Synchron, Bamberg, Germany, December 8, 2016.
- **Keynote**: "Dependable Cyber-Physical Systems," Symposium on Dependable Software Engineering (SETTA), Beijing, China, Nov. 9, 2016.
- **Keynote**: “Resurrecting Laplace's Demon: The Case for Deterministic Models,” MODELS, St. Malo, France, Oct. 4, 2016. (video: https://videos-rennes.inria.fr/video/SypTLsQ1g)
- **Keynote**: "The Internet of Important Things," IEEE Sarnoff Symposium, Newark, NJ, Sep. 20, 2016.
- **Plenary talk**: "The Internet of Important Things," IEEE System-on-Chip Conference (SOCC), Seattle, WA, Sep. 7, 2016.
- **Invited talk**, "Fundamental Limits of Cyber-Physical Systems Modeling," Symposium honoring Janos Sztipanovits, Nashville, TN, July 29, 2016.
- **Keynote**: "The Internet of Important Things," International Summer School on Advanced Computer Architecture and Compilation for High-Performance and Embedded Systems (ACACES), Fiuggi, Italy, July 10, 2016.
- **Invited talk**, "What Does ‘Real Time’ Mean?" Workshop on Real-Time Decision Making, Simons Institute, Berkeley, CA, June 28, 2016.
- **Invited talk**, "The Internet of Important Things," CRESS event - School of Computer Science, Reykjavik University, Iceland, June 16, 2016. (Video: https://www.youtube.com/watch?v=V2CvSsvDXb4&feature=youtu.be)
- **Keynote**, "Resurrecting Laplace's Demon: The Case for Deterministic Models," Workshop on Modelling in Software Engineering (MiSE’2016), Austin, TX, May 17, 2016.
- **Invited Panel**, NXP Influencers Summit- IoT Security Panel, Austin TX. Co-located with ICSE 2016, May 16, 2016.
- **Invited talk**, “The Internet of Important Things,” Airbus Lecture Series, Toulouse, France, Apr. 18, 2016.

- **Invited talk**, “Determinism: Resurrecting Laplace’s Demon,” Workshop on Game Changing and Controversial Topics in Cyber-Physical Systems, Budapest, Hungary, Apr. 15, 2016.
- **Keynote:** “Embedded Intelligent systems,” ARTEMIS Spring Event, Vienna, Apr. 13, 2016.
- **Invited talk**, “The challenges of doing multidisciplinary research, particularly in cyber-physical systems,” IPSN PhD Forum, CPS Week, Vienna, Apr. 11, 2016.
- **Invited talk**, “Resurrecting Laplace's Demon: The Case for Deterministic Models for Cyber-Physical Systems,” USC CPS Lecture Series, Los Angeles, Apr. 4, 2016.
- **Invited Talk**, “The Internet of Important Things,” UC Irvine EECS Lecture Series, Feb. 5, 2016.
- **Keynote:** “The Internet of Important Things,” at Embedded and Real Time Software and Systems (ERTS), Toulouse, Jan. 27, 2016.
- **Invited Talk**, “IoT and CPS: A Focus on Modeling,” US-German Workshop on IoT and CPS, Washington DC, Jan. 20, 2016.
- **Invited Talk**, “Accessors: An Open Architecture for the Internet of Things,” IFIP WG 10.4 Meeting and Workshop on Internet of Things, Aspen, CO, Jan. 11, 2016.
- **Invited Talk**, “Fundamental Limits of Cyber-Physical Systems Modeling,” ECE/CSE Departments, Univ. of Connecticut, Storrs, CT, Nov. 11, 2015.
- **Plenary Talk**, “Better Engineering Through Better Models,” at the Int. Conf. on Complex Systems Engineering (ICCSE), Univ. of Connecticut, Storrs, CT., Nov. 9, 2015.
- **Invited Talk**, “The Internet of Important Things,” U. of Sao Paulo, Brazil, Nov. 6, 2015.
- **Keynote:** “The Internet of Important Things,” at the Int. Embedded Systems Symposium (IESS), Foz do Iguacu, Brazil, Nov. 3, 2015.
- **Invited Talk**, “Modeling and Simulating Cyber-Physical Systems using CyPhySim,” Special Session on Design of Hybrid Systems, EMSOFT, ES Week, October 6, 2015, Amsterdam, The Netherlands.
- **Keynote:** “The Internet of Important Things,” Software Engineering and Formal Methods (SEFM), September 11, 2015, York, England, UK.
- **Keynote:** “Controlling Timing vs. Measuring Timing,” Workshop on Suite of Embedded Applications and Kernels (SEAK) at DAC, June 7, 2015, San Francisco, CA.
- **Keynote:** “The Internet of Important Things,” at Time Sensitive Networks and Applications (TSNA), April 29, 2015, Santa Clara, CA.
- **Keynote:** “Better Engineering Through Better Models,” IEEE Texas Workshop on Integrated System Exploration (TexasWISE), March 27, 2015, Round Top, TX.
- **Keynote:** “Architectural Support for Cyber-Physical Systems,” Architectural Support for Programming Languages and Operating Systems (ASPLOS) March 17, 2015, Istanbul, Turkey.
- **Invited Talk**, “Connecting the Cloud to Things,” IAP Berkeley Workshop on the Future of Cloud Computing, February 27, 2015, Berkeley, CA.
- **Keynote:** “It's About Time,” at Reconfigurable Computing and FPGAs (ReConFig), December 8, 2014, Cancun, Mexico.
- **Keynote:** “Mixing Discrete and Continuous Models,” North America Modelica Users’ Group Meeting, Oct. 14, 2014, Atlanta, GA.
- **Invited Wilson Lecture,** “Constructive Models of Discrete and Continuous Physical Phenomena,” ECE Dept, Univ. of Minnesota, Sept. 26, 2014, Minneapolis, MN.

- **Keynote:** Constructive Models of Discrete and Continuous Physical Phenomena, Summer Simulation Multi-Conference (SummerSim), July 6 - 10, 2014, Monterey, CA.
- **Keynote:** It's About Time: Leveraging Clock Synchronization for Distributed Real-Time Programming, IEEE Symposium on Object/Component/Service-oriented Real-Time Distributed Computing (ISORC), Reno, NV, June 12, 2014.
- **Keynote:** Leveraging Synchronized Clocks in Cyber-Physical Systems, Workshop on Synchronization in Telecommunications Systems (WSTS), San Jose, CA, June 11, 2014.
- **Invited Talk**, Swarm Systems, Visioning 2025, NSF and CCC Workshop, Washington DC, May 12-13, 2014.
- **Invited Talk**, It's About Time, Jet Propulsion Laboratory, May 6, 2014, Pasadena, CA.
- **Invited Talks,** Cyber-Physical Systems - Future of Tools, Intellectual Challenges and Opportunities, and Models and Reality, National Instruments, Austin, TX, April 18, 2014.
- **Invited Talk**, Precise and Repeatable Timing in Embedded Software, Texas Instruments, March 3, 2014, Santa Clara, CA, USA.
- **Invited Talk**, Cyber-Physical Systems - A Fundamental Intellectual Challenge, Triangle Computer Science Distinguished Lecturer Series (TCSDLS), CS Depts., U. of North Carolina in Chapel Hill, Duke U., and NC State, January 27, 2014, Chapel Hill, North Carolina.
- **Invited Talk**, Cyber-Physical Systems - A Fundamental Intellectual Challenge, College de France, Paris, France, December 11, 2013. (video: http://www.college-de-france.fr/site/gerard-berry/guestlecturer-2013-2014.htm)
- **Invited Talk**, Cyber-Physical Systems - A Rehash or A New Intellectual Challenge? Supelec, Paris, France, December 10, 2013. (video: http://wwwdi.supelec.fr/fb/SeminaireLee2013)
- **Invited Talk,** Systems of Systems Modeling, International Conference on Complex Systems Design & Management (CSD&M), Paris, France, December 4-6, 2013.
- **Invited Talk**, Cyber-Physical Systems - A Rehash or A New Intellectual Challenge? University of Michigan, Ann Arbor, MI, Oct. 16, 2013.
- **Invited Talk**, Cyber-Physical Systems - A Rehash or A New Intellectual Challenge? General Electric Global Research, San Ramon, CA, Oct. 9, 2013.
- **Keynote:** Reliable and Flexible Factory Automation: It's About Time, IEEE International Conference on Emerging Technologies & Factory Automation (ETFA) Cagliari, Italy, September 10-13, 2013.
- **Invited Talk in the Distinguished Speaker Series**, Cyber-Physical Systems A Rehash or A New Intellectual Challenge? Design Automation Conference (DAC), Sponsored by the IEEE Council on Electronic Design Automation (CEDA), Austin, Texas, June 4, 2013.
- **Invited talk**, **UTRC Fellows Innovation Lectures,** The Swarm at the Edge of the Cloud, United Technologies Research Center, East Hartford CT, May 30, 2013.
- **Invited talk**, It's About Time. Universiteit van Amsterdam, Amsterdam, The Netherlands, February 28, 2013.
- **Keynote:** Time for High-Confidence Distributed Embedded Systems. IEEE Real-Time Systems Symposium (RTSS), San Juan, Puerto Rico, Dec. 4-7, 2012.

- **Invited talk**, Leveraging Time Synchronization for Reliable Distributed Real-Time Software. Model-Based Embedded Software Engineering in 2020+, Bosch, Stuttgart, Dec. 3-4, 2012.
- **Plenary Talk,** Verifying Real-Time Software is Not Reasonable (Today). Haifa Verification Conference (HVC), Haifa, Israel, November 6-8, 2012.
- **Invited talk,** Models of Time for a Computational World. National Workshop on The New Clockwork for Time-Critical Systems, October 25, 26, and 27, 2012, Baltimore, Maryland.
- **Keynote:** Teaching Embedded Systems the Berkeley Way, Workshop on Embedded and Cyber-Physical Systems Education (WESE), Tampere, Finland, October 11, 2012.
- **Invited Talk**, Beyond Synchrony to Timed Systems: In honor of Paul Caspi, Invited Talk at EMSOFT: Special Session: An Overview Of The Career of Paul Caspi, Tampere, Finland, Oct 9, 2012.
- **Education Keynote**, Introducing Embedded Systems: A Cyber- Physical Systems Approach, National Science Foundation CPS PI Meeting, National Harbor, Maryland, October 5, 2012.
- **Keynote:** Time for High-Confidence Distributed Embedded Systems, International IEEE Symposium on Precision Clock Synchronization for Measurement, Control and Communication (ISPCS), South San Francisco, September 26, 2012.
- **Invited Talk**, Equations, Synchrony, Time, and Modes, Workshop on System Design meets Equation-based Languages, Department of Automatic Control, Lunds, Sweden, Sept. 18-21.
- **Keynote:** It's About Time, International Conference on Embedded Computer Systems: Architectures, Modeling, and Simulation (SAMOS), Samos, Greece, July 19-21, 2012.
- **Plenary Talk**, Certifying Real-Time Software is Not Reasonable (Today), Software Certification Consortium (SCC) Workshop, at the High Confidence Software and Systems (HCSS) Conference, Annapolis, MD, May 6 and 7, 2012.
- **Invited Talk**, Time for High-Confidence Cyber-Physical Systems, Arizona State University, April 6, 2012.
- **Plenary Talk**, Time for High-Confidence Cyber-Physical Systems, Performance Metrics for Intelligent Systems (PerMIS'12) Workshop, University of Maryland, March 20-22, 2012.
- **Invited Talk**, Time for High-Confidence Cyber-Physical Systems, UC Davis, Davis, CA, March 9, 2012.
- **Distinguished Speaker Series,** Heterogeneous Actor Models, Halmstad University, Sweden, February 10, 2012.
- **Invited Talk**, Time for High-Confidence Cyber-Physical Systems, Lund University, Sweden, February 9, 2012.
- **Keynote:** Heterogeneous Actor Models, MODPROD, Workshop on Model-Based Product Development, Linköping, Sweden, February 8, 2012.
- **Invited Talk**, Time for High-Confidence Cyber-Physical Systems, ICES workshop on Embedded and Cyber-physical Systems - Model-Based Design for Analysis and Synthesis, Stockholm, Sweden, February 6, 2012.
- **Invited Talk**, The Challenges of Embedded System Design, Xilinx Emerging Technology Symposium (ETS), San Jose, CA, February 1, 2012.

- **Keynote:** Heterogeneous Actor Models, IEEE Int. Conf. on Service-Oriented Computing and Applications, (SOCA, with LCPS, KASTLES, RTSOAA), Irvine, CA, December 12, 2011.
- **Keynote:** Time for High-Confidence Networked Embedded Systems, BoCSE 2011, 4th Bosch Conference on Systems and Software Engineering, Stuttgart, Germany, November 14th – 17th, 2011.
- **Invited Talk**, Portable Real-Time Code from PTIDES Models, Workshop on Time Analysis and Model-Based Design, from Functional Models to Distributed Deployments (TiMoBD) ESWeek, Taipei, Taiwan, Oct. 9, 2011.
- **Invited Roadmap Talk**, Heterogeneous Actor Models, EMSOFT, Taipei, Taiwan, October 10, 2011.
- **Invited Talk**, Time for High-Confidence Cyber-Physical Systems, Research Colloquium on the occasion of the retirement of Professor Hermann Kopetz, Time in Cyber-Physical Systems, September 28th, 2011, TU Wien, Vienna, Austria.
- **Keynote:** Foundations of Cyber-Physical Systems, CPS Principal Investigator Meeting, National Science Foundation, National Harbor, Maryland, Aug. 1-2, 2011.
- **Keynote:** Time for High-Confidence Networked Embedded Systems, Network Science Workshop (NSW), West Point, New York, June 22-24, 2011.
- **Invited Talk**, Temporal Isolation on Multiprocessing Architectures, Design Automation Conference (DAC), Special session on: Embedded Multi-Processor Software Synthesis, San Diego, CA, June 7, 2011.
- **Keynote:** Synthesis of Distributed Real-Time Embedded Software, Electronic System Level Synthesis Conference, ESLsyn, June 5-6, 2011, San Diego, California, USA.
- **Keynote:** Time for High-Confidence Software Systems, 11th Annual Conference on High Confidence Software and Systems (HCSS), Annapolis, Maryland, May 1-6, 2011.
- **Distinguished Lecture Series,** Foundations of Cyber-Physical Systems, Iowa State University, March 11, 2011.
- **Distinguished Lecture Series,** Computing Needs Time, Virginia Tech, Dec. 10, 2010.
- **Distinguished Speaker Series,** Computing Needs Time, Purdue University, Dec. 6, 2010.
- **Keynote:** Compositional Timing in Concurrent, Parallel, and Distributed Real-Time Systems, 3rd Workshop on Compositional Theory and Technology for Real-Time Embedded Systems (with RTSS), San Diego, CA, Nov. 30, 2010.
- **Distinguished Lecture Series,** Computing Needs Time, Washington University, St. Louis, Nov. 12, 2010.
- **Invited Talk**, Architecture for Precise and Repeatable Timing, Thales workshop, November 3, 2010, Palaiseau, France.
- **Invited Talk**, Programming Models for Parallel and Distributed Real-Time Systems, November 3, 2010, Palaiseau, France.
- **Keynote:** Computing Needs Time, Working day on time-oriented embedded systems, November 2, 2010, at ENSEEIHT, Toulouse, France
- **Invited Talk**, Predictability, Repeatability, and Models for Cyber-Physical Systems, WFCD (ESWEEK), Scottsdale, AZ, October 24, 2010.
- **Keynote:** Synthesis of Reliable Distributed Real-Time Software, Workshop on Software Synthesis, ESWEEK 2010, Scottsdale, AZ, October 29, 2010.

- **Keynote:** An Introductory Textbook on Cyber-Physical Systems, Workshop on Embedded Systems Education (WESE), Scottsdale, AZ, October 28, 2010.
- **Keynote:** Disciplined Heterogeneous Modeling, MODELS, Oslo, Norway, October 6-8, 2010.
- **Invited Talk,** Embedded Tutorial: CPS Foundations, Special Session: Cyber-Physical Systems Demystified, Design Automation Conference (DAC), Annaheim, CA, Thursday, June 17, 2010.
- **Invited Talk,** Time and Concurrency in Cyber-Physical Systems, Fujitsu Workshop on Secure/Correct Cyber Physical Systems, Sunnyvale, CA, June 10, 2010.
- **Keynote:** Design Challenges for Cyber-Physical Systems, Strategies for Embedded Computing Research International policy conference, Vienna, Austria, March 18-19, 2010.
- **Invited Talk,** Introducing Embedded Systems: A Cyber- Physical Approach, Intel Education Summit, Chandler, Arizona, March 9, 2010.
- **Keynote:** Cyber-Physical Systems: Challenges and Opportunities**,** IT Convergence Research Project Workshop, KAIST, Daejeon, Korea, February 19, 2010.
- **Keynote:** Introducing Embedded Systems: A Cyber- Physical Approach, Workshop on Embedded Systems Education (WESE) (with ESWEEK), Grenoble, France, October 15, 2009.
- **Invited Talk,** Parallel, Concurrent, and Distributed Software in Cyber-Physical Systems, Int. Workshop on User-Centric Cyber-Physical Systems and Services (UC-CPS), Institute of Information Science, Academia Sinica, Taipei, Taiwan, December 8-9, 2009.
- **Distinguished Lecture Series,** Computing Needs Time, Institute of Information Science, Academia Sinica, Taipei, Taiwan, December 7, 2009.
- **Invited Talk,** Disciplined Message Passing, Microsoft Research, Redmond, WA, Nov. 13, 2009.
- **Invited Talk,** Model-Based Code Generation is not a Replacement for Programming, Workshop on Software Synthesis (ESWEEK), Grenoble, France, October 16, 2009.
- **Keynote:** Architectures with Repeatable Timing for Cyber-Physical Systems, Workshop on Cyber-Physical Systems (ESWEEK), Grenoble, France, October 16, 2009.
- **Keynote:** Model-Based Design for Signal Processing Systems, IEEE Workshop on Signal Processing Systems (SiPS), Tampere, Finland, October 7-9, 2009.
- **Invited Talk**, A Disruptive Computer Design Idea: Architectures with Repeatable Timing, IEEE International Conference on Computer Design (ICCD), Squaw Valley, CA, October 6, 2009.
- **Invited Talk**, Time-Critical Networking, IEEE Photonics Society Summer Topicals, Newport Beach, CA, 20-22 July 2009.
- **Invited Talk**, "The Case for Timing-Centric Distributed Software," , 2nd International Workshop on Cyber-Physical Systems (WCPS 2009), Montreal, Quebec, Canada, June 22, 2009.
- **Keynote:** "Beyond Embedded Systems: Integrating Computation, Networking, and Physical Dynamics," ACM SIGPLAN/SIGBED 2009 Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), Dublin, Ireland, June 19-20, 2009.

- **Keynote:** "Cyber-Physical Systems Research at Berkeley," Workshop on Embedded Critical Systems: New Perspectives in Engineering and Computing, Thales Research and Technology Center, Palaiseau, France, June 17, 2009.
- **Invited Lecture**, "Beyond Embedded Systems: Challenges to Realizing the Vision of Cyber-Physical Systems," UC Irvine Department of Computer Science Distinguished Lecture Series Irvine, CA, May 8, 2009.
- **Keynote:** "Beyond Embedded Systems: Challenges to Realizing the Vision of Cyber-Physical Systems," Innovation Workshop on Convergence of Embedded and IT Systems, Bosch, Stuttgart, Germany, November 12, 2008.
- **Keynote:** Disciplined Concurrent Models of Computation for Parallel Software," 2008 Summer Institute: The Concurrency Challenge: Can We Make Parallel Programming Popular? Blaine, WA, August 3 to August 7, 2008.
- **Invited Lecture**, "Component Architectures for Time-Sensitive Systems," The Onassis Foundation Science Lecture Series, The 2008 Lectures in Computer Science, Embedded Networked Systems: Theory and Applications, Heraklion, Crete, July 24-28, 2008.
- **Invited Talk**, "Balancing Expressiveness and Analyzability in Stream Formalisms," Exploiting Concurrency: Efficiency and Correctness (EC2), A Workshop, in conjunction with the 20th International Conference on Computer Aided Verification (CAV 2008), Princeton, NJ, July 7 and 8, 2008.
- **Invited Talk,** "Cyber-Physical Systems: Design Challenges," International Symposium on Object/Component/Service-Oriented Real-Time Distributed Computing (ISORC), Orlando, FL, USA, May 6, 2008.
- **Invited Talk,** "Making Time Essential in Computation," Workshop: From Embedded Systems to Cyber-Physical Systems: a Review of the State-of-the-Art and Research Needs, CPS Week, St. Louis, MO, April 21, 2008.
- **Invited Lecture,** "Is Truly Real-Time Computing Becoming Unachievable?" ECE Distinguished Lecture Series, Carnegie Mellon University, Pittsburgh, PA, April 3, 2008.
- **Keynote:** "Distributed Real-Time Systems: Challenges and Opportunities," NSF NeTS FIND Initiative PI Meeting (Future Internet Design), Washington DC, November 27, 2007.
- **Invited Lecture**, "Can Concurrent Software Ever Be Quality Software?" Distinguished Lecture Series, Max Planck Institute for Software Systems, Kaiserslautern, Saarbrücken, Germany, November 9, 2007.
- **Keynote:** Can Concurrent Software Ever Be Quality Software?" Seventh International Conference On Quality Software (QSIC), Portland, Oregon, USA, Oct. 11 – 12, 2007.
- **Invited Talk**, "Using the Principles of Synchronous Languages in Discrete-event and Continuous-time Models," Workshop: Between Control and Software (in honor of Paul Caspi), Grenoble, France, September 28, 2007.
- **Invited Lecture**, "Software Challenges and Opportunities for Real-Time on Multicore Machines," Real-Time in Sweden, RTiS, SNART, Swedish National Real-Time Association, Västerås, Sweden, August 21, 2007.
- **Invited Tutorial,** "An Overview of Concurrent Models of Computation for Real-Time Systems," ARTES Summer School, Västerås, Sweden, August 20, 2007.

- **Keynote:** "Cyber-Physical Systems: Challenges and Opportunities in Software Technologies," ACM SIGPLAN/SIGBED 2007 Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), San Diego, California, June 13-15, 2007.
- **Keynote:** "Is Truly Real-Time Computing Becoming Unachievable?" Real-Time and Embedded Technology and Applications Symposium (RTAS), Bellevue, WA, April 3 - April 6, 2007.
- **Invited Tutorial,** "The Problem With Threads," Embedded Systems Conference (ESC), San Jose, CA, Tuesday, 3 April 2007
- **Invited Talk,** "Challenges with Concurrency and Time in Embedded Software," ODES: Workshop on Optimizations for DSP and Embedded Systems, In conjunction with IEEE/ACM International Symposium on Code Generation and Optimization (CGO), San Jose, CA, March 11, 2007.
- **Invited Talk,** "Making Concurrency Mainstream," Microsoft Research, Redmond, WA, Jan. 12, 2007.
- **Keynote: "**Discrete Event Models: Getting the Semantics Right," *Winter Simulation Conference,* December 4, 2006, Monterey, CA.
- **Plenary Talk**, "Concurrency Demands New Foundations for Computing," *ARTIST2 Workshop on MoCC – Models of Computation and Communication*, Zurich, Switzerland, November 16-17, 2006.
- **Plenary Talk, "**Actor Networks," *Workshop Foundations and Applications of Component-based Design*, Seoul, Korea, Oct. 26, 2006
- **Plenary Talk, "**Concurrent Semantics without the Notions of State or State Transitions," *FORMATS 2006: 4-th International Conference on Formal Modelling and Analysis of Timed Systems*, Paris, France, September 26, 2006.
- **Invited Joint Plenary Talk, "**Making Concurrency Mainstream," *CONCUR: Concurrency Theory*, and *FMICS: Formal Methods for Industrial Critical Systems,* Bonn, Germany, August 27, 2006.
- **Keynote: "**Graphical Design Platforms for Embedded Systems," *NI Week*, Austin, TX, August 8, 2006.
- **Invited Talk, "**HyVisual: A Hybrid System Modeling Framework Based on Ptolemy II**,"** in *IFAC Conference on Analysis and Design of Hybrid Systems* (ADHS'06), Alghero, Sardinia, June 7-9, 2006.
- **Plenary Talk, "**The Future of Embedded Software," *ARTEMIS 2006 Annual Conference*, Graz, Austria, May 22-24, 2006.
- **Invited Shannon Lecture, "**Building Unreliable Systems out of Reliable Components: The Real-Time Story," *IEEE Computer Society*, Nov. 17, 2005, Palo Alto, CA.
- **Keynote: "**Embedded Software: Dealing with Concurrency and Time," *KESES: Korean Embedded Software Engineering Society*, Daegu, Korea, October 20, 2005.
- **Plenary Talk, "**Building Unreliable Systems out of Reliable Components: The Real Time Story," *Monterey Workshop*, Laguna Beach, CA, September 23-25, 2005.
- **Plenary Talk,** "The Operational Semantics of Hybrid Systems," *Hybrid Systems, Computation and Control* (HSCC), Zurich, Switzerland, March 2005.
- **Distinguished Lecture,** "Concurrent Computational Systems," University of Arizona, Distinguished Lecture Series, Tuscon, Arizona, January 13, 2005
- **Invited Talk,** "Actor-Oriented Design: Concurrent Models as Programs," University of Salzburg, Austria, December 14, 2004.

- **Invited Talk,** "Concurrent Models of Computation," HP Workshop on Advanced Software Technologies, HP Labs, Palo Alto, CA, July 20-22, 2004.
- **Invited Talk,** "Embedded Software: Leveraging Concurrent Models of Computation," Citris Information Days, June 30 – July 1, 2004, Infineon, Munich, Germany.
- **Plenary Talk,** "Actor-Oriented Design: A focus on domain-specific languages for embedded systems," *Formal Methods and Models for Codesign* (MEMOCODE'2004), San Diego, California, June 22-25, 2004.
- **Invited Talk,** "Actor-Oriented Design: Concurrent Models as Programs," Parc Forum, Palo Alto, CA, May 13, 2004.
- **Invited Talk,** "Hybrid System Modeling: Operational Semantics Issues," OMG Technical Meeting, Feb. 4, 2004, Anaheim, CA, USA.
- **Invited Talk,** "An Overview of the Ptolemy Project and Actor-Oriented Design," OMG Technical Meeting, Feb. 4, 2004, Anaheim, CA, USA.
- **Invited Talk,** "Soft Walls: Preventing the Use of Commercial Aircraft as Weapons," CITRIS Corporate Sponsor Day, February 26, 2004, University of California at Berkeley.
- **Invited Talk,** "Why we need a "new systems science"," Asilomar Conference on Signals, Systems, and Computers, Monterey, CA, Nov. 11, 2003.
- **Invited Talk,** "Scaling Up Design," SRC Workshop on Silicon Nanoelectronics and Beyond , Panel: Tools and Methodologies for Nanoelectronic Design, Portland, OR, October 29, 2003.
- **Invited Talk,** "Behavioral Types as Interface Definitions for Concurrent Components," *NEXT TTA Workshop on the Specification of Linking Interfaces*, Oct. 12 2003, Philadelphia, PA, USA.
- **Invited Talk,** "Are Embedded Systems Just SystemsMade with Small Computers?" Artist International Collaboration Days, Education Day, In conjunction with EMSOFT, Philadelphia, PA, Oct 11, 2003.
- **Plenary Talk,** "Embedded Software Challenges for the Next Ten Years," *Infineon Embedded Software Days*, Munich, Germany, Sept. 29, 2003.
- **Plenary Talk,** "Model-Driven Development: From Object-Oriented Design to Actor-Oriented Design," *Workshop on Software Engineering for Embedded Systems (SEES),* a.k.a. *The Monterey Workshop*, Chicago, IL, Sept. 24, 2003.
- **Invited Talk,** "Streaming Models of Computation in the Ptolemy Project," *Workshop on Streaming Systems*, Endicott House, Dedham, MA, August 23, 2003.
- **Plenary Talk,** "Behavioral Types for Actor-Oriented Design," *FMCAD, Fourth International Conferences on Formal Methods in Computer-Aided Design*, Portland, OR**,** Nov. 6-8, 2002.
- **Invited Talk,** "Integrated Safety Envelopes; Built-in Restrictions of Navigable Airspace," NSF/OSTP Workshop on Information Technology Research for Critical Infrastructure Protection, Lansdowne, VA, Sept. 19-20, 2002.
- **Invited Talk,** "Preventing the use of Commercial Aircraft as Weapons," *Transportation Science Seminar*, UC Berkeley Institute of Transportation Studies, Feb. 9, 2002.
- **Invited State-of-the-Art Lecture**, "Computing for Embedded Systems," *IEEE Instrumentation and Measurement Technology Conference*, Budapest, Hungary, May 21-23, 2001.
- **Plenary Talk**, "Embedded Software fromConcurrent Component Models," ACM SIGPLAN 2001 *Workshop on Languages, Compilers, and Tools for Embedded Systems*

(LCTES) Snowbird, Utah, June 22-23, 2001.

- **Plenary Talk,** "Discrete-Event Modeling and Design of Embedded Software," *Workshop on Discrete Event Systems* (WODES), Ghent, Belgium, August 21, 2000.
- **Plenary Talk**, "Concurrent Models of Computation in System Level Design," *Forum on Design Languages*, *Workshop on System Specification & Design Languages*, Tübingen, Germany, September 4-8, 2000.
- **Plenary Talk**, "Modeling Heterogeneous Systems - Design for Understanding," *Design for Safety Workshop*, NASA Ames Research Center, Mountain View, CA, 11 October, 2000.
- **Keynote Address**, "Signals and Systems — Moving into the 21st Century," *Microelectronic Systems Education Conference*, Crystal City, Virginia, July 19-21, 1999.
- **Keynote Address**, "System-Level Design Languages: Orthogonalizing the Issues," *Hardware Design Language Conference* (HDL), San Jose, CA, March 9, 2000.
- **Invited Terman Award Lecture**, "Future Shock is Here - Ruminations about electrical engineering and its relationship to computer engineering and computer science," *Frontiers in Education Conference* in Pittsburgh, Pennsylvania, November 1997.
- **Plenary talk**, "Block Diagrams for Modeling and Design," at *DSP World Spring*, Santa Clara, CA, April 22, 1998.
- **Plenary talk**, "On the Methodology of Design for Electronic Systems," *Asilomar Conference on Computers and Communication*, Monterey, CA, November 4, 1996.
- **Invited embedded tutorial**, "Comparing Models of Computation," *ICCAD*, San Jose, November 11, 1996.

KEY RESEARCH CONTRACTS

- **Principal Investigator**, "CPS: TTP Option: Small: Consistency vs. Availability in Cyber-Physical Systems" **NSF,** $500,000, 1/1/2023 – 12/31/2025
- **Principal Investigator**, "CPS: Small: Reconciling Safety with the Internet for Cyber-Physical Systems" **NSF,** $499,037, 10/1/2018 – 9/30/2021
- **Principal Investigator***, "CPS: Breakthrough: A Mathematical Theory of Cyber-Physical Systems,"* **NSF**, CNS-1446619, Jan. 2015 – Dec. 2018, $499,300.
- **Co-Principal Investigator**, "*CPS: Breakthrough: Compositional Modeling Modeling with Interfaces (COSMOI)*," **NSF**, CNS-1329759, 10/1/13-9/30/16, $498,875
- **Principal Investigator and Director**, "*The TerraSwarm Research Center*," supported by the STARnet phase of the Focus Center Research Program (FCRP) a Semiconductor Research Corporation program sponsored by MARCO and DARPA, $27,573,125, January 2013 – October 31, 2017.
- **Co-Principal Investigator**, iCyPhy (Industrial Cyber-Physical Systems), funded by IBM and United Technologies, December 1, 2012 – December 31, 2015, $1,541,667. ICyPhy is a research consortium formed to identify and develop new engineering techniques that will make it easier to successfully build products and services that combine complex software, hardware and mechanical components. ICyPhy started as a partnership between UC Berkeley, Caltech, and member companies, United Technologies and IBM. It merged with CHESS in 2016 (next item).
- **Principal Investigator and Director**, "Center for Hybrid and Embedded Software Systems (CHESS)," September 2002 – present, with industrial funding:
  - **Bosch**: Nov. 2006 – Oct. 2013: $600,000

  - **DGIST**: Aug. 2005 – Aug. 2008: $225,000
  - **Denso**: August 2014-July 2017: $450,000
  - **HSBC**: March 2008 – Feb. 2009: $75,000
  - **Lockheed Martin**: March 2008 – Feb. 2010: $300,000
  - **National Instruments**: Nov. 2006 – Nov. 2017: $1,500,000
  - **Thales**: March 2009 – March 2013: $300,000
  - **Toyota:** August 2005 – July 2017: $2,263,560
  - **VTT Technical Research Center of Finland:** Oct. 2010 – Sept. 2013: $110,000
- **Principal Investigator**, "Software Producibility for Systems of Systems," Naval Research Labs, $307,854, October 2012 – October 2013.
- **Co-Principal Investigator**, *"CPS-Large: Action Webs,"* National Science Foundation, $5,000,000, September 2009-August 2014.
- **Principal Investigator**, *"CPS-Medium: Timing-Centric Software,"* National Science Foundation, $750,000, September 2010-August 2013.
- **Principal Investigator**, *"Disciplined Designed of Systems of Systems,"* Army Research Laboratory, $989,938, June 2011-June 2014.
- **Principal Investigator**, *"Precision Timed Architecture,"* National Science Foundation, $819,072, August 2007-December 2013.
- **Co-Principal Investigator**, *"Multi-Scale Systems Center,"* MARCO/FCRP, $2,139,137, September 2010-August 2013.
- **Principal Investigator**, *"Customizable and Extensible Modeling Framework,"* Air Force Office of Scientific Research DAF AFOSR, $450,000, February 2008-August 2010
- **Principal Investigator**, *"Collaborative Research CSR-EHS: PRET: Precision Timed Architecture,"* National Science Foundation, $549,994, August 2007- January 2011
- **Principal Investigator**, *"Timed Distributed System*s," UC MICRO Microelectronics Innovation and Computer Research Opportunities 08-061, $7,156, 08/01/08-12/31/09
- **Principal Investigator**, *"CSR-CPS: Action Webs Seedling,"* National Science Foundation, $129,998, October 2007 –September 2009
- **Principal Investigator**, *"Concurrent, Parallel, and Distributed Real-Time Software,"* IBM International Business Machines Corp, $19,000, October 2007-September 2008
- **Principal Investigator**, *"Timed Distributed Systems,"* UC MICRO Microelectronics Innovation and Computer Research Opportunities, $48,025, July 2007- December 2008
- **Principal Investigator**, "*Graduate Assistance in Areas of National Need*," Ed Asst Secretary for Postsecondary Education (Work Study), $383,643, August 2007-August 2010
- **Principal Investigator**, *"Scalable Composition of Subsystems,"* DA ARO Army Research Office 20070039, $750,000, February 2007 – February 2012
- **Principal Investigator**, *"SUPERB (Summer Undergraduate Program in Engineering Research at Berkeley),"* National Science Foundation CCF-0453604, $200,910, February 2005- January 2009
- **Co-Principal Investigator**, *"Foundations of Hybrid and Embedded Software Systems (CHESS),"* National Science Foundation Cooperative Agreements CCR-0225610, $13,144,900, September 2002-August 2009
- **Principal Investigator**, *"Intel Undergraduate Research Program,"* Intel Foundation, $180,000, January 2006- September 2008
- **Principal Investigator:** *CSR-SGER: Cyber-Physical Systems: Are Computing Founda-*

tions Adequate? National Science Foundation (NSF), $150,000, October 2006 - September 2007.

- **Principal Investigator:** *Customizable and Extensible Modeling Framework*, AFOSR, $156,000, May 2006 - January 2007.
- **Principal Investigator:** *Timed Distributed Systems*, California State MICRO Program, $64,181, September 2006 - December 2007.
- **Principal Investigator:** *Timed Distributed Systems*, California State MICRO Program, $66,690, September 2005 - December 2006.
- **Principal Investigator:** *UC Berkeley/ESCHER Embedded Software*, ESCHER Research Institute (via Vanderbilt University), $200,000, 2004.
- **Co-Principal Investigator:** *Foundations in Hybrid and Embedded Software Systems*, National Science Foundation (NSF), Information Technology Research (ITR) program, $13,000,000, 2002-2007.
- **Co-Principal Investigator:** *From Low-Level Protocols to Models of the National Airspace System - A Hybrid System Approach*, NASA Ames Research Center, Western Joint University Program (JUP), $243,143, 2002-2004.
- **Principal Investigator**: *Process-Based Software Components for Networked Embedded Systems*, DARPA Mobies, $2,426,999, 2000-2003.
- **Co-Principal Investigator**: *Integrated Design and Analysis Tools for Software-Based Control Systems*, DARPA SEC, $3,512,450, 1998-2003.
- **Principal Investigator**: *Design Methodology for DSP*, State of California MICRO Program, at approximately $150,000 per year, ~1988-2003.
- **Principal Investigator**: *Heterogeneous Modeling and Design*, DARPA Composite CAD, $2,406,938, 1996-2000.
- **Principal Investigator**: *Algorithm Analysis and Mapping Environment for Adaptive Computing Systems*, Lockheed/Martin $406,000, 1997-2000.
- **Co-Principal Investigator** (with many others): *Design and Test for Gigascale Integration*, DARPA (with several other PIs), $5,979,331, 1998-2001
- **Co-Principal Investigator** (with many others): *Focus Research Center for Design and Test of Gigascale Integrated Systems*, MARCO (with several other PIs), $4,763,099, 1998-2000.
- **Principal Investigator**: *Computer-Aided Design of Heterogeneous Hardware/Software Systems*, SRC, approximately $80,000 per year, ~1990-1998.
- **Principal Investigator**: *Design of Multidimensional Signal Processing Systems*, Questec, $148,713, 1997-1998.
- **Principal investigator**: *Integrating Control and Signal Processing*, Lockheed-Martin, $86,000, 1996-1997.
- **Principal Investigator**, *Design Methodology for Signal Processing*, National Science Foundation, $250,000, 1992-1995.
- **Principal Investigator**, *System-Level Design Methodology for Embedded Signal Processors*, ARPA and the the United States Air Force, $2,244,000, 1993-1997.

KEY SERVICE POSITIONS:

Key Conference Organization

- Co-organized Vienna Workshop on Digital Humanism (DIGHUM), TU Vienna, Apr 4-5, 2019.

- Eleven Biennial Ptolemy Miniconferences:
  1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015.
- General Chair, IEEE Workshop on Modeling and Simulation of Cyber-Physical Energy Systems, May 20 2013, Berkeley CA.
- Organizer, DoD Workshop on Software at Scale, Berkeley, August, 2010.
- Organizer, CPS Education Workshop, National Science Foundation, Alexandria, VA, Thursday, August 12, 2010.
- Co-Program-Chair, EOOLT - International Workshop of Object-Oriented Languages and Tools, Oslo, Norway, 2010.
- Co-Organizer, SYNCHRON'09, Dagstuhl Seminar 09481, Schloß Dagstuhl, Germany, November 22-27, 2009.
- Dagstuhl Seminar: Model-based Engineering of Embedded Real-time Systems, Schloss Dagstuhl, Germany, Nov. 5-9, 2007.
- Topic chair, "Real Time Embedded Systems," DATE 2002
- Joint Workshop on System Level Design Languages, 2000
- DARPA Workshop on Model-Based Methods for Embedded Software, 1999
- Chaired a DARPA ISAT study on "Complex Systems," 1997
- Dagstuhl Workshop on Design Automation for Embedded Systems, 1996
- Application-Specific Array Processors Conference, Berkeley, 1992

Steering Committees

- Advisory Council of a new journal: Research Directions: Cyber-Physical Systems, Cambridge University Press.
- Second Workshop on Event-based Semantics, held in conjunction with RTAS 2008, 14th IEEE Real-Time and Embedded Technology and Applications Symposium, as part of Cyber-Physical Systems Week (CPSWEEK), April 21-24, 2008
- Real-Time and Embedded Technology and Applications Symposium (RTAS), April 3 - April 6, 2007
- ACM & IEEE Conference on Embedded Software (EMSOFT), 2001 — present.
- International Conference on Compilers, Architectures and Synthesis for Embedded Systems (CASES), 2001 — 2006.

Program Committees

- FDL (2023)
- EMSOFT (2001-2005, 2009-2015, 2017-2022)
- RTSS (2021-2022)
- RTAS (2018)
- The Digital Humanism Initiative (2020-2022)
- Logic and Collaboration in Intelligent Applications Symposium, March 30-31, 2017, Stanford.
- Modelica 2015.
- Modelica 2014, March 10-12, 2014 in Lund, Sweden.
- Second International Workshop on Cyber-Physical Systems (WCPS2009), Montreal, Canada, June 2009.

- Model-driven High-level Programming of Embedded Systems (SLA++P), an ETAPS event, 2008
- Hardware/Software Interaction and Co-design track at RTSS-2007
- Automotive Software Workshop, 2006
- Workshop on Foundations and Applications of Component-Based Design, 2006
- Workshop on Optimization for DSP and Embedded Systems (ODES), 2006
- ICCPS (2010-2015)
- Hardware/Software Codesign (CODES) 2002
- Signal Processing Systems (SiPS) Design and Implementation, 1998, 1999, 2000, 2001.
- Formal Methods for Open Object-based Distributed Systems (FMOODS), 2000
- High-level Design, Validation and Test Workshop (HLDVT), 1999, 2000.
- Compilers, Architectures and Synthesis for Embedded Systems (CASES), 1999, 2000
- Workshop on Media Processors and DSPs (MP-DSP) 1999
- Application Of Concurrency to System Design, 1998
- Application Specific Array Processors (ASAP) 1990, 1993, 1997
- Workshop on Signal Processing Design and Implementation, 1997.
- Conf. on Parallel Architectures and Compilation Techniques (PACT) 1994.
- High-Level Synthesis Workshop, 1994.
- Hardware/Software Codesign Workshop, 1993.
- Conf. on Arch. and Comp. for Fine and Medium Grain Parallelism, 1993.
- IEEE Workshop on VLSI Signal Processing, 1990, 1992.

Editorial

- Regular reviewer for Transactions on Embedded Computing Systems (TECS)
- Regular reviewer for Transactions on Cyber-Physical Systems (TCPS)
- Regular reviewer for Software and Systems Modeling (SoSym)
- Occassional reviewer for Proceedings of the IEEE, AI and Ethics, Transactions on Computer-Aided Design of Integrated Circuits and Systems,
- Reviewer for National Academies report on Cyber-Physical Systems Education, 2017
- Associate Editor, *Design Automation for Embedded Systems,* 1994-2001
- Editorial Board, *VLSI Signal Processing,* 1993-1999

Key University Service

- Co-chair, Awards Committee, EECS, 2021-22.
- Executive Committee, EECS, 2008-15, 2017.
- Tenure and Promotion Committee, EECS, 2014-16.
- Cory Hall Space Committee, 2008-2016.
- Vice chair of EECS for Computer, Network and Instructional Labs (CNIL), 2009-2012
- Chair of the EECS Department, 2006-2008
- External Review Committee, Computer Engineering Dept., UC Santa Cruz, 2008.
- UC Micro Executive Committee, 2006-2008
- Chair of the EE Division, Associate Chair of EECS, 2005-2006
- Executive Committee, COE, 2005-2008
- Co-chair, Graduate Advising/Admissions Committee, EECS, 2003-2005
- Committee on Courses of Instruction, UCB, 2004-2005
- Affirmative Action Committee, COE, 2003-2005

- Co-Chair, EECS Department Faculty Search Committee, 2001-2003
- Research Council member, UC Digital Media Innovation Program (DiMI) 1999-2001
- EECS Department Executive Committee, 1996/97, 1999/2000
- Led curriculum reform in EECS, 1997-2000
- Chair, College/Departmental Affirmative Action Committees, 1994-96.
- Chair, EECS Department Faculty Search Committee, 1994-96.
- Chair, EECS Committee on Computer Needs and Resources, 1994-95
- Chair, EECS Cory Networking, 1994-95

Service to government

- NSF review panel, 2003, 2012, 2014, 2021
- DARPA ISAT (Information Science and Technology) board, 1994-1997
- Workshop participant, NSF/White House OSTP Workshop on Information Technology Research for Critical Infrastructure Protection, September, 2002.

Service to the profession

- Elected to the Council of the Commission for the History and Philosophy of Computing (HaPoC), 2021.
- Visiting Committee, School of Informatics, TU Vienna, 2016-2019.
- Member, International Committee for Scientific and Strategic Orientation (COSS) of the College de France, Paris, France, 2017.
- Member, International Advisory Board of the Technical University of Vienna's Faculty of Informatics, 2016 – 2019.
- Chair, Visiting Committee, *Department of Computer Science, School of Computing, National University of Singapore* (NUS), Singapore, 2015.
- Visiting Committee, *Department of Computer Science, School of Computing, National University of Singapore* (NUS), Singapore, 2006.
- Fellow Evaluation Committee, *IEEE Computer Society*, 1999, 2000, 2001.
- Chair**,** *VLSI Technical Comm.*, *IEEE Signal Processing Society* 1991-1993.
- Chair**,** *VLSI Technical Comm.*, *IEEE Signal Processing Society* 1991-1993.

Expert witness service

- Expert witness, National Instruments vs. The Math Works, trial in January 2003, Marshall TX.

External Thesis Evaluation Committee

- External Committee Member, PhD Thesis, Soroush Bateni, UT Dallas, 2022
- External Reviewer, PhD Thesis, Sidharta Andalam, Univ. of Aukland, New Zeland, 2012
- External Reviewer, PhD Thesis, Hauke Fuhrmann, Univ. of Kiel, Germany, 2011.
- Habilitation of Dr. Martin Schöberl, Technical University of Vienna, Austria, 2010.
- Outside reviewer, PhD Thesis, Patricia Derler, University of Salzburgh, Austria, 2010.
- Outside reviewer, PhD Thesis, Hauke Fuhrman, University of Kiel, Germany, 2010.
- Habilitation of Dr. Robert de Simone, INRIA, France, 2008
- Outside reviewer, PhD Thesis, Christian Buckl, TU Munich, Germany, 2008.

Ph.D. STUDENTS GRADUATED:

- Gil Lederman [2021]
  Neural Guidance in Constraint Solvers
- Marten Lohstroh [2020]
  Reactors: A Deterministic Model of Concurrent Computation for Reactive Systems
- Matthew Weber [2019]
  Context and Interaction in the Internet of Things
- Ben Zhang [2018]
  Adapting Swarm Applications: A Systematic and Quantitative Approach
- Hokeun Kim, 2017
  Securing the Internet of Things via Locally Centralized, Globally Distributed Authentication and Authorization
- Ilge Akkaya, 2016
  Data-Driven Cyber-Physical Systems via Real-Time Stream Analytics and Machine Learning
- Christopher Shaver, 2016
  On the Representation of Distributed Behavior
- Michael Zimmer, 2015
  Predictable Processors for Mixed-Criticality Systems and Precision-Timed I/O
- Christos Stergiou, 2013
  Schedulability Analysis and Verification of Real-Time Discrete-Event Systems
- Dai Bui, 2013
  Scheduling and Optimizing Stream Programs on Multicore Machines by Exploiting High-Level Abstractions
- Isaac Liu, 2012
  Precision Timed Machines
- Ben Lickly, 2012
  Static Model Analysis with Lattice-based Ontologies
- Jia Zou, 2011
  From Ptides to PtidyOS, Designing Distributed Real-Time Embedded Systems
- Eleftherios Matsikoudis, 2011
  Axioms for Asynchronous Processes
- Yang Zhao, 2009
  On the Design of Concurrent, Distributed Real-Time Systems
- Thomas Huining Feng, 2009
  Model Transformation with Hierarchical Discrete-Event Control
- Slobodan Matic, 2008
  Compositionality in Deterministic Real-Time Embedded Systems
- Gang Zhou, 2008
  Partial Evaluation for Optimized Compilation of Actor-Oriented Models
- Elaine Cheong, 2007
  Actor-Oriented Programming for Wireless Sensor Networks
- Ye Zhou, 2007
  Interface Theories for Causality Analysis in Actor Networks
- Haiyang Zheng, 2007
  Operational Semantics of Hybrid Systems

- James Adam Cataldo, 2006
  The Power of Higher-Order Composition Languages in System Design
- Xiaojun Liu, 2005
  Semantic Foundation of the Tagged Signal Model
- Stephen Neuendorffer, 2004
  Actor-Oriented Metaprogramming
- Yuhong Xiong, 2002
  An Extensible Type System for Component-Based Design
- Jie Liu, 2001
  Responsible Frameworks for Heterogeneous Modeling and Design of Embedded Systems
- John Davis, II, 2000
  Order and Containment in Concurrent System Design
- Bilung Lee, 2000
  Specification and Design of Reactive Systems
- Michael Williamson, 1998
  Synthesis of Parallel Hardware Implementations from Synchronous Dataflow Graph Specifications
- Micheal Goodwin, 1997
  Adaptive Signal Models: Theory, Algorithms, and Audio Applications
- Stephen A. Edwards, 1997
  The Specification and Execution of Heterogeneous Synchronous Reactive Systems
- Praveen Murthy, 1996
  Scheduling Techniques for Synchronous And Multidimensional Synchronous Dataflow
- Thomas M. Parks, 1995
  Bounded Scheduling of Process Networks
- Sundararajan Sriram, 1995
  Minimizing Communication and Synchronization Overhead in Multiprocessors for Digital Signal Processing
- Asawaree Kalavade, 1995
  System Level Codesign of Mixed Hardware-Software Systems
- Shuvra Bhattacharyya, 1994
  Compiling Dataflow Programs for Digital Signal Processing
- Joseph T. Buck, 1993
  Scheduling Dynamic Dataflow Graphs with Bounded Memory Using the Token Flow Model
- John Barry, 1992
  Wireless Communication Using Non-Directed Infrared Radiation
- Philip Bitar, 1992
  Combining Windows: A Performance Evaluation of Design Options
- Soonhoi Ha, 1992
  Compile-Time Scheduling of Dataflow Program Graphs with Dynamic Constructs
- Gilbert Sih, 1991
  Multiprocessor Scheduling to Account for Interprocessor Communication
- Ho-Ping Tseng, 1990
  Fuzzy Partitioning Applied to Automatic Speech Recognition

KEY SOFTWARE RELEASES:

- Lingua Franca 0.1.0, 0.2.0, 0.3,0 2022
- Ptolemy II 10.0 Software Release, 2014
- Ptolemy II 8.0.1 Software Release, 2010
- Ptolemy II 7.0.1 Software Release, 2008
- Viptos 1.0.2, 2007
- Ptolemy II version 6.0.1, 2007
- Viptos version 5.1, 2005
- Ptolemy II version 5.0, 2005
- HyVisual version 5.0-alpha, 2005
- Ptolemy II version 4.0.1, 2004
- HyVisual version 4.0.2, 2004
- VisualSense version 4.0.1, 2004
- Ptolemy II version 3.0.2, 2003
- HyVisual, version 2.2, 2003
- Ptolemy II version 2.0.1, 2002
- Ptplot version 5.2, 2002
- Ptolemy II version 1.0, 2001
- PtPlot version 5.1, 2001
- Ptolemy II version 0.4, 2000
- PtPlot version 3.1, 2000
- Ptolemy II version 0.2, 1999
- Ptolemy II version 0.1alpha, 1998
- PtPlot version 2.0, 1998
- Ptolemy Classic version 0.7.1, 1998
- PtPlot version 1.0 and 1.1, 1997
- Ptolemy Classic version 0.7.1, 1997
- Tycho version 0.2, 1997
- Ptolemy Classic version 0.6, 1996
- Tycho version 0.1, 1996

PUBLICATIONS:

For a complete and up-to-date list and acesss to most publications, see http://ptolemy.eecs.berkeley.edu/publications and https://www.icyphy.org/publications.html

BOOKS:

[1] E. A. Lee, *The Coevolution: The Entwined Futures of Humans and Machines*, MIT Press, 2020 (translated into Chinese in 2022).

[2] E. A. Lee, *Plato and the Nerd: The Creative Partnership of Humans and Technology*, MIT Press, 2017 (translated into Chinese and Japanese).

[3] E. A. Lee and S. A. Seshia, *Introduction to Embedded Systems, A Cyber-Physical Systems Approach*, **Second Edition,** MIT Press, ISBN 978-0-262-53381-2, 2017.

[4] Claudius Ptolemeaus, (ghost) Editor, *System Design, Modeling, and Simulation Using Ptolemy II*, http://ptolemy.org/systems, ISBN: 978-1-304-42106-7, 2014.

[5] Jeff C. Jensen, Edward A. Lee, and Sanjit A. Seshia. *An Introductory Lab in Embedded and Cyber-Physical Systems*, http://leeseshia.org/lab/, 2014.

[6] E. A. Lee and S. A. Seshia, *Introduction to Embedded Systems, A Cyber-Physical Systems Approach*, http://LeeSeshia.org, ISBN 978-0-557-70857-4, 2011.

[7] E. A. Lee and P. Varaiya, *Structure and Interpretation of Signals and Systems*, Second Edition, http://LeeVaraiya.org, ISBN 978-0-578-07719-2, 2011.

[8] J. Barry, E. A. Lee, and D. G. Messerschmitt, *Digital Communication*, Third Edition, Kluwer Academic Press, Norwell, Mass, 2004.

[9] E. A. Lee and P. Varaiya, Structure and Interpretation of Signals and Systems, Addison-Wesley, 2003.

[10] P. Lapsley, J. Bier, A. Shoham, and E. A. Lee, *DSP Processor Fudamentals -- Architectures and Features*, IEEE Press, 1997.

[11] S. S. Bhattacharyya, P. K. Murthy and E. A. Lee, *Software Synthesis from Dataflow Graphs*, Kluwer Academic Publishers, Norwell, Mass, 1996.

[12] E. A. Lee and D. G. Messerschmitt, *Digital Communication*, Second Edition, Kluwer Academic Press, Norwood, Mass, 1994.

[13] A. Kamas and E. A. Lee, *Digital Signal Processing Experiments*, Prentice-Hall, Englewood Cliffs, NJ, 1989.

[14] E. A. Lee and D. G. Messerschmitt, *Digital Communication*, Kluwer Academic Press, Norwood, Mass, 1988.

EDITED VOLUMES:

[15] Hannes Werthner, Erich Prem, Edward A. Lee, and Carlo Ghezzi, Editors, *Perspectives on Digital Humanism*, Springer, 2021.

[16] Peter Palensky and Edward A. Lee, (Eds.), *2013 Workshop on Modeling and Simulation of Cyber-Physical Energy Systems* (**MSCPES**), ISBN: 978-1-1499-1307-7, IEEE Catalog Number: CFP1394U-ART, May 20, 2013.

[17] Holger Giese, Gabor Karsai, Edward A. Lee, Bernhard Rumpe, and Bernhard Schätz (eds.), ***Model-based Engineering of Embedded Real-time Systems***, Lecture Notes in Computer Science, Volume LNCS 6100, 2011, Springer.

[18] Albert Benveniste, Stephen A. Edwards, Edward Lee, Klaus Schneider and Reinhard von Hanxleden (eds.), **SYNCHRON 2009**, Dagstuhl Seminar Proceedings, Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, Germany, 2010.

CHAPTERS IN BOOKS:

[19] Edward A. Lee and Marten Lohstroh. "Generalizing Logical Execution Time". Principles of Systems Design, LNCS 13660, July 2023.

[20] Matthew Weber and Edward A. Lee, "Semantic Localization for IoT," chapter in *AbstractSIoT 2020: Semantic IOT: Theory and Applications - Interoperability, Provenance and Beyond*, Springer, 2021.

[21] Hokeun Kim, Armin Wasicek, and Edward A. Lee, "An Integrated Simulation Tool for Computer Architecture and Cyber-Physical Systems," in book: *Cyber Physical Systems. Design, Modeling, and Evaluation*, LNCS, volume 11267, April, 2019.

[22] Ilge Akkaya, Yan Liu, and Edward A. Lee. "Modeling and Simulation of Network Aspects for Distributed Cyber-Physical Energy Systems," In *Cyber Physical Systems Approach to Smart Electric Power Grid*, pp. 1-23. Springer, Berlin Heidelberg, 2015.

[23] Edward A. Lee. "Constructive Collisions," chapter in *From Programs to Systems. The Systems Perspective in Computing*. Saddek Benwalem, Yassinie Lakhneck, Axek Legay (eds.), pp. 161-176, Springer, Berlin Heidelberg, 2014.

[24] E. A. Lee and E. Matsikoudis, "The semantics of dataflow with firing," in *From Semantics to Computer Science: Essays in Honour of Gilles Kahn*, Y. Bertot, G. Huet, J. J. Levy, and G. Plotkin, Eds., Cambridge, UK: Cambridge University Press, 2009, ch. 4.

[25] E. A. Lee and S. Neuendorffer, "Actor-oriented Models for Codesign," In Sandeep Shukla and Jean-Pierre Talpin editors, *Formal Methods and Models for System Design*, Kluwer, 2004.

[26] X. Liu, J. Liu, J. Eker, and E. A. Lee, "Heterogeneous Modeling and Design of Control Systems," in *Software-Enabled Control: Information Technology for Dynamical Systems*, T. Samad and G. Balas (eds.), New York City: IEEE Press, 2003.

[27] E. A. Lee, "Embedded Software," in *Advances in Computers* (M. Zelkowitz, editor), Vol. 56, Academic Press, London, 2002.

[28] E. A. Lee and T. M. Parks, "Dataflow Process Networks," in *Readings in Hardware/Software Co-Design*, G. De Micheli, R. Ernst, and W. Wolf, eds., Morgan Kaufmann, San Francisco, 2002.

[29] S. Edwards, L. Lavagno, E. A. Lee and A. Sangiovanni-Vincentelli, "Design of Embedded Systems: Formal Models, Validation, and Synthesis," in *Readings in Hardware/Software Co-Design*, G. De Micheli, R. Ernst, and W. Wolf, eds., Morgan Kaufmann, San Francisco, 2002.

[30] A. Kalavade and E. A. Lee, "The Extended Partitioning Problem: Hardware/Software Mapping and Implementation-Bin Selection," in *Readings in Hardware/Software Co-Design*, G. De Micheli, R. Ernst, and W. Wolf, eds., Morgan Kaufmann, San Francisco, 2002.

[31] S. S. Bhattacharyya, J. T. Buck, S. Ha and E. A. Lee, "Generating Compact Code from Dataflow Specifications of Multirate Signal Processing Algorithms," in *Readings in Hardware/Software Co-Design*, G. De Micheli, R. Ernst, and W. Wolf, eds., Morgan Kaufmann, San Francisco, 2002.

[32] J. Buck, S. Ha, E. A. Lee, D. G. Messerschmitt, "Ptolemy: a Framework for Simulating and Prototyping Heterogeneous Systems," in *Readings in Hardware/Software Co-Design*, G. De Micheli, R. Ernst, and W. Wolf, eds., Morgan Kaufmann, San Francisco, 2002.

[33] A. Kalavade, and E. A. Lee, "A Hardware/Software Codesign Methodology for DSP Applications," in *Readings in Hardware/Software Co-Design*, G. De Micheli, R. Ernst, and W. Wolf, eds., Morgan Kaufmann, San Francisco, 2002.

[34] W.-T. Chang, A. Kalavade, and E. A. Lee, "Effective Heterogeneous Design and Co-simulation," in *Hardware/Software Co-design*, G. DeMicheli and M. Sami, eds., NATO ASI Series Vol. 310, Kluwer Academic Publishers, 1996.

[35] J. Buck and E. A. Lee, "The Token Flow Model," in *Advanced Topics in Dataflow Computing and Multithreading,* ed. Lubomir Bic, Guang Gao, and Jean-Luc Gaudiot, IEEE Computer Society Press, 1993.

[36] E. A. Lee, "Static Scheduling of Data-Flow Programs for DSP," in *Advanced Topics in Data-Flow Computing,* ed. J.-L. Gaudiot and L. Bic, Prentice-Hall, 1991.

[37] E. A. Lee and J. C. Bier, "Architectures for Statically Scheduled Dataflow", in *Parallel Algorithms and Architectures for DSP Applications,* ed. M. A. Bayoumi, Kluwer Academic Pub., 1991.

[38] E. A. Lee, "Recurrences, Iteration, and Conditionals in Statically Scheduled Block Diagram Languages", in *VLSI Signal Processing III*, Ed. R. W. Brodersen and H. S. Moscovitz, IEEE Press, New York, 1988.

[39] E. A. Lee, "Dataflow Programming for Parallel Implementation of Signal Processing Systems," in *Lecture Notes in Control and Information Sciences: Discrete-Event Systems: Models and Applications,* ed. by P. Varaiya and A. B. Kurzhanski, Springer-Verlag, 1988, and invited paper, *IIASA Conference on Discrete-Event Systems,* Sopron, Hungary, August, 1987.

[40] W.-H. Ho, E. A. Lee, and D. G. Messerschmitt, "High Level Data Flow Programming for Digital Signal Processing", in *VLSI Signal Processing III*, Ed. R. W. Brodersen and H. S. Moscovitz, IEEE Press, New York, 1988.

ARCHIVAL JOURNALS:

[41] Edward A. Lee, "What Can Deep Neural Networks Teach Us About Embodied Bounded Rationality," *Frontiers in Psychology*, 25, April 2022.

[42] Edward A. Lee, "Determinism," *ACM Transactions on Embedded Computing Systems* (TECS), 20(5), July 2021.

[43] Martin A. Sehr, Marten Lohstroh, Mathew Weber, Ines Ugalde, Martin Witte, Joerg Neidig, Stephan Hoeme, Mehrdad Niknami, and Edward A. Lee, "Programmable Logic Controllers in the Context of Industry 4.0," *IEEE Transactions on Industrial Informatics*, 17(5), May 2021.

[44] Marten Lohstroh, Christian Menard, Soroush Bateni, and Edward A. Lee, “Toward a Lingua Franca for Deterministic Concurrent Systems,” *ACM Transactions on Embedded Computing Systems* (TECS), 20(4), May 2021.

[45] Marjan Sirjani, Edward A. Lee, and Ehsan Khamespanah, “Verification of Cyberphysical Systems,” *Mathematics*, 8(7), July 2 2020.

[46] Matthew Weber, Baihong Jin, Gil Lederman, Yasser Shoukry, Edward A Lee, Sanjit Seshia, Alberto Sangiovanni-Vincentelli, "Gordian: Formal Reasoning-Based Outlier Detection for Secure Localization,” *ACM Transactions on Cyber-Physical Systems* (TCPS), June, 2020.

[47] Kim, Hokeun; Kang, Eunsuk; Broman, David; Lee, Edward, "Resilient Authentication and Authorization for the Internet of Things (IoT) Using Edge Computing," *ACM Transactions on Internet of Things*, Vol. 1, No. 1, Article 4, February 2020.

[48] Hokeun Kim, Schahram Dustdar, Edward A. Lee, "Creating a Resilient IoT With Edge Computing," *Computer*, 52(8), pp. 43-53, August 2019.

[49] Fabio Cremona, Marten Lohstroh, David Broman, Edward A. Lee, Michael Masin, Stavros Tripakis, "Hybrid co-simulation: it's about time," *Software & Systems Modeling*, June 2019, Volume 18, Issue 3, 18 pp. 1655-1679.

[50] Marten Lohstroh, Hokeun Kim, John C. Eidson, Chadlia Jerad, Beth Osyk, Edward A. Lee, “On Enabling Technologies for the Internet of Important Things,” ***IEEE Access***, Vol 7, March, 2019.

[51] Edward A. Lee, “Modeling in Engineering and Science,” Viewpoint, ***Communications of the ACM*** 62(1), pp. 35-36, January 2019.

[52] Christopher Brooks, Chadlia Jerad, Hokeun Kim, Edward A. Lee, Marten Lohstroh, Victor Nouvellet, Beth Osyk, Matt Weber. “A Component Architecture for the Internet of Things,” ***Proceedings of the IEEE***, Vol. 106, No. 9, September, 2018.

[53] Edward A. Lee, “Is software the result of top-down intelligent design or evolution?” Viewpoint, ***Communications of the ACM*** 61(9) pp. 34-36, September 2018.

[54] Maryam Bagheri, Marjan Sirjani, Ehsan Khamespanah, Narges Khakpour, Ilge Akkaya, Ali Movaghar, Edward A. Lee, “Coordinated actor model of self-adaptive track-based traffic control systems,” ***Journal of Systems and Software***, Vol. 143, pp 116-139, September 2018.

[55] Edward A. Lee, “What Is Real Time Computing? A Personal View,” ***IEEE Design & Test***, Vol. 35, Issue 2, pp 64-72, April, 2018.

[56] Fabio Cremona, Marten Lohstroh, David Broman, Edward A. Lee, Michael Masin, and Stavros Tripakis, “Hybrid Co-simulation: It's About Time,” ***International Journal on Software and Systems Modeling*** (SoSym), pp 1-25, November, 2017.

[57] Hokeun Kim and Edward A. Lee, “Locally Centralized, Globally Distributed Authentication and Authorization for the Internet of Things,” ***IEEE IT Professional*** Vol: 9 Issue: 5, pp 27-33, October, 2017.

[58] Edward A. Lee, “Fundamental Limits of Cyber-Physical Systems Modeling,” ***ACM Transactions on Cyber-Physical Systems***, vol. 1, no. 1, Article 3, October, 2016.

[59] Nitesh Mor, Ben Zhang, John Kolb, Douglas S. Chan, Nihil Goyal, Nicholas Sun, Ken Lutz, Eric Allman, John Wawrzynek, Edward A. Lee, John Kubiatowicz, “Toward a Global Data Infrastructure,” ***IEEE Internet Computing***, May/June, 2016, pp. 54-62.

[60] Ilge Akkaya, Patricia Derler, Shuhei Emoto, and Edward A. Lee, “Systems engineering for Industrial Cyber-Physical Systems using Aspects,” ***IEEE Proceedings***, Vol. 104, Issue 5, pp 997-1012, April 20, 2016.

[61] Eleftherios Matsikoudis and Edward A. Lee, “The Fixed-Point Theory of Strictly Causal Functions,” in ***Theoretical Computer Science***, Vol. 574, pp. 39-88, 2015.

[62] Ilge Akkaya, Yan Liu, and Edward A. Lee, “Uncertainty Analysis of Middleware Services for Streaming Smart Grid Applications,” in ***IEEE Tr. on Services Computing***, Vol. PP, No. 99, DOI: 0.1109/TSC.2015.2456888, July 2015.

[63] Elizabeth Latronico, Edward A. Lee, Marten Lohstroh, Chris Shaver, Armin Wasicek, and Matthew Weber. "A Vision of Swarmlets," ***IEEE Internet Computing***, 19(2), pp. 20-28, March-April 2015.

[64] Edward A. Lee. “The Past, Present, and Future of Cyber-Physical Systems: A Focus on Models," ***Sensors***, 15(3), p. 4837-4869, doi:10.3390/s150304837, February, 2015.

[65] Edward A. Lee. “Constructive Models of Discrete and Continuous Physical Phenomena,” ***IEEE Access***, Vol.2, pp. 797-821, August 7, 2014.

[66] Edward A. Lee, Jan Rabaey, David Blaauw, Kevin Fu, Carlos Guestrin, Bjorn Hartmann, Roozbeh Jafari, Doug Jones, John Kubiatowicz, Vijay Kumar, Rahul Mangharam, Richard Murray, George Pappas, Kris Pister, Anthony Rowe, Alberto Sangiovanni-Vincentelli, Sanjit A. Seshia, Tajana Simunic Rosing, Ben Taskar, John Wawrzynek, David Wessel. “The Swarm at the Edge of the Cloud,” ***Design & Test***, IEEE, pp. 1-17, March 2014.

[67] Stavros Tripakis, Christos Stergiou, Chris Shaver, and Edward A. Lee. “A modular formal semantics for Ptolemy.” ***Mathematical Structures in Computer Science***, 23(04), pp. 834-881, Aug 2013.

[68] Stavros Tripakis, Dai Bui, Bert Rodiers, Edward A. Lee. “Compositionality in Synchronous Data Flow: Modular Code Generation from Hierarchical SDF Graphs.” ***ACM Transactions on Embedded Computing Systems*** (**TECS**), Volume 12 Issue 3, March 2013.

[69] Kyungmin Bae, Peter Olveczky, Thomas Feng, Edward A. Lee, Stavros Tripakis, “Verifying Hierarchical Ptolemy II Discrete-Event Models using Real-Time Maude.” ***Science of Computer Programming***, 77(12), pp 1235-1271, October, 2012.

[70] John Eidson, Edward A. Lee, Slobodan Matic, Sanjit A. Seshia, Jia Zou. “Distributed Real-Time Software for Cyber-Physical Systems.” ***Proceedings of the IEEE*** (special issue on CPS), 100(1):45-59, January 2012.

[71] Patricia Derler, Edward A. Lee, Alberto Sangiovanni-Vincentelli. “Modeling Cyber-Physical Systems.” ***Proceedings of the IEEE*** (special issue on CPS), 100(1):13-28, January 2012.

[72] Stavros Tripakis, Ben Lickly, Thomas A. Henzinger and Edward A. Lee, “A Theory of Synchronous Relational Interfaces.” ***ACM Transactions on Programming Languages and Systems*** (**TOPLAS**). Vol.33, Issue 4, July 2011.

[73] Y. Zhao, Y. Xiong, E. A. Lee, X. Liu, and L. C. Zhong, “The Design and Application of Structured Types in Ptolemy II,” ***International Journal of Intelligent Systems***, 25(2), pp. 118-136, Wiley Periodicals, Inc., 2010.

[74] E. A. Lee, X. Liu, and S. Neuendorffer, “Classes and inheritance in actor-oriented design,” ***ACM Transactions on Embedded Computing Systems*** (**TECS**), 8(4), Article No. 29, July, 2009.

[75] E. A. Lee, Computing Needs Time, ***Communications of the ACM***, 52(5):70-79, May 2009.

[76] A. Goderis, C. Brooks, I. Altintas, E. A. Lee, C. Gobel. “Heterogeneous Composition of Models of Computation,” ***Future Generation Computer Systems***, 25(5):552-560, May 2009.

[77] X. Liu, E. A. Lee, "CPO semantics of timed interactive actor networks," ***Theoretical Computer Science,*** 409 (1):110-25, December, 2008.

[78] Y. Zhou and E. A. Lee, "Causality interfaces for actor networks," ***ACM Trans. Embedded Computing Systems***, 7(3):1-35, April 2008.

[79] B. Ludascher, I. Altintas, C. Berkley, D. Higgins, E. Jaeger, M. Jones, E. A. Lee, J. Tao, and Y. Zhao, "Scientific workflow management and the Kepler system," ***Concurrency & Computation: Practice & Experience***, Special Issue: Workflow in Grid Systems, 18(10):1039-1065, Aug. 2006

[80] E. A. Lee, "The Problem with Threads," in ***IEEE Computer***, 39(5):33-42, May 2006.

[81] E. A. Lee, "Absolutely Positively On Time: What Would It Take?" ***IEEE Computer***, 38(7):85-87, July 2005.

[82] E. A. Lee and Y. Xiong, “A Behavioral Type System and Its Application in Ptolemy II,” ***Formal Aspects of Computing Journal***, special issue on “Semantic Foundations of Engineering Design Languages,” 16(3):210-237, August, 2004.

[83] J. Liu, J. Eker, J. W. Janneck, X. Liu, and E. A. Lee, "Actor-Oriented Control System Design: A Responsible Framework Perspective" ***IEEE Trans. on Control System Technology***, 12(2): 250-262, March 2004.

[84] S. A. Edwards and E. A. Lee, “The Semantics and Execution of a Synchronous Block-Diagram Language,” ***Science of Computer Programming***, 48(1):21-42, July 2003.

[85] E. A. Lee, S. Neuendorffer and M. J. Wirthlin, “Actor-Oriented Design of Embedded Hardware and Software Systems,” **invited paper,** ***Journal of Circuits, Systems, and Computers***, 12(3):231-260, 2003.

[86] J. Liu and E. A. Lee, "Timed Multitasking for Real-Time Embedded Software," **invited paper** in ***IEEE Control Systems Magazine***, special issue on "Advances in Software Enabled Control," pp. 65-75, February 2003.

[87] J. Eker, J. W. Janneck, E. A. Lee, J. Liu, X. Liu, J. Ludvig, S. Neuendorffer, S. Sachs, Y. Xiong, "Taming Heterogeneity-the Ptolemy Approach," ***Proceedings of the IEEE***, 91(1):127-144, January 2003.

[88] J. Liu and E. A. Lee, "A Component-Based Approach to Modeling and Simulating Mixed- Signal and Hybrid Systems," ***ACM Trans. on Modeling and Computer Simulation,*** special issue on computer automated multi-paradigm modeling, 12(4):343-368, October 2002.

[89] P. K. Murthy and E. A. Lee, "Multidimensional Synchronous Dataflow," ***IEEE Transactions on Signal Processing***, 50(8):2064 -2079, August 2002.

[90] S. S. Bhattacharyya, S. Sriram, and E. A. Lee, "Resynchronization for Multiprocessor DSP systems," ***IEEE Transactions on Circuits and Systems - I: Fundamental Theory and Applications***, 47(11):1597-1609, November 2000.

[91] E. A. Lee, "What's Ahead for Embedded Software?," ***IEEE Computer***, 33(9):18-26, September 2000.

[92] E. A. Lee, "Modeling Concurrent Real-time Processes Using Discrete Events," **invited paper**, ***Annals of Software Engineering***, Special Volume on Real-Time Software Engineering, 7:25-45, 1999.

[93] E. A. Lee and D. G. Messerschmitt, "A Highest Education in the Year 2049," **invited paper**, ***Proceedings of the IEEE***, 87(9):1685-1691, September 1999.

[94] A. Girault, B. Lee, and E. A. Lee, "Hierarchical Finite State Machines with Multiple Concurrency Models," ***IEEE Transactions On Computer-aided Design Of Integrated Circuits And Systems***, 18(6):742-760, June 1999.

[95] S. S. Bhattacharyya, P. K. Murthy, and E. A. Lee, "Synthesis of Embedded Software from Synchronous Dataflow Specifications," **invited paper**, ***Journal of VLSI Signal Processing Systems***, 21(2), June 1999.

[96] E. A. Lee and A. Sangiovanni-Vincentelli, "A Framework for Comparing Models of Computation," ***IEEE Transactions On Computer-aided Design Of Integrated Circuits And Systems***, 17(12):1217-1229, December 1998.

[97] E. A. Lee and D. G. Messerschmitt, "Engineering an Education for the Future," ***IEEE Computer Magazine***, 31(1):77-85, January, 1998.

[98] P. K. Murthy, S. S. Bhattacharyya, and E. A. Lee, "Joint Minimization of Code and Data for Synchronous Dataflow Programs," ***Journal of Formal Methods in System Design***, 11(1):41-70, July 1997.

[99] S. Ha and E. A. Lee, "Compile-Time Scheduling of Dynamic Constructs in Dataflow Program Graphs," ***IEEE Trans. on Computers***, 46(7), July 1997.

[100] S. Ha and E. A. Lee, "Compile-Time Scheduling of Dynamic Constructs in Dataflow Program Graphs," ***IEEE Trans. on Computers***, 46(7), July 1997.

[101] S. S. Bhattacharyya, S. Sriram, and E. A. Lee, "Optimizing Synchronization in Multiprocessor DSP Systems," ***IEEE Tr. on Signal Processing***, 45(6), June 1997.

[102] S. Sriram and E. A. Lee, "Determining the Order of Processor Transactions in Statically Scheduled Multiprocessors," ***Journal of VLSI Signal Processing***, 15(3):207- 220, March 1997.

[103] A. Kalavade and E. A. Lee, "The Extended Partitioning Problem: Hardware/Software Mapping and Implementation-Bin Selection," ***Journal of Design Automation for Embedded Systems***, 2:125-163, March 1997.

[104] S. Edwards, L. Lavagno, E. A. Lee, and A. Sangiovanni-Vincentelli, "Design of Embedded Systems: Formal Models, Validation, and Synthesis," ***Proceedings of the IEEE***, 85(3), March 1997.

[105] W.-T. Chang, S.-H. Ha, and E. A. Lee, "Heterogeneous Simulation — Mixing Discrete-Event Models with Dataflow," **invited paper**, ***Journal on VLSI Signal Processing***, 13(1), January, 1997.

[106] S. S. Bhattacharyya, P. K. Murthy, and E. A. Lee, "APGAN and RPMC: Complimentary Heuristics for Translating DSP Block Diagrams into Efficient Software Implementations," ***Journal of Design Automation for Embedded Systems***, 2(1):33-60, January, 1997.

[107] A. Kalavade and E. A. Lee, "Complexity Management in System-Level Design," ***Journal of VLSI Signal Processing Systems***, 14(2), November 1996.

[108] J. R. Barry, E. A. Lee, and D. G. Messerschmitt, "Capacity Penalty Due to Ideal Zero-Forcing Decision-Feedback Equalization," ***IEEE Trans. on Information Theory***, 42(4):1062-1071, July 1996.

[109] E. A. Lee and T. M. Parks, "Dataflow Process Networks," ***Proceedings of the IEEE***, 83(5):773-801, May, 1995.

[110] S. S. Bhattacharyya, J. T. Buck, S. Ha and E. A. Lee, "Generating Compact Code from Dataflow Specifications of Multirate Signal Processing Algorithms," ***IEEE Trans. on Circuits and Systems I: Fundamental Theory and Applications***, 42(3):138-150, March 1995.

[111] J. L. Pino, S. Ha, E. A. Lee and J. T. Buck, "Software Synthesis for DSP Using Ptolemy," ***Journal on VLSI Signal Processing***, 9(1):7-21, Jan., 1995.

[112] S. S. Bhattacharyya and E. A. Lee, "Looped Schedules for Dataflow Descriptions of Multirate Signal Processing Algorithms," ***Formal Methods in System Design***, 5(3), December, 1994.

[113] J. Buck, S. Ha, E. A. Lee, D. G. Messerschmitt, "Ptolemy: a Framework for Simulating and Prototyping Heterogeneous Systems", ***International Journal of Computer Simulation***, special issue on "Simulation Software Development," January 1994.

[114] J. Pino, S. Ha, E. Lee, J. Buck, “Software Synthesis for DSP Using Ptolemy”, **Invited paper** ***Journal on VLSI Signal Processing***, special issue on “Synthesis for DSP”, 9(1):7-21, January, 1995.

[115] A. Kalavade, and E. A. Lee, “A Hardware/Software Codesign Methodology for DSP Applications,” ***IEEE Design and Test***, September 1993.

[116] G. C. Sih and E. A. Lee, “Declustering: A New Multiprocessor Scheduling Technique,” ***IEEE Trans. on Parallel and Distributed Systems,*** 4(6):625-637, June 1993.

[117] J. Barry, J. Kahn, W. J. Krause, E. A. Lee, D. G. Messerschmitt, “Simulation of Multipath Impulse Response for Indoor Wireless Optical Channels,” ***IEEE Journal on Selected Areas in Communications***, 11(3):367-379, April 1993.

[118] G. C. Sih and E. A. Lee, “A Compile-Time Scheduling Heuristic for Interconnection-Constrained Heterogeneous Processor Architectures,” ***IEEE Trans. on Parallel and Distributed Systems,*** 4(2), February, 1993.

[119] E. A. Lee, “Consistency in Dataflow Graphs,” ***IEEE Transactions on Parallel and Distributed Systems,*** 2(2), April 1991.

[120] S. Ha and E. A. Lee, “Compile-Time Scheduling and Assignment of Dataflow Program Graphs with Data-Dependent Iteration,” ***IEEE Transactions on Computers***, November, 1991.

[121] J. R. Barry, J. M. Kahn, E. A. Lee, and D. G. Messerschmitt, “High-Speed Non-Directive Optical Communication for Wireless Networks,” ***IEEE Network Magazine***, November, 1991.

[122] J. R. Barry and E. A. Lee, “Performance of Coherent Optical Receivers”, ***Proceedings of the IEEE***, 78(8), August, 1990.

[123] J. Bier, E. Goei, W. Ho, P. Lapsley, M. O’Reilly, G. Sih and E. A. Lee, “Gabriel: A Design Environment for DSP,” ***IEEE Micro Magazine***, 10(5):28-45, October 1990.

[124] E. A. Lee and J. Bier, "Architectures For Statically Scheduled Dataflow," ***Journal on Parallel and Distributed Systems***, December 1990.

[125] E. A. Lee, “Programmable DSP Architectures, Part II,” ***ASSP Magazine***, January, 1989.

[126] E. A. Lee, “Programmable DSP Architectures, Part I,” ***ASSP Magazine***, October, 1988.

[127] E. A. Lee, W.-H. Ho, E. Goei, J. Bier, and S. Bhattacharyya, “Gabriel: A Design Environment for DSP,” ***IEEE Trans. on Acoustics, Speech, and Signal Processing***, November, 1989.

[128] E. A. Lee and D. G. Messerschmitt, “Static Scheduling of Synchronous Data Flow Programs for Digital Signal Processing,” ***IEEE Transactions on Computers***, January, 1987.

[129] E. A. Lee and D. G. Messerschmitt, “Synchronous Data Flow,” ***IEEE Proceedings***, September, 1987.

[130] E. A. Lee and D. G. Messerschmitt, “Pipeline Interleaved Programmable DSPs: Architecture,” ***IEEE Trans. on Acoustics, Speech, and Signal Processing***, 35(9), September, 1987

[131] E. A. Lee and D. G. Messerschmitt, “Pipeline Interleaved Programmable DSPs: Synchronous Data Flow Programming,” ***IEEE Trans. on Acoustics, Speech, and Signal Processing***, 35(9), September, 1987.

[132] H.-H. Lu, E. A. Lee, and D. G. Messerschmitt, “Fast Recursive Filtering with Multiple Slow Processing Elements,” ***IEEE Tr. on Circuits and Systems,*** November, 1985.

REFEREED ARCHIVAL CONFERENCE AND SYMPOSIUM PROCEEDINGS:

[133] Edward A. Lee and Marten Lohstroh, “Time for All Programs, Not Just Real-Time Programs,” Int. Symp. on Leveraging Applications of Formal Methods (ISoLA), October 17-29 2021.

[134] Marten Lohstroh, Christian Menard, Alexander Schulz-Rosengarten, Matthew Weber, Jeronimo Castrillon, and Edward A. Lee, “A Language for Deterministic Coordination across Multiple Timelines,” Forum on Design Languages (FDL), September 2020.

[135] Marjan Sirjani, Ehsan Khamespanah, and Edward A. Lee, “Model Checking Software in Cyberphysical Systems,” IEEE Computers, Software, and Applications Conference (COMPSAC), July 2020.

[136] Martin Witte, Martin A. Sehr, Ines Ugalde, Joerg Neidig, Mehrdad Niknami, Stephan Hoeme, and Edward A. Lee, "Opportunities for Industrial Control," Proc. of 21st IFAC World Congress, Berlin, Germany, July 12-17, 2020.

[137] Gil Lederman, Markus N. Rabe, Edward A. Lee, Sanjit A. Seshia, Learning Heuristics for Quantified Boolean Formulas through Reinforcement Learning, International Conference on Learning Representations (ICLR), Virtual Conference, April 26-May 1, 2020.

[138] Marjan Sirjani, Ehsan Khamespanah, Edward A. Lee, Model Checking Software in Cyberphysical Systems, Proc. of IEEE Computers, Software, and Applications Conference (COMPSAC 2020), (not held in) Madrid, Spain, July, 2020.

[139] Mathieu Jan, Mihail Asavoae, Martin Schoeberl, Edward A. Lee, "Formal Semantics of Predictable Pipelines: a Comparative Study," 25th Asia and South Pacific Design Automation Conference, Beijing, China, 13 Jan 2020 to 16 Jan 2020.

[140] Marten Lohstroh, Martin Schoeberl, Mathieu Jan, Edward Wang, Edward A. Lee "Work-in-Progress: Programs with Ironclad Timing Guarantees," ACM SIGBED International Conference on Embedded Software (EMSOFT), New York, NY, October 13-18, 2019.

[141] Marten Lohstroh, Edward A. Lee, "Deterministic Actors," Forum on Specification and Design Languages (FDL), Southampton, UK, September 2-4, 2019.

[142] Matthew Weber, Ravi Akella, and Edward A. Lee, “Service Discovery for The Connected Car with Semantic Accessors,” *IEEE Inteligent Vehicles Symposium* (IV), Paris, June 9-12, 2019.

[143] Marten Lohstroh, Martin Schoeberl, Andres Goens, Armin Wasicek, Christopher Gill, Marjan Sirjani, Edward A. Lee, "Invited: Actors Revisited for Time-Critical Systems," *Design Automation Conference* (DAC), June, 2019.

[144] Edward A. Lee, "Freedom From Choice and the Power of Models: in Honor of Alberto Sangiovanni-Vincentelli," *International Symposium on Physical Design* (ISPD), April 14-17, 2019, San Francisco, CA.

[145] Edward A. Lee, "Observation and Interaction," Proc. of the 13th *International Conference on Language and Automata Theory and Applications* (LATA), St. Petersburg, Russia, March 26-29, 2019.

[146] Chadlia Jerad, Edward A. Lee. "Deterministic Timing for the Industrial Internet of Things" In Proc. IEEE *Int. Conf. on Industrial Internet* (ICII), Bellvue, WA, Oct. 21-23, 2018.

[147] Fabio Cremona, Marten Lohstroh, David Broman, Edward A. Lee, Michael Masin, and Stavros Tripakis. "Hybrid Co-simulation: It's About Time: [Extended Abstract]" In ACM/IEEE 21th *International Conference on Model Driven Engineering Languages and Systems* (MODELS), Copenhagen, Denmark. October 14-19, 2018.

[148] Edward A. Lee and Marjan Sirjani, "What Good are Models?" Invited Paper in Proc. of *Formal Aspects of Component Software* (FACS), Pohang, South Korea, October 10-12, 2018, Kyungmin Bae and Peter Csaba Olveczky, Eds., Springer, LNCS 11222.

[149] Edward A. Lee, "Models of Timed Systems," *Int. Conf. on Formal Modeling and Analysis of Timed Systems* (FORMATS), Beijing, China, pp. 17-33, LNCS 11022, Springer, September 4-6, 2018.

[150] Ben Zhang, Xin Jin, Sylvia Ratnasamy, John Wawrzynek, and Edward A. Lee, "AWStream: Adaptive Wide-Area Streaming Analytics," *ACM SIGCOMM*, August 20-25, 2018, Budapest, Hungary, ACM.

[151] Edward A. Lee, Jan Reineke, and Michael Zimmer, "Abstract PRET Machines," **Invited TCRTS award paper**. *IEEE Real-Time Systems Symposium* (RTSS 17), December 5, 2017.

[152] Hokeun Kim, Eunsuk Kang, David Broman, and Edward A. Lee, "An Architectural Mechanism for Resilient IoT Services," Proceedings of the 1st ACM Workshop on *Internet of Safe Things* (SafeThings 2017), Delft, The Netherlands, November 5, 2017.

[153] Hokeun Kim, Armin Wasicek, and Edward A. Lee, "An Integrated Simulation Tool for Computer Architecture and Cyber-Physical Systems," Proceedings of the 6th *Workshop on Design, Modeling and Evaluation of Cyber-Physical Systems* (CyPhy'17), Seoul, Korea, October 19, 2017.

[154] Marten Lohstroh, Hokeun Kim, and Edward A. Lee, "Contextual Callbacks for Resource Discovery and Trust Negotiation on the Internet of Things (Work-in-Progress)," Proceedings of The ACM SIGBED *International Conference on Embedded Software* (EMSOFT), Seoul, Korea, October 15-20, 2017.

[155] Chihhong Cheng, Edward A. Lee, Harald Reuss, “autoCode4: Structural Controller Synthesis,” Proceedings of the *International Conference on Tools and Algorithms for the Construction and Analysis of Systems* (TACAS), Springer, 22, April, 2017.

[156] **(Best paper award)** Hokeun Kim, Eunsuk Kang, Edward A. Lee, and David Broman, “A Toolkit for Construction of Authorization Service Infrastructure for the Internet of Things,” in Proceedings of the 2nd ACM/IEEE *International Conference on Internet-of-Things Design and Implementation* (IoTDI), Pittsburgh, PA, USA, April 18-21, 2017.

[157] Edward A. Lee, “Dependable Cyber-Physical Systems,” Proceedings of *Symposium on Dependable Software Engineering Theories*, *Tools and Applications* (SETTA) Beijing, China, Nov.9-11, 2016.

[158] Aviral Shrivastava, Patricia Derler, Ya-Shian Li Baboud, Kevin Stanton, Mohammad Khayatian, Hugo A. Andrade, Marc Weiss, John Eidson, Sundeep Chandhoke, “Time in cyber-physical systems,” in Proceedings of IEEE/ACM/IFIP *International Conference on Hardware/Software Codesign and System Synthesis* (CODES '16), October, 2016.

[159] Hokeun Kim, Armin Wasicek, Benjamin Mehne, and Edward A. Lee, “A Secure Network Architecture for the Internet of Things Based on Local Authorization Entities,” in Proceedings of the 4th IEEE *International Conference on Future Internet of Things and Cloud* (FiCloud), Vienna, Austria, August 22-24, 2016.

[160] Hokeun Kim, Armin Wasicek, Benjamin Mehne, and Edward A. Lee, “A Secure Network Architecture for the Internet of Things Based on Local Authorization Entities,” in Work-in-Progress Session of the *Design Automation Conference* (DAC), Austin, TX, June 5-9, 2016.

[161] Marten Lohstroh, Christopher Brooks, Edward A. Lee, “Demo Abstract: Building IoT Applications with Accessors in CapeCode,” *International Conference on Cyber-Physical Systems* (ICCPS), Vienna, Austria, April 11-14, 2016.

[162] Hokeun Kim, Yan Zhao and Lihua Zhao, “Process-Level Modeling and Simulation for HP's Multi Jet Fusion 3D Printing Technology,” in Proceedings of the 1st International Workshop on Cyber-Physical Production Systems (CPPS), Vienna, Austria, April 12, 2016.

[163] Maryam Baheri, Ilge Akkaya, Ehsan Khamespanah, Narges Khakpour, Marjan Sirjani, Ali Movaghar, and Edward A. Lee, “Coordinated Actors for Reliable Self-Adaptive Systems,” in Proceedings of Formal Aspects of Component Software (FACS), Besancon, France, Oct. 19-21, 2016.

[164] (**best paper award**) Ilge Akkaya, Daniel Fremont, Rafael Valle, Alexandre Donzé, Edward A. Lee, and Sanjit A. Seshia, “Control Improvisation with Probabilistic Temporal Specifications,” In Proceedings of the 1st IEEE International Conference on Internet-of-Things Design and Implementation (IoTDI'16), IEEE, Berlin, Germany, April 2-4, 2016.

[165] Fabio Cremona, Marten Lohstroh, Stavros Tripakis, Christopher Brooks and Edward A. Lee, “FIDE -- An FMI Integrated Development Environment,” *Symposium on Applied Computing*, Pisa, Italy, April 4, 2016.

[166] Shuhei Emoto, Ilge Akkaya, Edward A. Lee, “Information Seeking and Model Predictive Control of a Cooperative Robot Swarm,” *Proceedings of the First International Symposium on Swarm Behavior and Bio-Inspired Robotics*, October 28-30, 2015, Kyoto, Japan.

[167] Edward A. Lee, Mehrdad Niknami, Thierry Nouidui, Michael Wetter. “Modeling and Simulating Cyber-Physical Systems using CyPhySim,” *Proceedings of the International Conference on Embedded Software* (**EMSOFT**), Amsterdam, The Netherlands, October 4-9, 2015.

[168] Michael Wetter, Thierry Nouidui, David Lorenzetti, Edward A. Lee, and Amir Roth. “Prototyping The Next Generation Energyplus Simulation Engine,” *Proceedings of the 14th International Conference of the International Building Performance Simulation Association* (**BS**), Hyderabad - India, Dec. 7-9, 2015.

[169] Marten Lohstroh, Edward A. Lee. “An Interface Theory for the Internet of Things,” *Proceedings of the 13th International Conference on Software Engineering and Formal Methods* (**SEFM**) Sept. 7-11, 2015, York, UK, Springer, LNCS 9276, pp. 20-34.

[170] Armin Wasicek, Edward A. Lee, Hokeun Kim, Lev Greenberg, Akhito Iwai, and Ilge Akkaya. “System Simulation From Operational Data,” *Proceedings of the Design Automation Conference* (**DAC**), San Francisco, CA, June, 2015.

[171] Michael Zimmer, Edward A. Lee, J. Karl Hedrick. “Ramifications of Software Implementation and Deployment: A Case Study on Yaw Moment Controller Design,” in *Proceedings of IEEE American Control Conference* (**ACC**), July 1-3, Chicago, IL., 2015.

[172] David Broman, Lev Greenberg, Edward A. Lee, Michael Masin, Stavros Tripakis, Michael Wetter. “Requirements for Hybrid Cosimulation Standards,” in *Proceedings of Hybrid Systems Computation and Control* (**HSCC**), pp. 179-188. ACM, Seattle, WA, April 14-16, 2015.

[173] Hokeun Kim, David Broman, Edward A. Lee, Michael Zimmer, Aviral Shrivastava, and Junkwang Oh. “A Predictable and Command-Level Priority-Based DRAM Controller for Mixed-Criticality Systems,” in *Proceedings of the 21st IEEE Real-Time and Embedded Technology and Application Symposium* (**RTAS**), Seattle, pp 317-326, WA, USA, April 13-16, 2015.

[174] Armin Wasicek, Patricia Derler, and Edward A. Lee, "Aspect-oriented Modeling of Attacks in Automotive Cyber-Physical Systems," in *ACM/EDAC/IEEE Proceedings of the 51st Annual Design Automation Conference* (DAC), San Francisco, CA, June, 2014.

[175] Michael Zimmer, David Broman, Chris Shaver, and Edward A. Lee. “FlexPRET: A Processor Platform for Mixed-Criticality Systems,” In *Proceedings of the 20th IEEE Real-Time and Embedded Technology and Application Symposium* (**RTAS**), Berlin, Germany, April 15-17, 2014.

[176] Amit Fisher, Clas Jacobson, Edward A. Lee, Richard Murray, Alberto Sangiovanni-Vincentelli, Eelco Scholte. “Industrial Cyber-Physical Systems-iCyPhy, in *Proc. Complex Systems Design & Management* (**CSD&M**), Springer, pp 21-37, Paris, France, December 4, 2013.

[177] Ilge Akkaya, Edward A. Lee, and Patricia Derler. “Model-Based Evaluation Of GPS Spoofing Attacks On Power Grid Sensors.” In *Modeling and Simulation of Cyber-Physical Energy Systems* (**MSCPES**), pp. 1-6. IEEE, May 20, 2013.

[178] Dai Bui, Edward A. Lee, “StreaMorph: A Case for Synethesizing Energy-Efficient Adaptive Programs Using High-Level Abstractions.” Proc. of the Int. Conference on Embedded Software (**EMSOFT**), Montreal, Canada, Sept. 29-Oct 4, 2013.

[179] Eleftherios Matsikoudis, Christos Stergiou, Edward A. Lee, “On the Schedulability of Real-Time Discrete-Event Systems.” Proc. of the Int. Conference on Embedded Software (**EMSOFT**), Montreal, Canada, Sept. 29-Oct 4, 2013.

[180] David Broman, Christopher Brooks, Lev Greenberg, Edward A. Lee, Michael Masin, Stavros Tripakis, and Michael Wetter. “Determinate Composition of FMUs for Co-Simulation.” Proc. of the Int. Conference on Embedded Software (**EMSOFT**), Montreal, Canada, Sept. 29-Oct 4, 2013.

[181] Eleftherios Matsikoudis, Edward A. Lee, “The Fixed-Point Theory of Strictly Contracting Functions on Generalized Ultrametric Semilattices.” In D. Baelde and A. Carayol (Eds.): *Fixed Points in Computer Science* 2013 (FICS 2013), EPTCS 126, Torino, Italy, September 2013, pp. 56-71, DOI: 10.4204/EPTCS.126.5.

[182] Patricia Derler, John C. Eidson, Stuart Goose, Edward A. Lee, Slobodan Matic, Michael Zimmer, “Using Ptides and Synchronized Clocks to Design Distributed Systems with Deterministic Systemwide Timing.” Int. IEEE Symposium on Precision Clock Synchronization for Measurement (**ISPCS**), Lemgo, Germany, Sept. 22-27, 2013.

[183] Eleftherios Matsikoudis, Edward A. Lee. “On Fixed Points of Strictly Causal Functions.” Int. Conference on Formal Modeling and Analysis of Timed Systems (**FORMATS**), Buenos Aires, Argentina, August 29-31 2013, published in V. Braberman and L. Fribourg (Eds.), LNCS 8053, pp. 183–197, Springer, 2013.

[184] Christos Stergiou, Stavros Tripakis, Eleftherios Matsikoudis, Edward A. Lee. “On the Verification of Timed Discrete-Event Models.” Int. Conference on Formal Modeling and Analysis of Timed Systems (**FORMATS**), Buenos Aires, Argentina, August 29-31, 2013.

[185] Eleftherios Matsikoudis, Edward A. Lee. “An Axiomatization of the Theory of Generalized Ultrametric Semilattices of Linear Signals.” Int. Symposium on Fundamentals of Computation Theory (**FCT**), Liverpool, United Kingdom, August 19-21, 2013. Published in L. Gasieniec and F. Wolter (Eds.): FCT 2013, LNCS 8070, pp. 248-258, Springer 2013.

[186] Hokeun Kim, Liangpeng Guo, Edward A. Lee, Alberto Sangiovanni-Vincentelli, “A Tool Integration Approach for Architectural Exploration of Aircraft Electric Power Systems.” Prof. of the Int. Conference on Cyber-Physical Systems, Networks, and Applications (**CPSNA**), Taipei, Taiwan, Aug. 19-20, 2013.

[187] Stavros Tripakis, Christos Stergiou, Manfred Broy, Edward A. Lee. “Error-Completion in Interface Theories.” Int. **SPIN** Symposium on Model Checking of Software, Stony Brook, NY, USA, 8-9 July 2013.

[188] David Broman, Michael Zimmer, Yooseong Kim, Hokeun Kim, Jian Cai, Aviral Shrivastava, Stephen A. Edwards, and Edward A. Lee. “Precision Timed Infrastructure: Design Challenges.” In Proc. of the Electronic System Level Synthesis Conference (**ESLsyn**), Austin, Texas, USA, May 31-June 1, 2013.

[189] Patricia Derler, Edward A. Lee, Martin Torngren, Stavros Tripakis. “Cyber-Physical System Design Contracts.” Int. Conference on Cyber-Physical Systems (**ICCPS**), Philadelphia, USA, April 8 - 11, 2013.

[190] David Broman, Edward A. Lee, Stavros Tripakis, and Martin Törngren. “Viewpoints, Formalisms, Languages, and Tools for Cyber-Physical Systems.” Proc. of the Int. Workshop on Multi-Paradigm Modeling (**MPM**), Innsbruck, Austria, October, 2012.

[191] Isaac Liu, Jan Reineke, David Broman, Michael Zimmer, Edward A. Lee. “A PRET Microarchitecture Implementation with Repeatable Timing and Competitive Performance.” Prof. of Int. Conference on Computer Design (**ICCD**), Montreal, Quebec, Canada, October, IEEE, 2012.

[192] Edward A. Lee, Sanjit Seshia, Jeff C. Jensen. “Teaching Embedded Systems the Berkeley Way.” Workshop on Embedded Systems Education (**WESE**), a part of Embedded Systems Week (**ESWeek**), Tampere, Finland, October 12, 2012.

[193] Chris Shaver, Edward A. Lee. “The Coroutine Model of Computation.” Proc. of the Int. Conference on Model Driven Engineering, Languages, and Systems (**MODELS**), Innsbruck, Austria, Sept. 30-Oct. 5, 2012.

[194] Reinhard von Hanxleden, Edward A. Lee, Christian Motika, and Hauke Fuhrmann. “Multi-View Modeling and Pragmatics in 2020.” Position Paper on Designing Complex Cyber-Physical Systems, Proc. of the 17th **Monterey Workshop**, Oxford, UK, March 19-21, 2012. Published in Springer Lecture Notes in Computer Science, LNCS 7539, pp 209-223, 2012.

[195] Eleftherios Matsikoudis, Edward A. Lee. “From Transitions to Executions.” In D. Pattinson and L. Schröder, editors, *Coalgebraic Methods in Computer Science*, LNCS 7399, Lecture Notes in Computer Science, pp. 170-190, Springer 2012. Proceedings of the Workshop on Coalgebraic Methods in Computer Science (**CMCS**), Tallinn, Estonia, 31 March - 1 April 2012.

[196] Isaac Liu, Edward A. Lee, Matthew Viele, Guoqiang Gerald Wang, Hugo Andrade. “A Heterogeneous Architecture for Evaluating Real-Time One-Dimensional Computational Fluid Dynamics on FPGAs.” Int. Symposium on Field-Programmable Custom Computing Machines (**FCCM**), Toronto, Canada, April 29-May 1, 2012.

[197] Jia Zou, Slobodan Matic, Edward A. Lee. “PtidyOS: A Lightweight Microkernel for Ptides Real-Time Systems.” Proc. of the Real-Time and Embedded Technology and Applications Symposium (**RTAS**), Beijing China, April 17-19, 2012.

[198] Ben Lickly, Charles Shelton, Elizabeth Latronico, Edward A. Lee. “A Practical Ontology Framework for Static Model Analysis.” Proc. of the Int. Conference on Embedded Software (**EMSOFT**), p.23-32, Taipei, Taiwan, October 9-14, 2011.

[199] Jan Reineke, Isaac Liu, Hiren D. Patel, Sungjun Kim, Edward A. Lee. "PRET DRAM Controller: Bank Privatization for Predictability and Temporal Isolation." Proc. of the Int. Conf. on Hardware/Software Codesign and System Synthesis (**CODES+ISSS**), p.99-108, Taipei, Taiwan, October 9-14, 2011.

[200] Saddek Bensalem, Kees Goossens, Christoph M. Kirsch, Roman Obermaisser, Edward A. Lee, Joseph Sifakis. "Time-predictable and composable architectures for dependable embedded systems." Proc. of the Int. Conf. on Hardware/Software Codesign and System Synthesis (**CODES+ISSS**), p. 59-68, Taipei, Taiwan, October 9-14, 2011.

[201] Slobodan Matic, Ilge Akkaya, Michael Zimmer, John Eidson and Edward A. Lee. "PTIDES Model on a Distributed Testbed Emulating Smart Grid Real-Time Applications." IEEE Conference on Innovative Smart Grid Technologies (**ISGT-EUROPE**), Manchester, UK, Dec. 5-7, 2011.

[202] Dai Nguyen Bui, Edward A. Lee, Isaac Liu, Hiren D. Patel, Jan Reineke. "Temporal Isolation on Multiprocessing Architectures." Design Automation Conference (**DAC**), June, 2011.

[203] Jeff C. Jensen, Edward A. Lee, Sanjit A. Seshia, "An Introductory Capstone Design Course on Embedded Systems." Proc. of the Int. Symposium on Circuits and Systems (**ISCAS**), pp 1199-1202, Workshop on Innovations in Circuits and Systems Education, Rio de Janeiro, Brazil. May, 2011.

[204] Edward A. Lee and Alberto L. Sangiovanni-Vincentelli, "Component-Based Design for the Future." in Proceedings 2011 Design Automation and Test Europe (**DATE**), March, 2011. Conference dates and location.

[205] E. A. Lee, "CPS Foundations." Proc. Design Automation Conference (**DAC**), June 13-18, Anaheim, CA, 2010.

[206] Thomas Huining Feng, Edward A. Lee, Lee W. Schruben, "Ptera: An Event-Oriented Model of Computation for Heterogeneous Systems." Prof. of Int. Conference on Embedded Software (**EMSOFT**), October 24-29, 2010, Scottsdale, Arizona.

[207] T. H. Feng, E. A. Lee, L. W. Schruben, "Ptera: An Event-Oriented Model of Computation for Heterogeneous Systems," **EMSOFT**, October 24-29, 2010, Scottsdale, Arizona, USA, ACM Press.

[208] E. A. Lee, "Disciplined Heterogeneous Modeling," in D.C. Petriu, N. Rouquette, O. Haugen (Eds.): MODELS 2010, PRT II, LNCS 6395, Springer-Verlag, pp. 273-287, 2010. (Proceedings of the ACM/IEEE 13th International Conference on Model Driven Engineering, Languages, and Systems (**MODELS**), Oct. 3-8, 2010.)

[209] E.A. Lee, "CPS Foundations," Proc. Design Automation Conference (**DAC**), ACM, 2010, pp. 737-742. http://dx.doi.org/10.1145/1837274.1837462

[210] K. Bae, P. C. Ölveczky, T. H. Feng, S. Tripakis. "Verifying Ptolemy II Discrete-Event Models Using Real-Time Maude," **ICFEM** '09: Proceedings of the 11th International Conference on Formal Engineering Methods, 717-736, 9-12, December, 2009.

[211] S. Tripakis, B. Lickly, T. A. Henzinger, E. A. Lee, “On Relational Interfaces,” Proceedings of the 7th ACM International Conference on Embedded Software (**EMSOFT**), pp. 67-76, ACM, 2009.

[212] M.-K. Leung, T. Mandl, E. A. Lee, E. Latronico, C. Shelton, S. Tripakis, and B. Lickly. “Scalable Semantic Annotation using Lattice-based Ontologies,” ACM/IEEE 12th International Conference on Model Driven Engineering Languages and Systems (**MODELS**), Denver, CO, USA, 4-9 October, 2009 (**distinguished paper award).**

[213] S. A. Edwards, S. Kim, E. A. Lee, I. Liu, H. D. Patel, M. Schoeberl. “A Disruptive Computer Design Idea: Architectures with Repeatable Timing,” Proceedings of International Conference on Computer Design (**ICCD**), IEEE, Lake Tahoe, CA, 4-7, pp. 54-59, October, 2009.

[214] J. Zou, J. Auerbach, D. F. Bacon, E. A. Lee. “PTIDES on Flexible Task Graphs: Real-Time Embedded System Building from Theory to Practice,” In *Proceedings of Languages Compilers, and Tools for Embedded Systems* (**LCTES**), Dublin, Ireland, June 19-20, 2009, Published in ACM SIGPLAN Notices, 44(7):31-40, July 2009.

[215] J. Zou, S. Matic, E. A. Lee, T. H. Feng, P. Derler. “Execution Strategies for PTIDES, a Programming Model for Distributed Embedded Systems,” Proc. of the *15th IEEE Real-Time and Embedded Technology and Applications Symposium* (**RTAS**), IEEE Press, pp. 77-86, April, 2009.

[216] P. Derler, E. A. Lee, S. Matic, "Simulation and Implementation of the PTIDES Programming Model", in *Proceedings of the 12-th IEEE International Symposium on Distributed Simulation and Real Time Applications* (**DS-RT**), pp. 330-333, IEEE Computer Society, October, 2008.

[217] S.-S. Forbes, H. A. Andrade, H. Patel, E. A. Lee, "An Automated Mapping of Timed Functional Specification to A Precision Timed Architecture", in *Proceedings of the 12th IEEE International Symposium on Distributed Simulation and Real Time Applications* (**DS-RT**), pp. 322-325, IEEE, October, 2008.

[218] B. Lickly, I. Liu, S. Kim, H. D. Patel, S. A. Edwards, and E. A. Lee, "Predictable programming on a precision timed architecture," in Proc. 2008 *Intl. Conf. on Compilers, Architecture, and Synthesis for Embedded Systems* (**CASES**), October 19 - 24, Atlanta, Georgia, pp. 137-146, IEEE Press, October, 2008.

[219] E. A. Lee, "Cyber physical systems: Design challenges," (Invited Paper) in *Proc. 11th IEEE Intl. Symp. on Object/Component/Service-Oriented Real-Time Distributed Computing* (**ISORC**), Los Alamitos, CA: IEEE Computer Society, May 2008, pp. 363-369.

[220] T. H. Feng and E. A. Lee, "Real-time distributed discrete-event execution with fault tolerance," in *Proc. 14th IEEE Real-Time and Embedded Technology and Applications Symp*. (**RTAS**), St. Louis, MO, IEEE Press, pp. 205-214, Apr 2008.

[221] E. A. Lee, H. Zheng, "Leveraging Synchronous Language Principles for Heterogeneous Modeling and Design of Embedded Systems," in *Proc. 7th ACM/IEEE Intl. Conf. on*

Embedded Software (**EMSOFT**), Salzburg, Austria, pp. 114-123, ACM Press, September 30–October 3, 2007.

[222] E. A. Lee and S. Matic, "On determinism in event-triggered distributed systems with time synchronization," in Proc. 2007 *IEEE Intl. Symp. on Precision Clock Synchronization for Measurement, Control and Communication* (**ISPCS**), IEEE Press, pp. 56-63, 2007.

[223] G. Zhou, M.-K. Leung, and E. A. Lee, "A Code Generation Framework for Actor-Oriented Models with Partial Evaluation," in *Proc. of International Conference on Embedded Software and Systems* (**ICESS**), Springer, LNCS 4523, pp. 786-799, Daegu, South Korea, May 14-16, 2007.

[224] A. Goderis, C. Brooks, I. Altintas, E. A. Lee, "Composing Different Models of Computation in Ptolemy II and Kepler," *Proc. International Conference on Computational Science* (**ICCS**), May, 2007, LNCS 4489, Springer, pp. 182-190, May 2007.

[225] E. A. Lee and Y. Zhao, "Reinventing computing for real time," in Reliable Systems on Unreliable Networked Platforms: Proc. 12th **Monterey Workshop**. Revised Selected Papers, F. Kordon and J. Sztipanovits, Eds., LNCS 4322, Springer, pp. 1-25, 2007.

[226] S. A. Edwards and E. A. Lee, "The case for the precision timed (PRET) machine," in *Proc. 44th ACM/IEEE Design Automation Conf.* (**DAC**), San Diego, California, ACM Press, pp. 264-265, June 4-8, 2007.

[227] Y. Zhao, Jie Liu and E. A. Lee, "A Programming Model for Time-Synchronized Distributed Real-Time Systems," in *Proceedings of the 13th IEEE Real-Time and Embedded Technology and Applications Symposium* (**RTAS**), Bellevue, WA, United States, IEEE Press, April 3-6, 2007

[228] T. H. Feng and E. A. Lee, "Incremental checkpointing with application to distributed discrete event simulation," in *Proc. 38th Winter Simulation Conf.* (**WSC**), Monterey, CA, IEEE Press, pp. 1004-1011, December 3-6, 2006.

[229] Y. Zhou and E. A. Lee. "A Causality Interface for Deadlock Analysis in Dataflow," in *Proceedings of the 6th ACM & IEEE Conference on Embedded Software* (**EMSOFT**), Seoul, Korea, ACM Press, October 22-25, 2006.

[230] E. A. Lee. "Concurrent Semantics without the Notions of State or State Transitions," **invited paper** in *Proceedings of the International Conference on Formal Modelling and Analysis of Timed Systems* (**FORMATS**), Paris, LNCS 4202, Springer-Verlag, September 25-27, 2006.

[231] X. Liu, E. Matsikoudis, and E. A. Lee. "Modeling Timed Concurrent Systems," (Invited Paper) in *Proceedings of the 17th International Conference on Concurrency Theory* (**CONCUR**), Bonn, Germany, LNCS 4137, Springer-Verlag, pp. 1-15, August 27-30, 2006.

[232] A. Cataldo, E. A. Lee, X. Liu, E. Matsikoudis and H. Zheng "A Constructive Fixed-Point Theorem and the Feedback Semantics of Timed Systems," *Workshop on Discrete Event Systems* (**WODES**), Ann Arbor, MI, IEEE Press, pp. 27-32, July 10-12, 2006.

[233] Aaron D. Ames, H. Zheng, Robert Gregg and Shankar Sastry, "Is there Life after Zeno? Taking Executions past the Breaking (Zeno) Point," **Pro*ceedings of the 2006 American Control Conference,*** Minneapolis, MN, June 14-16, 2006.

[234] H. Zheng, E. A. Lee, and A. D. Ames, "Beyond Zeno: Get on with it!," in *Proceedings of Hybrid Systems: Computation and Control* (**HSCC**) LNCS 3927, Springer- Verlag, Santa Barbara, CA, pp. 568-582, March 29-31, 2006.

[235] E. Wandeler, J.W. Janneck, E. A. Lee, L. Thiele, "Counting Interface Automata and their Applications in Static Analysis of Actor Models," *Proceedings of the 3rd International Conference on Software Engineering and Formal Methods* (**SEFM**), Koblenz, Germany, pp. 106-116, September 5-9, 2005.

[236] Y. Xiong, E. A. Lee, X. Liu, Y. Zhao, L.C. Zhong, "The Design and Application of Structured Types in Ptolemy II," **best paper award**, *IEEE Int. Conf. on Granular Computing* (**GRC**), Beijing, China, July 25-27, 2005.

[237] E. A. Lee and H. Zheng, "Operational Semantics of Hybrid Systems," **Invited paper** in *Proceedings of Hybrid Systems: Computation and Control* (**HSCC**), Zurich, Switzerland, LNCS 3414, Springer-Verlag, March 9-11, 2005.

[238] E. A. Lee and S. Neuendorffer, "Classes and Subclasses in Actor-Oriented Design," **invited paper**, *Conference on Formal Methods and Models for Codesign* (**MEMOCODE**), San Diego, CA, June 22-25, 2004.

[239] S. Neuendorffer and E. A. Lee, "Hierarchical Reconfiguration of Dataflow Models," *Conference on Formal Methods and Models for Codesign* (**MEMOCODE**), San Diego, CA, June 22-25, 2004.

[240] P. Baldwin, S. Kohli, E. A. Lee, X. Liu, and Y. Zhao, "Modeling of Sensor Nets in Ptolemy II," In *Proc. of Information Processing in Sensor Networks*, (**IPSN**), Berkeley, CA, April 26-27, 2004.

[241] J. Liu, J. Eker, J. W. Janneck and E. A. Lee, "Realistic Simulations of Embedded Control Systems," *International Federation of Automatic Control*, *15th **IFAC World Congress***, Barcelona, Spain, July 21-26, 2002.

[242] J. Liu, S. Jefferson, and E. A. Lee, "Motivating Hierarchical Run-Time Models in Measurement and Control Systems," *American Control Conference* (**ACC**), Arlington, VA, pp. 3457- 3462, June 25-27, 2001.

[243] E. A. Lee, "Computing for Embedded Systems," **invited paper**, ***IEEE Instrumentation and Measurement Technology Conference***, Budapest, Hungary, May 21-23, 2001.

[244] J. Tsay, C. Hylands and E. A. Lee, "A Code Generation Framework for Java Component-Based Designs," *Intl. Conf. on Compilers, Architecture, and Synthesis for Embedded Systems* (**CASES**), November 17-19, 2000, San Jose, CA.

[245] J. Liu and E. A. Lee, "Component-based Hierarchical Modeling of Systems with Continuous and Discrete Dynamics," Proc. of the 2000 IEEE *International Conference on Control Applications* and *IEEE Symposium on Computer-Aided Control System Design* (**CCA/ CACSD**), Anchorage, AK, September 25-27, 2000.

[246] Y. Xiong and E. A. Lee, “An Extensible Type System for Component-Based Design,” 6th *International Conference on Tools and Algorithms for the Construction and Analysis of Systems*, LNCS 1785, Springer-Verlag, March/April 2000.

[247] J. Liu, X. Liu, T. J. Koo, B. Sinopoli, S.Sastry, and E. A. Lee, “Hierarchical Hybrid System Simulation,” 38th IEEE *Conference on Decision and Control* (**CDC**) Phoenix, AZ, Dec. 1999.

[248] J. Liu, B. Wu, X. Liu, and E. A. Lee, “Interoperation of Heterogeneous CAD Tools in Ptolemy II,” ***Symposium on Design, Test, and Microfabrication of MEMS/MOEMS***, Paris, France, March 1999.

[249] S. S. Bhattacharyya, P. K. Murthy, and E. A. Lee, “Optimized Software Synthesis for Synchronous Dataflow,” **invited paper**, *International Conference on Application Specific Systems, Architectures, and Processors* (**ASSP**), July 1997.

[250] S. S. Bhattacharyya, P. K. Murthy, and E. A. Lee, “Software Synthesis for Synchronous Dataflow,” **invited paper**, *Proc. International Conference on Application Specific Systems, Architectures, and Processors* (**ASSP**), July 1997.

[251] S. S. Bhattacharyya, S. Sriram, and E. A. Lee, “Latency-Constrained Resynchronization for Multiprocessor DSP Implementation,” *Proc. Application-Specific Array Processors Conference* (**ASAP**) Chicago, August 19- 21, 1996.

[252] K. Chiang, B. L. Evans, W. T. Huang, F. Kovac, E. A. Lee, H. J. Reekie, D. G. Messerschmitt, and S. Sastry, “Real-Time DSP for Sophomores,” in *Proc. IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Atlanta, GA, May 7-10, 1996.

[253] P. K. Murthy and E. A. Lee, ``An Extension of Multidimensional Synchronous Dataflow to Handle Arbitrary Sampling Lattices,'' in *Proc. IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Atlanta, GA, May 7-10, 1996.

[254] J. L. Pino, M. C. Williamson, and E. A. Lee, ``Interface Synthesis in Heterogeneous System-Level DSP Design Tools,'' in *Proc. IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Atlanta, GA, May 7-10, 1996.

[255] B. L. Evans, D. R. Firth, K. D. White, and E. A. Lee, “Automatic Generation of Programs That Jointly Optimize Characteristics of Analog Filter Designs,” ***Proc. of European Conference on Circuit Theory and Design***, Istanbul, Turkey, August 27-31, 1995.

[256] B. L. Evans, S. X. Gu, A. Kalavade, and E. A. Lee, “Symbolic Computation in System Simulation and Design,” **invited Paper**, *Proc. of **SPIE Int. Sym. on Advanced Signal Processing Algorithms, Architectures, and Implementations***, San Diego, CA, July 9-16, 1995.

[257] S. S. Bhattacharyya, S. Sriram, and E. A. Lee, “Minimizing Synchronization Overhead in Statically Scheduled Multiprocessor Systems,” *Proc. of IEEE Int. Conference on Application Specific Signal Processors* (**ASSP**), July 24-26, 1995.

[258] A. Kalavade, J. L. Pino and E. A. Lee, “Managing Complexity in Heterogeneous Specification, Simulation, and Synthesis,” **invited paper**, *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Detroit, MI, pp. 2833-2836, May 8-12, 1995.

[259] K. Khiar and E. A. Lee, "Modeling Radar Systems Using Hierarchical Dataflow," in *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Detroit, MI, May 8-12, 1995.

[260] T. M. Parks and E. A. Lee, "Non Preemptive Real-Time Scheduling of Dataflow Systems," in *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Detroit, MI, May 8-12, 1995.

[261] J. L. Pino and E. A. Lee, "Hierarchical Static Scheduling of Dataflow Graphs onto Multiple Processors," *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Detroit, MI, May 8-12, 1995.

[262] S. Sriram and E. A. Lee, "Design and Implementation of an Ordered Memory Access Architecture," *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Minneapolis, MN, April, 1993.

[263] E. A. Lee, "Representing and Exploiting Data Parallelism Using Multidimensional Dataflow Diagrams," *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Minneapolis, MN, April, 1993.

[264] J. T. Buck and E. A. Lee, "Scheduling Dynamic Dataflow Graphs with Bounded Memory Using the Token Flow Model," *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Minneapolis, MN, April, 1993.

[265] E. A. Lee, "Multidimensional Streams Rooted in Dataflow", *Proc. IFIP WG10.3* ***Working Conference on Architectures and Compilation Techniques for Fine and Medium-Grain Parallelism*** (Orlando, FL, USA January, 1993), North-Holland, New York, 1993.

[266] E. A. Lee, "A Design Lab for Statistical Signal Processing," *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), San Francisco, March, 1992.

[267] D. G. Powell, E. A. Lee, W. C. Newman, "Direct Synthesis of Optimized DSP Assembly Code from Signal Flow Block Diagrams," *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), San Francisco, March, 1992.

[268] J. Buck, S. Ha, E. A. Lee, and D. G. Messerschmitt, "Multirate Signal Processing in Ptolemy", *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**), Toronto, Canada, April, 1991.

[269] S. Ha, E. A. Lee, "Quasi-Static Scheduling for Multiprocessor DSP", *Proc. of IEEE Int. Symposium on Circuits and Systems* (**ISCAS**), Singapore, June 1991.

[270] J. Buck, S. Ha, E. A. Lee, and D.G. Messerschmitt, "Ptolemy: A Platform for Heterogeneous Simulation and Prototyping, *Proc. 1991* ***European Simulation Conference***, Copenhagen, Denmark, June 17-19, 1991.

[271] E. A. Lee and S. Ha, "Scheduling Strategies for Multiprocessor DSP", *Proc. of* ***GLOBECOM***, Dallas, Texas, November, 1989.

[272] J. Bier and E. A. Lee, "Frigg: A Simulation Environment for Multiprocessor DSP System Development", *Proc. of Int. Conf. on Computer Design* (**ICCD**), Boston, MA, October, 1989.

[273] H.-P. Tseng, M. J. Sabin and E. A. Lee, "Fuzzy Vector Quantization Applied to Hidden Markov Modeling," *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**)*,* Dallas, April 1987.

[274] T. H.-Y. Meng, D. G. Messerschmitt and E. A. Lee, "Least Squares Computation at Arbitrarily High Speeds," *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**)*,* Dallas, April 1987.

[275] E. A. Lee and D. G. Messerschmitt, "On Quantization Effects in State-Variable Digital Filter Implementations," *Proc. of IEEE Int. Conf. on Acoustics, Speech, and Signal Processing* (**ICASSP**)*,* Denver, CO, March, 1985.

NON-ARCHIVAL CONFERENCE AND SYMPOSIUM PROCEEDINGS:

[276] Shuhei Emoto, "Cooperative Multi-Robot Information Acquisition based on Distributed Robust Model Predictive Control," in Proceedings of the 2016 IEEE International Conference on Robotics and Biomimetics ROBIO 2016, Qingdao, China, December 3-7.

[277] Shuhei Emoto, Ilge Akkaya, Edward A. Lee, Information Seeking of a Robot Swarm based on Robust Model Predictive Control, *The Robotics and Mechatronics Conference*, Yokahama, Japan, June 8-11, 2016.

[278] Marten Lohstroh, Christopher Brooks, Edward A. Lee, "Demo Abstract: Building IoT Applications with Accessors in CapeCode," *International Conference on Cyber-Physical Systems* (**ICCPS**) 2016, Vienna, Austria, April 11-14, 2016.

[279] Ben Zhang, Nitesh Mor, John Kolb, Douglas S. Chan, Nikhil Goyal, Ken Lutz, Eric Allman, John Wawrzynek, Edward Lee, John Kubiatowicz. "The Cloud is Not Enough: Saving IoT from the Cloud." In Proc. 7th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud), July 6-7, 2015, Santa Clara, CA.

[280] Ilge Akkaya, Shuhei Emoto, Edward A. Lee. "PILOT: An Actor-oriented Learning and Optimization Toolkit," in *Proceedings of Second International Workshop on Robotic Sensor Networks* (**RSN'15**), part of Cyber-Physical Systems Week, Seattle, WA, USA, April 13, 2015.

[281] Matthew Weber and Edward A. Lee. "Poster Abstract: A Model For Semantic Localization," in *Proceedings of IPSN* 2015, Seattle, April 13-17, 2015.

[282] Edward A. Lee, "Swarm Technology," in *Proc. of GOMACTEC*, March 23-26, St. Louis, MO., 2015

[283] Edward A. Lee. "Architectural Support for Cyber-Physical Systems (Abstract)," in *Proceedings of the Twentieth International Conference on Architectural Support for Programming Languages and Operating Systems* (**ASPLOS**), Istanbul, Turkey, March, 2015.

[284] Ilge Akkaya, Yan Liu, Edward A. Lee, and Ian Gorton. Modeling uncertainty for middleware-based streaming power grid applications. In *Proceedings of the 8th Workshop on Middleware for Next Generation Internet Computing*, p. 4. ACM, Beijing, China, December 9, 2013.

[285] Jeff C. Jensen, Edward A. Lee, and Sanjit A. Seshia, "Virtualizing Cyber-Physical Systems: Bringing CPS to Online Education," in Proc. of the First Workshop on Cyber-Physical Education (CPS-Ed), in conjunction with CPS week, April 8, 2013, Philadelphia, Pennsylvania. http://cps-vo.org/group/edu/workshop

[286] Jeff C. Jensen, Danica H. Chang, and Edward A. Lee, A Model-Based Design Methodology for Cyber-Physical Systems, Proceedings of the First IEEE Workshop on Design, Modeling, and Evaluation of Cyber-Physical Systems (**CyPhy**), Istanbul, Turkey, July 6-7, 2011.

[287] Janette Cardoso, Patricia Derler, John Eidson, Edward A. Lee. "Network Latency and Packet Delay Variation in Cyber-physical Systems." Proceedings of the 2011 IEEE 1st International Workshop on Network Science (**NSW**), June 22-24, 2011, West Point, NY.

[288] Isaac Liu, Jan Reineke, and Edward A. Lee, PRET Architecture Supporting Concurrent Programs with Composable Timing Properties, in Signals, Systems, and Computers (**ASILOMAR**), Conference Record of the Forty Fourth Asilomar Conference, November 2010, Pacific Grove, California.

[289] E. A. Lee and S. Tripakis, "Modal Models in Ptolemy," Proceedings of 3rd International Workshop on Equation-Based Object-Oriented Modeling Languages and Tools (**EOOLT** 2010), October, 2010.

[290] J. C. Eidson, E. A. Lee, S. Matic, S. A. Seshia and J. Zou, "A Time-Centric Model for Cyber-Physical Applications," Proceedings of 3rd International Workshop on Model Based Architecting and Construction of Embedded System (**ACESMB** 2010), pp. 21-35, October, 2010.

[291] Edward A. Lee, Sanjit A. Seshia. "An Introductory Textbook on Cyber-Physical Systems." Proc. of the 2010 Workshop on Embedded Systems Education (**WESE**), October 28, 2010, Scottsdale, Arizona.

[292] M. Schoeberl, C. Brooks, E. A. Lee, "Code Generation for Embedded Java with Ptolemy," Proceedings of the 8th IFIP Workshop on Software Technologies for Future Embedded and Ubiquitous Systems (**SEUS**), October, 2010.

[293] Dai Bui, Hiren Patel and Edward Lee, Deploying Hard Real-time Control Software on Chip-Multiprocessors. IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (**RTCSA**), 23-25 Aug. 2010, Macau, China.

[294] S. Tripakis, D. Bui, B. Rodiers and E. A. Lee, "Compositionality in Synchronous Data Flow: Modular Code Generation from Hierarchical SDF Graphs (Poster Abstract)." ACM/IEEE First International Conference on Cyber-Physical Systems, Stockholm, Sweden, Apr 13-15, 2010.

[295] E. A. Lee, S. Matic, S. A. Seshia, J. Zou. "The Case for Timing-Centric Distributed Software." IEEE International Conference on Distributed Computing Systems Workshops: Workshop on Cyber-Physical Systems, IEEE, pp. 57-64, June, 2009.

[296] E. A. Lee, "Time-Critical Networking," Extended Abstract for Invited Presentation, in Proceedings of ***IEEE Photonics Society Summer Topicals***, Newport Beach, CA, July 20-22, 2009.

[297] E. A. Lee, S. Matic, S. A. Seshia, J. Zou. “The Case for Timing-Centric Distributed Software,” IEEE International Conference on Distributed Computing Systems Workshops: ***Workshop on Cyber-Physical Systems***, IEEE, pp. 57-64, June, 2009.

[298] Shanna-Shaye Forbes, Jia Zou, Slobodan Matic, E. A. Lee. “Poster Abstract: PtidyOS: An Operating System based on the PTIDES Programming Model”, 15th IEEE *Real-Time and Embedded Technology and Applications Symposium* (**RTAS**), April, 2009.

[299] Isaac Liu, Ben Lickly, Hiren D. Patel, E. A. Lee. “Poster Abstract: Timing Instruction -- ISA Extensions for Timing Guarantees,” 15th IEEE *Real-Time and Embedded Technology and Applications Symposium* (**RTAS**), April, 2009.

[300] T. H. Feng and E. A. Lee, "Scalable models using model transformations," in *Proc. 1st Intl. Workshop on Model Based Architecting and Construction of Embedded Systems* (**ACES^MB** 2008), ACM, September, 2008.

[301] C. Brooks, C. Cheng, T. H. Feng, E. A. Lee, and R. von Hanxleden, "Model engineering using multimodeling," in *Proc. 1st Intl. Workshop on Model Co-Evolution and Consistency Management* (**MCCM**), ACM, September, 2008.

[302] M.-K. Leung and E. A. Lee, "An Extensible Software Synthesis Framework for Heterogeneous Actor Models," in *Proceedings of the 7th Model-driven High-level Programming of Embedded Systems Workshop* (**SLA++P**), Work-in-Progress Session, Budapest, Hungary, March 2008.

[303] T. H. Feng, E. A. Lee, H. D. Patel, and J. Zou, "Toward an Effective Execution Policy for Distributed Real-Time Embedded Systems," in *Proceedings of the 14th IEEE Real-Time and Embedded Technology and Applications Symposium* (**RTAS**), Work-in-Progress Session, St. Louis, MO, USA, IEEE Press, Apr 2008.

[304] Y. Zhao, E. A. Lee and Jie Liu. “Application of Programming Temporally Integrated Distributed Embedded Systems,” In Proceedings of 2006 ***IEEE 1588 Conference Gaithersburg***, MD, October 2-4, 2006.

[305] E. A. Lee. "Cyber-Physical Systems - Are Computing Foundations Adequate?," Position Paper for NSF ***Workshop on Cyber-Physical Systems: Research Motivation, Techniques and Roadmap***, Austin, Texas, October 16-17, 2006.

[306] E. Cheong, E. A. Lee, and Y. Zhao, "Viptos: A Graphical Development and Simulation Environment for TinyOS-based Wireless Sensor Networks," Abstract in Proceedings of the Third ACM *Conference on Embedded Networked Sensor Systems* (**SenSys**), San Diego, CA, p. 302, November 2-4, 2005.

[307] E. A. Lee, H. Zheng, and Y. Zhou, "Causality Interfaces and Compositional Causality Analysis," **Invited paper** in *Foundations of Interface Technologies* (**FIT**), Satellite to CONCUR 2005, San Francisco, California, USA, August 21, 2005.

[308] E. A. Lee, "What are the Key Challenges in Embedded Software?" Guest Editorial in ***System Design Frontier***, Volume 2, Number 1, January 2005, Shanghai Hometown Microsystems Inc.

[309] E. A. Lee, "Model-Driven Development - From Object-Oriented Design to Actor-Oriented Design," extended abstract of an invited presentation at *Workshop on Software Engineering for Embedded Systems: From Requirements to Implementation* (a.k.a. **The Monterey Workshop**) Chicago Sept.24, 2003.

[310] J. Liu and E. A. Lee, "On the Causality of Mixed-Signal and Hybrid Models," *6th International Workshop on Hybrid Systems: Computation and Control* (**HSCC**), April 3-5, Prague, Czech Republic, 2003.

[311] E. A. Lee and Y. Xiong, "System-Level Types for Component-Based Design," *First Workshop on Embedded Software* (**EMSOFT**), Lake Tahoe, CA, USA, Oct. 8-10, 2001.

[312] X. Liu, Y. Xiong, and E. A. Lee, "The Ptolemy II Framework for Visual Languages," poster paper, ***Symposium on Visual Languages and Formal Methods***, Stresa, Italy, Sept. 5- 7, 2001.

[313] J. Liu, X. Liu, and E. A. Lee, "Modeling Distributed Hybrid Systems in Ptolemy II," **invited embedded tutorial** in ***American Control Conference***, Arlington, VA, June 25-27, 2001.

[314] E. A. Lee, "Designing a Relevant Lab for Introductory Signals and Systems," ***Proc. of the First Signal Processing Education Workshop***, Hunt, Texas, October 15 - 18, 2000.

[315] E. A. Lee and P. Varaiya, "Introducing Signals and Systems - the Berkeley Approach," ***First Signal Processing Education Workshop***, Hunt, Texas, October 15 - 18, 2000.

[316] S. S. Bhattacharyya, P. K. Murthy, and E. A. Lee, "Optimal Parenthesization of Lexical Orderings for DSP Block Diagrams," in *Proc.* ***IEEE Workshop on VLSI Signal Processing***, Osaka, Japan, October 16-18, 1995.

TECHNICAL MEMORANDA and arXiv PAPERS:

[317] Soroush Bateni, Marten Lohstroh, Hou Seng Wong, Rohan Tabish, Hokeun Kim, Shaokai Lin, Christian Menard, Cong Liu, Edward A. Lee. "Xronos: Predictable Coordination for Safety-Critical Distributed Embedded Systems". arXiv:2207.09555 [cs.DC], July 2022.

[318] Edward A. Lee, Soroush Bateni, Shaokai Lin, Marten Lohstroh, Christian Menard, "Quantifying and Generalizing the CAP Theorem," arXiv:2109.07771 [cs.DC], September 2021.

[319] M. Weber, B. Jin, G. Lederman, Y. Shoukry, E. A. Lee, S. A. Seshia, and A. L. Sangiovanni-Vincentelli, "Gordian: Formal Reasoning Based Outlier Detection for Secure Localization," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2019-1, Jan. 2019.

[320] Marc Weiss, John Eidson, Charles Barry, David Broman, Leon Goldin, Bob Iannucci, Edward A. Lee, and Kevin Stanton. "Time-Aware Applications, Computers, and Communication Systems (TAACCS)," Technical report, National Institute of Standards and Technology, NIST Technical Note 1867, February, 2015.

[321] Christopher Brooks and Edward Lee. Ptolemy Coding Style, EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2014-164, September 5, 2014.

[322] Eleftherios Matsikoudis, Edward A. Lee. “Generalized Ultrametric Semilattices of Linear Signals,” EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2014-7, January 23, 2014.

[323] Eleftherios Matsikoudis, Edward A. Lee. The Fixed-Point Theory of Strictly Causal Functions, EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2013-122, June 9, 2013.

[324] M. Toerngren, S. Tripakis, P. Derler, and E. A. Lee. “Design Contracts for Cyber-Physical Systems: Making Timing Assumptions Explicit.” EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2012-191, Aug. 2012.

[325] Eleftherios Matsikoudis, Edward A. Lee. “Labelled Execution Systems.” EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2012-64, May 7, 2012.

[326] Dai N. Bui, Hiren D. Patel, Edward A. Lee. “Checking for Circular Dependencies in Distributed Stream Programs.” EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2011-97, August 29, 2011.

[327] Remi Barrere, Eric Lenormand, Dai Bui, Edward A. Lee, Christopher Shaver and Stavros Tripakis, “An Introduction to the Pthales Domain of Ptolemy II.” EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2011-32, April 26, 2011.

[328] Patricia Derler, Edward A. Lee, and Alberto L. Sangiovanni-Vincentelli, “Addressing Modeling Challenges in Cyber-Physical Systems,” EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2011-17, March 4, 2011.

[329] S. Tripakis, D. Bui, M. Geilen, B. Rodiers and E. A. Lee, “Compositionality in Synchronous Data Flow: Modular Code Generation from Hierarchical SDF Graphs,” EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2010-52, May 7, 2010.

[330] K. Bae, P. Olveczky, T. H. Feng, E. A. Lee, S. Tripakis, “Verifying Hierarchical Ptolemy II Discrete-Event Models using Real-Time Maude,” EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2010-50, May 6, 2010.

[331] S. Tripakis, B. Lickly, T. A. Henzinger and E. A. Lee, “A Theory of Synchronous Relational Interfaces,” EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2010-45, April 23, 2010.

[332] T. H. Feng, E. A. Lee and L. W. Schruben, “Ptera: An Event-Oriented Model of Computation,” EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2010-40, April 10, 2010.

[333] S. Resmerita, P. Derler and E. A. Lee, "Modeling and Simulation of Legacy Embedded Systems," EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2010-38, April 8, 2010.

[334] E. A. Lee, "Finite State Machines and Modal Models in Ptolemy II," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2009-151, Nov. 2009.

[335] M. Schoeberl, H. D. Patel, E. A. Lee. "Fun with a Deadline Instruction," EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2009-149, October 30, 2009.

[336] S. Tripakis, D. Bui, B. Rodiers, E. A. Lee. "Compositionality in Synchronous Data Flow: Modular Code Generation from Hierarchical SDF Graphs," EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2009-143, October 20, 2009.

[337] J. C. Eidson, E. A. Lee, S. Matic, S. A. Seshia, J. Zou. "Time-centric Models For Designing Embedded Cyber-physical Systems," EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2009-135, October 9, 2009. Updated version.

[338] S. Tripakis, B. Lickly, T. A. Henzinger, and E. A. Lee, "On Relational Interfaces," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2009-60, May 2009.

[339] D. Bui, A. Pinto, and E. A. Lee, "On-time Network On-Chip: Analysis and Architecture," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2009-59, May 2009.

[340] J. Zou, J. Auerbach, D. F. Bacon, and E. A. Lee, "PTIDES on Flexible Task Graph: Real-Time Embedded System Building from Theory to Practice," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2009-31, Feb. 2009.

[341] E. A. Lee, "Computing Needs Time," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2009-30, Feb. 2009.

[342] E. A. Lee, "Disciplined Message Passing," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2009-7, Jan. 2009.

[343] E. A. Lee, "ThreadedComposite: A Mechanism for Building Concurrent and Parallel Ptolemy II Models," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-151, Dec. 2008.

[344] H. D. Patel, B. Lickly, B. Burgers, and E. A. Lee, "A Timing Requirements-Aware Scratchpad Memory Allocation Scheme for a Precision Timed Architecture," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-115, Sep. 2008.

[345] S. Bandyopadhyay, T. H. Feng, H. D. Patel, and E. A. Lee, "A Scratchpad Memory Allocation Scheme for Dataflow Models," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-104, Aug. 2008.

[346] T. H. Feng and E. A. Lee, "Scalable Models Using Model Transformation," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-85, July 2008.

[347] P. Derler, T. H. Feng, E. A. Lee, S. Matic, H. D. Patel, Y. Zhao, and J. Zou, "PTIDES: A Programming Model for Distributed Real-Time Embedded Systems," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-72, May 2008.

[348] C. P. Cheng, T. Fristoe, and E. A. Lee, "Applied Verification: The Ptolemy Approach," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-41, April 2008.

[349] B. Lickly, I. Liu, S. Kim, H. D. Patel, S. A. Edwards, and E. A. Lee, "Predictable Programming on a Precision Timed Architecture," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-40, April 2008.

[350] C. Brooks, C. P. Cheng, T. H. Feng, E. A. Lee, and R. von Hanxleden, "Model Engineering using Multimodeling," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-39, April 2008.

[351] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, and H. Zheng, "Heterogeneous Concurrent Modeling and Design in Java (Volume 3: Ptolemy II Domains)," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-37, April 2008.

[352] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, and H. Zheng, "Heterogeneous Concurrent Modeling and Design in Java (Volume 2: Ptolemy II Software Architecture)," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-29, April 2008.

[353] Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, and H. Zheng, "Heterogeneous Concurrent Modeling and Design in Java (Volume 1: Introduction to Ptolemy II)," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-28, April 2008.

[354] K. Asanovic, R. Bodik, J. Demmel, T. Keaveny, K. Keutzer, J. D. Kubiatowicz, E. A. Lee, N. Morgan, G. Necula, D. A. Patterson, K. Sen, J. Wawrzynek, D. Wessel, and K. A. Yelick, "The Parallel Computing Laboratory at U.C. Berkeley: A Research Agenda Based on the Berkeley View," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-23, March 2008.

[355] E. A. Lee, "Cyber Physical Systems: Design Challenges," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-8, Jan. 2008.

[356] C. Brooks, T. H. Feng, E. A. Lee, and R. von Hanxleden, "Multimodeling: A Preliminary Case Study," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2008-7, Jan. 2008.

[357] A. Goderis, C. Brooks, I. Altintas, E. A. Lee, and C. Goble, "Heterogeneous Composition of Models of Computation," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-139, Nov. 2007.

[358] T. H. Feng and E. A. Lee, "Implementation of Real-Time Distributed Discrete-Event Execution with Fault Tolerance," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-133, Nov. 2007.

[359] X. Liu and E. A. Lee, "CPO Semantics of Timed Interactive Actor Networks," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-131, Nov. 2007.

[360] E. A. Lee and S. Neuendorffer, "Tutorial: Building Ptolemy II Models Graphically," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-129, Oct. 2007.

[361] E. A. Lee, "Computing Foundations and Practice for Cyber-Physical Systems: A Preliminary Report," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-72, May 2007.

[362] G. Zhou, M. Leung, and E. A. Lee, "A Code Generation Framework for Actor-Oriented Models with Partial Evaluation," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-29, Feb. 2007.

[363] Y. Zhao, Y. Xiong, E. A. Lee, X. Liu, and L. C. Zhong, "The Design and Application of Structured Types in Ptolemy II," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-21, Jan. 2007.

[364] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, and H. Zheng, "Heterogeneous Concurrent Modeling and Design in Java (Volume 3: Ptolemy II Domains)," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-9, Jan. 2007.

[365] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, and H. Zheng, "Heterogeneous Concurrent Modeling and Design in Java (Volume 2: Ptolemy II Software Architecture)," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-8, Jan. 2007.

[366] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, and H. Zheng, "Heterogeneous Concurrent Modeling and Design in Java (Volume 1: Introduction to Ptolemy II)," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2007-7, Jan. 2007.

[367] E. A. Lee, X. Liu, and S. A. Neuendorffer, "Classes and Inheritance in Actor-Oriented Design," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2006-154, Nov. 2006.

[368] E. Cheong, E. A. Lee, and Y. Zhao, "Joint Modeling and Design of Wireless Networks and Sensor Node Software," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2006-150, Nov. 2006.

[369] S. Edwards and E. A. Lee, "The Case for the Precision Timed (PRET) Machine," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2006-149, Nov. 2006.

[370] Y. Zhou and E. A. Lee, "Causality Interfaces for Actor Networks," EECS Department, University of California, Berkeley, Tech. Rep. UCB/EECS-2006-148, Nov. 2006.

[371] S. Edwards and E. A. Lee, “The Case for the Precision Timed (PRET) Machine,” S. Edwards and E. A. Lee, EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2006-149, November 17, 2006.

[372] E. Cheong, E. A. Lee and Y. Zhao. “Joint Modeling and Design of Wireless Networks and Sensor Node Software,” EECS Department, University of California, Berkeley, UCB/EECS-2006-150, November 17, 2006.

[373] Y. Zhou and E. A. Lee. “Causality Interfaces for Actor Networks,” EECS Department, University of California, Berkeley, UCB/EECS-2006-148, November 16, 2006.

[374] E. A. Lee and Y. Zhao. "Reinventing Computing for Real Time", EECS Department, University of California, Berkeley UCB/EECS-2006-83, May 30, 2006.

[375] Y. Zhao, E. A. Lee and Jie Liu, "Programming Temporally Integrated Distributed Embedded Systems," EECS Department, University of California, Berkeley, Technical Report UCB/EECS-2006-82, May 28, 2006.

[376] X. Liu and E. A. Lee, "CPO Semantics of Timed Interactive Actor Networks," EECS Department, University of California, Berkeley, Technical Report UCB/EECS- 2006-67, May 18, 2006.

[377] Y. Zhou and E. A. Lee., "A Causality Interface for Deadlock Analysis in Dataflow," EECS Department, University of California, Berkeley, Technical Report UCB/EECS-2006-51, May 12, 2006.

[378] A. Cataldo, E. Cheong, T. H. Feng, E. A. Lee and A. Mihal, "A Formalism for Higher-Order Composition Languages that Satisfies the Church- Rosser Property," EECS Department, University of California, Berkeley, Technical Report UCB/EECS-2006-48, May 9, 2006.

[379] X. Liu, E. Matsikoudis and E. A. Lee, "Modeling Timed Concurrent Systems using Generalized Ultrametrics," EECS Department, University of California, Berkeley, Technical Report UCB/EECS-2006-45, May 1, 2006.

[380] E. Cheong, E. A. Lee, Y. Zhao, "Viptos: A Graphical Development and Simulation Environment for TinyOS-based Wireless Sensor Networks," EECS Department, University of California, Berkeley, Technical Report UCB/EECS-2006-15, February 15, 2006.

[381] E. A. Lee, "Building Unreliable Systems out of Reliable Components: The Real Time Story," Technical Report UCB/EECS-2005-5, EECS Department, University of California, Berkeley, October 2005.

[382] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, H. Zheng (eds.), "Heterogeneous Concurrent Modeling and Design in Java, Volume 1: Introduction to Ptolemy II," Technical Memorandum UCB/ERL M05/21, University of California, Berkeley, CA USA 94720, July 15, 2005.

[383] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, H. Zheng (eds.), "Heterogeneous Concurrent Modeling and Design in Java, Volume 2: Ptolemy II Software Architecture," Technical Memorandum UCB/ERL M05/22, University of California, Berkeley, CA USA 94720, July 15, 2005.

[384] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, H. Zheng (eds.), "Heterogeneous Concurrent Modeling and Design in Java, Volume 3: Ptolemy II Domains," Technical Memorandum UCB/ERL M05/23, University of California, Berkeley, CA USA 94720, July 15, 2005.

[385] C. Brooks, A. Cataldo, E. A. Lee, J. Liu, X. Liu, S. Neuendorffer, H. Zheng "HyVisual: A Hybrid System Visual Modeler," Technical Memorandum UCB/ERL M05/ 24, University of California, Berkeley, CA 94720, July 15, 2005.

[386] P. Baldwin, S. Kohli, E. A. Lee, X. Liu, and Y. Zhao, "VisualSense: Visual Modeling for Wireless and Sensor Network Systems," Technical Memorandum UCB/ERL M05/25, University of California, Berkeley, CA 94720, USA, July 15, 2005.

[387] A. Cataldo, E. A. Lee, X. Liu, E. Matsikoudis and H. Zheng, "Discrete-Event Systems: Generalizing Metric Spaces and Fixed Point Semantics," UCB/ ERL M05/12, April 8, 2005.

[388] E. A. Lee, "Concurrent Models of Computation for Embedded Software," Technical Memorandum UCB/ERL M05/2, January 4, 2005, University of California, Berkeley, CA 94720.

[389] E. A. Lee and S. Neuendorrfer, "Concurrent Models of Computation for Embedded Software," Technical Memorandum UCB/ERL M04/26, University of California, Berkeley, CA 94720, July 22, 2004.

[390] E. A. Lee, "Balance between Formal and Informal Methods, Engineering and Artistry, Evolution and Rebuild, " Technical Memorandum UCB/ERL M04/19 , University of California, Berkeley, CA 94720, July 4, 2004.

[391] C. Brooks, A. Cataldo, E. A. Lee, J. Liu, X. Liu, S. Neuendorffer, H. Zheng, "HyVisual: A Hybrid System Visual Modeler," Technical Memorandum UCB/ERL M04/18, University of California, Berkeley, CA 94720, June 28, 2004.

[392] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, H. Zheng (eds.), "Heterogeneous Concurrent Modeling and Design in Java (Volume 1: Introduction to Ptolemy II) ," Technical Memorandum UCB/ERL M04/27, University of California, Berkeley, CA USA 94720, July 29, 2004.

[393] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, H. Zheng (eds.) "Heterogeneous Concurrent Modeling and Design in Java (Volume 2: Ptolemy II Software Architecture) ," Technical Memorandum UCB/ERL M04/16, University of California, Berkeley, CA USA 94720, June 24, 2004.

[394] C. Brooks, E. A. Lee, X. Liu, S. Neuendorffer, Y. Zhao, H. Zheng (eds.)"Heterogeneous Concurrent Modeling and Design in Java (Volume 3: Ptolemy II Domains)," Technical Memorandum UCB/ERL M04/17, University of California, Berkeley, CA USA 94720, June 24, 2004.

[395] P. Baldwin, S. Kohli, E. A. Lee, X. Liu, and Y. Zhao, "VisualSense: Visual Modeling for Wireless and Sensor Network Systems," Technical Memorandum UCB/ERL M04/08, University of California, Berkeley, CA 94720, USA, April 23, 2004.

[396] S. Neuendorffer and E. A. Lee, "Hierarchical Reconfiguration of Dataflow Models," Technical Memorandum UCB/ERL M04/2, University of California, Berkeley, CA 94720, USA, January 2004.

[397] C. Hylands Brooks and E. A. Lee, "Ptolemy II Coding Style" Technical Memorandum UCB/ERL M03/44, University of California at Berkeley, November 24, 2003.

[398] E. A. Lee, "Soft Walls: Frequently Asked Questions," Technical Memorandum UCB/ERL M03/31, University of California, Berkeley, CA 94720, July 21, 2003.

[399] A. Cataldo, C. Hylands, E. A. Lee, J. Liu, X. Liu, S. Neuendorffer, H. Zheng "HyVisual: A Hybrid System Visual Modeler," Technical Memorandum UCB/ERL M03/30, University of California, Berkeley, CA 94720, July 17, 2003.

[400] C. Hylands, E. A. Lee, J. Liu, X. Liu, S. Neuendorffer, Y. Xiong, H. Zheng (eds.), "Heterogeneous Concurrent Modeling and Design in Java (Volume 1: Introduction to Ptolemy II)," Technical Memorandum UCB/ERL M03/27, University of California, Berkeley, CA USA 94720, July 16, 2003.

[401] C. Hylands, E. A. Lee, J. Liu, X. Liu, S. Neuendorffer, Y. Xiong, H. Zheng, (eds.), "Heterogeneous Concurrent Modeling and Design in Java (Volume 2: Ptolemy II Software Architecture)," Technical Memorandum UCB/ERL M03/28, University of California, Berkeley, CA USA 94720, July 16, 2003.

[402] C. Hylands, E. A. Lee, J. Liu, X. Liu, S. Neuendorffer, Y. Xiong, H. Zheng (eds.), "Heterogeneous Concurrent Modeling and Design in Java (Volume 3: Ptolemy II Domains)," Technical Memorandum UCB/ERL M03/29, University of California, Berkeley, CA USA 94720, July 16, 2003.

[403] E. A. Lee, "Overview of the Ptolemy Project," Technical Memorandum No. UCB/ ERL M03/25, University of California, Berkeley, CA, 94720, USA, July 2, 2003.

[404] C. Hylands, E. A. Lee, J. Liu, X. Liu, S. Neuendorffer, H. Zheng, “HyVisual: A Hybrid System Visual Modeler,” Technical Memorandum UCB/ERL M03/1, University of California, Berkeley, CA 94720, January 28, 2003.

[405] H. J. Reekie and E. A. Lee, “Lightweight Component Models for Embedded Systems,” Memorandum UCB/ERL M02/30, University of California, Berkeley, CA 94720, USA, October 30, 2002.

[406] E. A. Lee and Y. Xiong, “Behavioral Types for Component-Based Design,” Memorandum UCB/ERL M02/29, University of California, Berkeley, CA 94720, USA, September 27, 2002.

[407] S. S. Bhattacharyya, E. Cheong, J. Davis II, M. Goel, C. Hylands, B. Kienhuis, E. A. Lee, J. Liu, X. Liu, L. Muliadi, S. Neuendorffer, J. Reekie, N. Smyth, J. Tsay, B. Vogel, W. Williams, Y. Xiong, H. Zheng, “Heterogeneous Concurrent Modeling and Design in

Java," Memorandum UCB/ERL M02/23, University of California, Berkeley, CA USA 94720, August 5, 2002.

[408] J. A. Cataldo, E. A. Lee, and X. Liu, "Preliminary Version of a Two-Dimensional Technical Specification for Softwalls," Technical Memorandum UCB/ERL M02/9, University of California, Berkeley, CA 94720, April 17, 2002.

[409] E. A. Lee, "Soft Walls - Modifying Flight Control Systems to Limit the Flight Space of Commercial Aircraft (Draft 1)," Technical Memorandum UCB/ERL M01/31, University of California, Berkeley, CA 94720, September 15, 2001.

[410] J. Davis II, C. Hylands, B. Kienhuis, E. A. Lee, J. Liu, X. Liu, L. Muliadi, S. Neuendorffer, J. Tsay, B. Vogel, and Y. Xiong, "Heterogeneous Concurrent Modeling and Design in Java," Technical Memorandum UCB/ERL M01/12, EECS, University of California, Berkeley, March 15, 2001.

[411] J. Reekie, S. Neuendorffer, C. Hylands and E. A. Lee, "Software Practice in the Ptolemy Project," Technical Report Series, GSRC-TR-1999-01, Gigascale Semiconductor Research Center, University of California, Berkeley, CA 94720, April 1999.

[412] E. A. Lee, "A Denotational Semantics for Dataflow with Firing," Technical Report UCB/ERL M97/3, Electronics Research Laboratory, U. C. Berkeley, January 1997.

[413] E. A. Lee, "Transmitter Implementation for 1200 and 2400 BPS Full-Duplex Data Transmission on the Switched Network," TM 82-43429-3, Bell Laboratories, Holmdel NJ, August 27, 1982.

[414] E. A. Lee, "Algorithms for 2400 BPS Full-Duplex Transmission on the Switched Network," TM 82-43429-4, Bell Laboratories, Holmdel NJ, August 27, 1982.

[415] E. A. Lee, "DSP-Based Implementation of a Receiver for 1200 and 2400 BPS Full-Duplex Data Transmission on the Switched Network," Unpublished Memorandum, Bell Laboratories, Holmdel NJ, August 25, 1982.

[416] E. A. Lee, "A Fixed Reference Coherent Detector for DPSK Receivers," TM 82-43421-3, Bell Laboratories, Holmdel NJ, July 30, 1982.

PATENTS:

[417] E. A. Lee and J. Bier, "Multiprocessor System Having Statically Determined Resource Allocation Schedule at Compile Time and the Using a Static Schedule With Processor Signals To Control The Execution Time Dynamically," U.S. Patent No. 5,367,678, Nov. 22, 1994.

[418] E. A. Lee and D. Shaw, "Simultaneous Transmission of Speech and Data over an Analog Channel," U.S. Patent No. 452331, June 11, 1985.

MASTERS REPORTS SUPERVISED

(This list is incomplete)

[419] Jeff C. Jensen, "Elements of Model-Based Design," Master's Report, EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2010-19, February 19, 2010.

[420] Thomas Huining Feng,"Engineering Structurally Configurable Models with Model Transformation," Master's Thesis, EECS Department, University of California, Berkeley, Technical Report No. UCB/EECS-2008-159, December 15, 2008.

[421] Haiyang Zheng. “Simulating Zeno Hybrid Systems Beyond Their Zeno Points,” Technical Report No. EECS-2006-114, EECS Department, University of California, Berkeley, September 8, 2006.

[422] Shamik Bandyopadhyay. “Automated Memory Allocation of Actor Code and Data Buffer in Heterochronous Dataflow Models to Scratchpad Memory,” EECS Department, University of California, Berkeley UCB/EECS-2006-105, August 14, 2006.

[423] Gang Zhou, "Dynamic Dataflow Modeling in Ptolemy II," Master's Report, Technical Memorandum No. UCB/ERL M05/2, University of California, Berkeley, CA, 94720, USA, December 21, 2004.

[424] Vinay Krishnan, "Real-Time Systems Design in Ptolemy II: A Time-Triggered Approach," Master's Report, Technical Memorandum UCB/ERL M04/22, University of California, Berkeley, CA 94720, July 12, 2004.

[425] Sanjeev Kohli, "Cache Aware Scheduling for Synchronous Dataflow Programs," Master's Report, Technical Memorandum UCB/ERL M04/03, University of California, Berkeley, CA 94720, February 23, 2004.

[426] Adam Cataldo, "Control Algorithms for Soft Walls," Master's Report, Technical Memorandum UCB/ERL M03/42, University of California, Berkeley, CA 94720, January 21, 2004.

[427] Y. Zhou, "Communication Systems Modeling in Ptolemy II," Master's Report, Technical Memorandum No. UCB/ERL M03/53, University of California, Berkeley, CA, 94720, USA, December 18, 2003.

[428] James Yeh, "Image and Video Processing Libraries in Ptolemy II," Master's Report, Technical Memorandum No. UCB/ERL M03/52, University of California, Berkeley, CA, 94720, USA, December 16, 2003.

[429] Yang Zhao, "A Model of Computation with Push and Pull Processing," Master's Report, Technical Memorandum No. UCB/ERL M03/51, University of California, Berkeley, CA, 94720, USA, December 16, 2003.

[430] Elaine Cheong, "Design and Implementation of TinyGALS: A Programming Model for Event-Driven Embedded Systems," Master's Report, Technical Memorandum No. UCB/ERL M03/14, University of California, Berkeley, CA, 94720, USA, May 23, 2003.

[431] Stephen Neuendorffer, "Automatic Specialization of Actor-Oriented Models in Ptolemy II," Master's Report, Technical Memorandum UCB/ERL M02/41, University of California, Berkeley, CA 94720, December 25, 2002.

[432] Paul Whitaker, "The Simulation of Synchronous Reactive Systems In Ptolemy II," Master's Report, Memorandum UCB/ERL M01/20, Electronics Research Laboratory, University of California, Berkeley, May 2001.

[433] Chamberlain Fong, "Discrete-Time Dataflow Models for Visual Simulation in Ptolemy II," Master's Report, Memorandum UCB/ERL M01/9, Electronics Research Laboratory, University of California, Berkeley, January 2001.

[434] Lukito Muliadi, "Discrete Event Modeling in Ptolemy II," Master's Report, Dept. of EECS, University of California, Berkeley, CA 94720, May 1999.

[435] Neil Smyth, "Communicating Sequential ProcessesDomain in Ptolemy II," Master's Report, UCB/ERL Memorandum M98/70, Dept. of EECS, University of California, Berkeley, CA 94720, December 1998.

[436] Jie Liu, "Continuous Time and Mixed-Signal Simulation in Ptolemy II," Master's Report, UCB/ERL Memorandum M98/74, Dept. of EECS, University of California, Berkeley, CA 94720, December 1998.

[437] S.-P. Chang, "System-Level Modeling and Evaluation of Network Protocols," Master's Report, UCB/ERL Memorandum M98/73, University of California, Berkeley, CA 94710, December 16, 1998.

[438] Mudit Goel, "Process Networks in Ptolemy II," Master's Report, ERL Technical Memorandum UCB/ERL No. M98/69, University of California, Berkeley, CA 94720, December 16, 1998.

[439] W. Chen, "Real-time Signal Processing on the Ultrasparc," Master's Report, ERL Technical Memorandum UCB/ERL No. 97/4, University of California, Berkeley, CA 94720, May 6, 1997.

[440] Patrick Warner, "Network of Workstations Active Messages Target for Ptolemy C Code Generation," Master's Report, ERL Technical Memorandum UCB/ERL No. 97/8, University of California, Berkeley, CA 94720, January 24, 1997.

[441] Bilung Lee, "Fusing Dataflow with Finite State Machines," Master's Report, Technical Memorandum No. M96/20, Electronics Research Laboratory, University of California, Berkeley, CA 94720, May 1996.

[442] S.-I. Shih, "Code Generation for VSP Software Tool in Ptolemy," Master's Report, Plan II, ERL Technical Memorandum UCB/ERL M94/41, University of California, Berkeley, CA 94720, May 25, 1994.

[443] M. J. Chen, "Developing a Multidimensional Synchronous Dataflow Domain in Ptolemy," Master's Report, ERL Technical Memorandum UCB/ERL No. 94/16, University of California, Berkeley, CA 94720, May 6, 1994.

[444] Alan Peevers, "A Real-Time 3D Signal Analysis/Synthesis Tool Based on the Overlap-Add Short-Time Fourier Transform," Master's Report, Plan II, University of California, Berkeley, CA 94720, February 24, 1994.

[445] Praveen K. Murthy, "Multiprocessor Code Synthesis in Ptolemy," Tech Report UCB/ERL 93/ 66, Master's Report Dept. of EECS, University of California, Berkeley, CA 94720, July 1993.

[446] Kennard D. White, "XPole: An Interactive Graphical Signal Analysis and Filter Design Tool," Master's Report, UCB/ERL M93/70, Dept. of EECS, University of California, Berkeley, CA 94720, May 1993.

[447] Jose Luis Pino, "Software Synthesis for Single-Processor DSP Systems Using Ptolemy," Master's Report, UCB/ERL M93/35, Dept. of EECS, University of California, Berkeley, CA 94720, May 1993.

[448] Brian Link, "The Waveguide Toolkit," Master's Report, EECS Dept., University of California, Berkeley, CA 94720, December, 1992.

[449] A. Wong, "A Library of DSP Blocks and Applications for the Motorola DSP96000 Family," Master's Report, Plan II, EECS Dept., University of California, Berkeley, CA 94720, May, 1992.

[450] Philip D. Lapsley, "Host Interface and Debugging of Dataflow DSP Systems," Master's Report, Electronics Research Laboratory, University of California, Berkeley, CA 94720, December, 1991.

[451] Asawaree Kalavade, "Hardware/Software Codesign Using Ptolemy," Master's Report, Electronics Research Laboratory, University of California, Berkeley, CA 94720, December, 1991.

[452] Shuvra S. Bhattacharyya, "Scheduling Synchronous Dataflow Graphs for Efficient Iteration," Master's Report, EECS Dept., Univ. of Calif., Berkeley, May, 1991.

[453] Michael Grimwood, "An Application Using Gabriel: Design and Implementation of a Free- Space Digital Infrared Communication Link," Master's Report, ERL, EECS Dept., University of California, Berkeley, CA 94720, August, 1990.

[454] Martha Fratt, "Speech Processing Using The Gabriel DSP System," Master's Report, ERL, EECS Dept., University of California, Berkeley, CA 94720, August, 1990.

[455] Maureen P. O'Reilly, "The Design of a 16-QAM Passband Data Modem Using Gabriel, Plan II," Master's Report, ERL, EECS Dept., University of California, Berkeley, CA 94720, August, 1990.

[456] S. How, "Code Generation for Multirate DSP Systems in Gabriel," Master's Report, ERL, EECS Dept., University of California, Berkeley, CA 94720, May, 1990.

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