Erik Brunvand
Biographical Sketch

School of Computing
University of Utah
Salt Lake City, UT 84112

Phone: 801-581-4345
Fax: 801-581-5843
email: elb@cs.utah.edu

Professional Preparation

University of Utah	Computer Science, Mathematics	BS, 1982
University of Utah	Computer Science	M.S., 1984
Carnegie Mellon University	Computer Science	Ph.D, 1991

Professional Appointments

National Science Foundation	Program Director CISE/CNS	2019 - 2022
University of Utah	Professor, School of Computing	1990 - present
University of Utah	Adjunct Professor, ECE Department	1990 - present
University of Utah	University Professor	2014-2016
University of Utah	Director, Computer Engineering Program	2003-2006, 2009-2012, 2015-2018
University of Washington	Visiting Professor, DXARTS Program	2012
Columbia University	Visiting Professor, Computer Science	2006

Selected Recent Publications

Complete list includes 1 book, 20 journal articles, and 90+ conference publications

A. Banerjee, S. Basu, E. Brunvand, P. Mazumder, W. R. Cleaveland II, G. Singh, M. Martonosi, F. Pembleton, "Navigating the Seismic Shift of Post-Moore Computer Systems Design," *IEEE Micro*, Vol 41, n6, 2021.

E. Brunvand and W. Wischer, "Collective Currents: Exploring Sustainability through a Collaborative and Interactive Installation," Leonardo, Vol 54, N3, 2021.

E. Vasiou, K. Shkurko, E. Brunvand, C. Yuksel, "Mach-RT: A Many Chip Architecture for High Performance Ray Tracing," *IEEE Transactions on Visualization and Computer Graphics (TVCG), 2020.*

D. Lin, E. Vasiou, C. Yulsel, D. Kopta, E. Brunvand, "Hardware-Acclerated Dual-Split Trees," in High Prformance Computer Graphics (HPG 2020), Virtual Event, July 2020.

E. Brunvand, D. Kline, A. Jones, "Dark Silicon Considered Harmful: A Case for Truly Green Computing," International Green and Sustainable Computing Conference (IGSC), Pittsburgh, PA, Oct 2018. *Awarded Best Paper at IGSC'18*

E. Vasiou, K. Shkurko, I. Mallett, E. Brunvand, and C. Yuksel, "A Detailed Study of Ray Tracing Performance: Render Time and Energy Cost," Computer Graphics International (CGI), Bintan, Indonesia, June 2018.

K. Shkurko, T. Grant, E. Brunvand, D. Kopta, J. Spjut, E. Vasiou, I. Mallett, C. Yuksel, "SimTRaX: Simulation Infrastructure for Exploring Thousands of Cores," Great Lakes Symposium on VLSI (GLSVLSI 2018), Chicago, Illinois, 2018.

K. Shkurko, C. Yuksel, D. Kopta, I. Mallett, E. Brunvand. "Time Interval Ray Tracing for Motion Blur," IEEE Transactions on Visualization and Computer Graphics, Vol PP, Issue 99, Nov 2017

E. Brunvand and N. McCurty, "Making Noise: Using Sound-Art to explore Technological Fluency," ACM SIGCSE, Seattle, WA, 2017. *Awarded Best Paper*

D. Kline, N. Parshook, X. Ge, E. Brunvand, R. Melhem, P. Chrysanthis and A. Jones, "Holistically Evaluating the Environmental Impacts in Modern Computing Systems," International Sustainable and Green Computing (ICSG) Conference, Hangzhou, China, Nov 2016.

J G Alford and Erik Brunvand, "Leveraging CS Teachable Moments in the Maker Movement," ACM SIGCSE, Memphis, TN, 2016.

Erik Brunvand, "CS+X: Cross Campus Collaborations," ACM SIGGRAPH 2016 (panel), Anaheim, CA, August 2016.

D. Kopta, K. Shkurko, J. Spjut, E. Brunvand, A. Davis. "Memory Considerations for Low-Energy Ray Tracing," Computer Graphics Forum, Vol34, No. 1, Feb 2015

E. Brunvand, "Kinetic Sculptures: Creating Programmable Art," SIGGRAPH 2015, Los Angles, CA, August 2015.

E. Brunvand, "A Noise-Based Curriculum for Technological Fluency," SIGGRAPH 2015, Los Angeles, CA, August 2015.

E. Brunvand, "Using Surface-Mount Components in an Embedded Systems Lab," ACM Workshop on Computer Architecture Education (WCAE), Portland, OR, June 2015.

E. Brunvand, "Technological Fluency through Circuit Bending," International Conference on Microelectronic Systems Education, Pittsburgh, PA, May 2015.

E. Brunvand, "Speculatorum Oculi," Leonardo, Vol 47, No. 4, Aug 2014

E. Brunvand, N. Chatterjee, D. Kopta, "Why Graphics Programmers Need to Know about DRAM," SIGGRAPH 2014 (course), Vancouver, B.C., Canada.

E. Brunvand, S. Brunvand, "Drawing Machines: An Arts and Engineering Collaboration," NAEA conference, San Diego, CA, Mar 2014

E. Brunvand, "Lights! Speed! Action!: Fundamentals of physical computing for programmers," SIGGRAPH '13, (New York, NY, USA), pp. 13:1–13:108, ACM, 2013.

D. Kopta, K. Shkurko, J. Spjut, E. Brunvand, A. Davis, "An Energy and Bandwidth Efficient Ray Tracing Architecture," in High-Performance Computer Graphics (HPG 2013), July 2013.

Konstantin Shkurko, Thiago Ize, Christiaan Gribble, Erik Brunvand, and Lee Butler, "Simulating Radio Frequency Propagation via Ray Tracing," GPU Technology Conference, March 2013.

D. Kopta, T. Ize, J. Spjut, E. Brunvand, A. Davis, A. Kensler, "Fast, Effective BVH Updates for Animated Scenes," ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D), Mar, 2012.

Joseph Spjut, Daniel Kopta, Erik Brunvand, Al Davis, "A Mobile Accelerator Architecture for Ray Tracing," 3rd Workshop on SoCs, Heterogeneous Architectures and Workloads (SHAW-3), Feb 2012.

E. Brunvand, "Games as Motivation in Computer Design Courses: I/O is the Key," SIGCSE, Dallas, March 2011.

E. Brunvand, P. Stout, "Kinetic Art and Embedded Systems: A Natural Collaboration," SIGCSE, Dallas, March 2011.

Erik Brunvand, *Digital VLSI Chip Design with Cadence and Synopsys CAD Tools,* Addison-Wesley, 2010.

D. Kopta, J. Spjut, E. Brunvand, A. Davis, "Efficient MIMD Architectures for High-Performance Ray Tracing," International Conference on Computer Design (ICCD), Oct 2010.

D. Nellans, K. Sudan, E. Brunvand, R. Balasubramonian, "Improving Server Performance on Multi-Cores via Selective Off-loading of OS Functionality, LNCS 2010

D Nellans, K. Sudan, E. Brunvand, R. Balasubramonian, "Hardware Prediction of OS Run-Length for Fine-Grained Resource Customization,: ISPASS, March 2010.

Academic Activities

Conference Organization/Keynotes:

ACM SIGGRAPH Conference Chair, 2023

ACM SIGGRAPH Distinguished Educator Award selection committee Chair, 2019-2021

ACM SIGGRAPH Education Chair, 2017, 2018

FPGA Conference: Keynote speaker 2020 (virtual)

VLSI Design conference: Keynote speaker 2016 (Kolkata, India)

GLSVLSI: Keynote speaker, 2015 (Pittsburgh, PA)

IFIP/IEEE Intl. Conference on VLSI: Keynote speaker 2012 (Santa Cruz)

IEEE Symposium on Asynchronous Circuits and Systems: Program Chair 1994 (Salt Lake City), General Chair 2001 (Salt Lake City), General Chair 2011 (Cornell, NY), Chair of Steering Committee 1994—2008, Member of Steering Committee 2008 — present.

Great Lakes Symposium on VLSI (GLSVLSI): Program Chair: 2010 (Providence, RI), General Chair 2012 (Salt Lake City), Member of Steering Committee 2010 — present.

Conference on Advanced Research on VLSI: General Chair 2001 (Salt Lake City).

Member of program committee for many conferences including: IEEE Symposium on Interactive Ray Tracing, ACM High Performance Graphics, IEEE Symposium on Asynchronous Circuits, SIGGRAPH, Eurographics, GLSVLSI, ACM I3D.

Senior Member IEEE, Senior Member ACM

Teaching - Regular courses taught include the following:

CS2050: Making Noise - Sound Art and Digital Media

CS3700: Digital Hardware Fundamentals

CS3710: Computer Design Lab

CS3992: Computer Engineering Project Planning

CS4710: Computer Engineering Senior Project

CS5789: Embedded Systems and Kinetic Art (Cross listed with Art 4455)

CS6710: Digital VLSI Design

CS6712: Digital VLSI Testing

Selected Teaching Honors and Awards

Two-year University Professorship from the Undergraduate College for the academic years 2014-2015 and 2015-2016.

School of Computing Outstanding Teaching Award, 2012.

Dee Fellowship for interdisciplinary course in arts and technology, Fall 2011 - Spring 2012

University of Utah John R. Park Fellowship, 2006, 2019

Nominated for Utah Engineers Council, Utah Engineering Educator of the Year award, 2003.

University of Utah Distinguished Teaching Award, 2002

College of Engineering Outstanding Teaching Award, 1997

Funded Research

Architectures for Energy Efficient Ray Tracing, National Science Foundation, Oct 2014 - Sep 2019 ($899,992) Co-PI: Cem Yuksel

University Professorship, Undergraduate College, University of Utah, Aug 2014 - Jul 1016 ($35,000)

University Teaching Assistantship (supporting Nina McCurdy), University of Utah, Aug 2015 - Jul 2016 ($15,000)

Recent Past Projects

Radio Frequency Ray Tracing, Army Research Labs (ARL), Sep 2012 - Sep 2013 ($85,000)

The Big Draw: Art and Engineering Collaboration, Council of Dee Fellows, Aug 2011 - Jul 2012 ($8,400) PI: Paul Stout

Flexible Architectures for Future Graphics Processing Systems, National Science Foundation, Aug 2010 - Jul 2014 ($499,709) Co-PI: Al Davis

University Teaching Assistantship (supporting Josef Spjut), University of Utah, Aug 2010 - July 2011 ($15,000)

Radio Frequency Ray Tracing Evaluation, Army Research Labs (ARL), Feb 2011 - May 2011 ($37,384)

Hardware Support for Real Time Ray Tracing, National Science Foundation, June 2006 - June 2010 ($505,382) Co-PIs: Al Davis, Peter Shirley, Steve Parker

Ray Trace Applications to Radio Frequency (RF) Propagation, Army Research Labs (ARL), Sep 2007 - Dec 2008 ($140,087)

High-Performance Asynchronous Computer Architecture, National Science Foundation, Sep 2002 - Jul 2006 ($325,000)

Students and Collaborators

Ph.D. students graduated: Konstantin Shkurko, Elena Vasiou, Daniel Kopta, David Nellans, Josef Spjut, John Hurdle, Luli Josephson (M.Phil.), Ajay Khoche, William Richardson, Jung-Lin Yang

Recent University Service

University Teaching Committee (Chair 2015–2019, 2001–2005, Member 2013–2014)

Graduate School Review Committee for the Department of Film and Media Studies, 2014.

Creative Campus Steering Committee 2012–2014

University Research Committee, 2006–2009

College of Engineering Curriculum Committee, 2011 - present

Director, Computer Engineering Program (an ABET-accredited BS degree granting program in the College of Engineering), 2002–2005, 2009–2012, 2015–present.

School of Computing - Director, Computing Track in Computer Engineering, 2007–present

School of Computing - Director, Computing Track in Digital Media, 2011–2014

School of Computing Curriculum Committe, 2011–present

School of Computing Scholarship Committee, 2014–present

School of Computing Director of Graduate Studies, 2006–2008

School of Computing Graduate Admissions Committee, 2008–present