Center for LifeLong Learning and Design (L3D)

Recent Highlights

Current Major Research Grants

- 2010-2013: "Transformative Models of Learning and Discovery in Cultures of Participation," NSF

- 2010-2014: "Energy Sustainability and Smart Grids: Fostering and Supporting Cultures of Participation in the Energy Landscape of the Future," NSF

- 2010-2013: "A Cultural Shift in Computer Science: Introducing Computation Through E-Textiles," NSF

- 2009-2012: "Construction made Simple(r): Interfaces, Devices, and Infrastructure for Beginning Fabrication," NSF

- 2009-2011: "Reforming IT Education through Game Design: Integrating Technology-Hub, Inner City, Rural and Remote Regions," NSF

Participation in Defining Major National and International Research Efforts

- Science of Design (SoD) Program, NSF

- Creativity and Information Technology Program (CreativeIT), NSF

- Technology Mediated Social Participation (TMSP) Program, NSF

- European Union Network of Excellence on "Technology Enhanced Learning"

Overview

The Center for LifeLong Learning and Design (L^3D) is part of the Department of Computer Science and the Institute of Cognitive Science at the University of Colorado Boulder. The mission of the center is to establish the scientific foundations for the envisionment, design, development, and assessment of socio-technical systems that serve as amplifiers of human capabilities and that will bring dramatic and transformative improvements in the ways people live, learn, work, and collaborate.

Over the 18 years of its existence, L^3D has developed a unique research vision and identity to cope with some of the fundamental challenges facing our society in the 21st century. The center focuses on lifelong learning, design, and transformative innovative media in a variety of application domains including urban planning, energy sustainability, and cognitive disabilities. Within the University of Colorado, L^3D has built collaborative, interdisciplinary relationships with faculty in the College of Engineering and Applied Science, the Department of Computer Science, the Institute of Cognitive Science, the Alliance for Technology, Arts and Society (ATLAS), the College of Architecture and Planning, the School of Education, the Renewable and Sustainable Energy Institute (RASEI), and the Coleman Initiative for Cognitive Disabilities. Beyond CU, the state, and the nation, the center has established numerous international collaborations.

More than 30 L^3D doctoral graduates are working in academia (including at MIT Media Lab, UC Irvine, Univ. of Tokyo, Texas A&M, Univ. of Graz) and industrial research labs. Three of our graduates obtained NSF Career Awards, some of them have taken on leadership positions such as being chairs of departments, and many have graduated their own PhD students working on research themes inspired by the L^3D visions and developments.

L^3D Director: Gerhard Fischer

Gerhard Fischer (http://l3d.cs.colorado.edu/~gerhard/) is a professor of computer science, a fellow of the Institute of Cognitive Science, and the director and founder of the Center for LifeLong Learning and Design (L^3D) at the University of Colorado Boulder. He is a member of the Computer Human Interaction Academy and a Fellow of the Association for Computing Machinery.

Fischer's research is focused on new conceptual frameworks and new media for learning, working, and collaborating; human-computer interaction; design; meta-design; domain-oriented design environments; social creativity; distributed cognition; universal design (assistive technologies); and socio-technical environments.

http://L3D.cs.colorado.edu/

Examples L³D Research Thrusts:

The Center for LifeLong Learning and Design conducts research to facilitate learning across various life stages and abilities. Faculty are exploring and developing technologies to make learning fun, engaging, and accessible to children, to help people with disabilities live more independently, and to enhance communication and collaboration among professionals.

The Envisionment and Discovery Collaboratory

http://L3D.cs.colorado.edu/~gerhard/EDC-brief-descr.pdf

The Envisionment and Discovery Collaboratory (EDC) supports problem-solving activities by bringing individuals who share a common problem together in face-to-face meetings and promoting a form of social reflection-in-action. Participants are provided a shared construction space in which they interact with computationally enhanced physical objects that are used to represent the situation (action space). Computer-generated information is projected back onto the tabletop construction area, creating an augmented reality environment. At left, Boulder City Council members and CU regents use the EDC in an urban planning session.

The AgentSheets Group

http://www.agentsheets.com

Culminating more than a decade of research conducted and directed by founder Dr. Alexander Repenning, AgentSheets, Inc. creates computational thinking tools, which reflect years of research in human-computer interaction, end-user programming, and simulation tools. AgentSheets seeks to reinvent computer science in public schools by motivating and educating all students, including women and underrepresented communities, to learn about computer science through game design.

Craft Technology Group

http://cs.colorado.edu/~ctg/Craft_Tech.html

The Craft Technology Group (CTG) focuses on interweaving computation with craft materials. This blending can take many forms, including the application of specialized software to aid in the design and construction of crafts (such as mechanical toys and paper sculpture) and in the creation of craft objects with embedded intelligence. The particular interest of CTG lies in the educational realm extending the landscape of children's craft activities

Socio-Technical Systems for Energy Sustainability

http://L3D.cs.colorado.edu/energy

Empowering energy users to act as informed decision makers rather than just being passive consumers requires that they *learn* about energy and energy consumption, *become aware* of where, when, and how much energy they spend, *understand* the impact of potential savings, and be *motivated* to change their behavior (individually and collectively). L3D's research in meta-design and cultures of participation provides the theoretical foundations for developing socio-technical systems to support the future of energy use in our world.

Sponsors and Partners

- The National Science Foundation
- National Institute of Health
- National Renewable Energy Laboratory
- European Commission
- Google
- The Coleman Institute for Cognitive Disabilities
- SAP
- Software Research Associates, Tokyo

More Information

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Faculty

Gerhard Fischer (Director), *See reverse side for bio*

Michael Eisenberg (Associate Director), *Professor, Computer Science*; Presidential Teaching Scholar; cognitive science, craft technologies, educational computing

Hal Eden (Associate Director), *Senior Research Associate*; design of next generation socio-technical environments, table-top computing environments

Ernesto Arias *Professor Emeritus, Architecture and Planning, Institute of Cognitive Science*; technologies that support place-based education and collaborative learning communities

Mark Dubin *Professor Emeritus, Molecular, Cellular and Developmental Biology (Neurobiology)*; cognitive neuroscience, use of Virtual Reality in brain rehabilitation

Ann Eisenberg *Adjunct Professor, Computer Science*; Co-Director, Craft Technology Group ; creation of computational environments to enhance children's spatial cognition.

Kris Gutiérrez *Professor/Inaugural Provost's Chair, School of Education;* cultural dimensions of learning; social design experiments for expansive forms of learning

Walter Kintsch *Professor Emeritus, Psychology, Institute of Cognitive Science*; Latent Semantic Analysis (LSA), evaluating LSA-based educational software in schools

Clayton Lewis *Professor, Computer Science*; assistive technologies, user interface design, human-computer interaction, cognitive architectures

Alexander Repenning *Research Professor, Computer Science*; founder of AgentSheets Inc.; end-user programming, agent-based simulations, visual programming

James Sullivan *Senior Research Associate*; universal design, assistive technologies, innovative tools for people with cognitive disabilities

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