



RESEARCH SHOWCASE

Friday, October 18, 2019, 3:30–5:30 p.m.
Roser ATLAS Center

RESEARCH & INNOVATION WEEK
— IMPACT THROUGH RESEARCH + SCHOLARSHIP + CREATIVE WORK —

Labs & Studios

ACME Lab (229)

Director: Ellen Yi-Luen Do

The ACME Lab works on computational tools for design, especially sketching, creativity and design cognition, including creativity support tools and design studies, tangible and embedded interaction and, most recently, computing for health and wellness.

Emergent Nanomaterials Lab (204)

Director: Carson Bruns

The Emergent Nanomaterials Lab manipulates matter on the smallest of scales, synthesizing, assembling, combining and organizing nanoscale building blocks to design technologies that enhance the quality of life in the domains of health, energy, sensory augmentation and self-expression.

Identity Lab (225)

Director: Jed Brubaker, Department of Information Science

The Identity Lab explores how identity is designed, represented and experienced through technology.

IRON Lab (234)

Director: Dan Szafir

The Interactive Robotics and Novel Technologies Lab explores human-centered principles for novel sensing, interactive and robotic technologies to enable new forms of assistance in collaborative work, education and space exploration.

Living Matter Lab (206)

Director: Mirela Alistar

The Living Matter Lab pioneers new technologies that make personal information about ones biology and biome more accessible. Specifically, they explore for highly configurable digital microfluidic biochips can simplify medical diagnostics.

MettaCognition Lab (225)

Director: Annie Bruns

The MettaCognition Lab investigates how mindfulness and loving-kindness (metta) meditation cultivates critical skills for resilience, emotional intelligence and attentional control.

THING Lab (231)

Director: Daniel Leithinger

The THING Lab employs shape-changing materials, novel sensors and unique design methods to make digital information tangible, paving the way for a new generation of interactivity that goes beyond sight and sound.

Joel Swanson Studio (231D)

Joel Swanson, Artist & Designer

Joel Swanson is an artist and writer who explores the relationship between language and technology. His work playfully subverts the technologies, materials and underlying structures of language to reveal its idiosyncrasies and inconsistencies.

Unstable Design Lab (207)

Director: Laura Devendorf

The Unstable Design Lab weaves anthropology, art, design and engineering to explore how instability—the idea that technology may challenge us, or not work as we expect—can be embraced through design to help us live more humanely, creatively, and sustainably with technology.

VisuaLab (208)

Director: Danielle Szafir

The VisuaLab works at the intersection of data science, visual cognition, and computer graphics. We quantify how people make sense of visual information to develop novel visualization techniques, interactive systems, and computational models for working with data across domains.

Whaaat!? Lab (105)

Directors: Matt Bethancourt & Danny Rankin

The Whaaat!? Lab explores and designs games and experimental interactions that aim to surprise and delight in ways that make the player say, “whaaat!?”

Projects

AR/VR and Robotics (234)

Michael Walker, Hooman Hedayati, Midhun Sreekumar Menon

IRON Lab

Research showing that augmented and virtual reality can significantly improve user performances and experiences with robots as scientific advancements of robotic hardware and software allow robots to be brought into workplaces and homes.

Augmented Reality Remote Assistance (2B29)

Peter Gyory, Kyle Neubarth, Chad Lewis, Blake Hampton, Gabriel Chapel,

Hyerin Seok, Dan Szafir, Ellen Do, Daniel Leithinger, Per Karlsson

ACME Lab, THING Lab

ARRA improves remote collaboration and guidance for tasks like device repair and search and rescue by sending video feeds of remote people and scanned 3D models of their remote environments. Experts can then navigate and annotate this 3D model in virtual reality.

Autonomous Forest Trail Navigation (234)

Ashwin Vasan, Michael Walker,

IRON Lab

Using simulated 3D environments, we train a quadcopter to fly autonomously and navigate a forest trail environment. Using a VR headset, we can visualize and navigate this forest-based 3D simulation.

:: Body (1st floor lobby)

Armon Naeini

Open Access Week Installation

An interactive augmented reality installation selected for CU Boulder's Open Access Week, Oct 21-24.

Delete After Death: Improving Facebook's Postmortem Options (225)

Katie Z. Gach, Facebook Memorialization Team

Identity Lab (Dept. of Information Science)

Facebook is often legally obliged to delete accounts if they learn of a user's demise. Erasing years of personal online reflections and photos can be deeply painful for surviving loved ones. This research led to revised user account management options after death for all Facebook users worldwide.

Effective Highlight Colors for Visualizations (208)

Supriya Naidu, Danielle Szafir

VisuaLab

This project measures how effectively different highlight colors support search and positive aesthetics when quantitative data is visually represented.

Fabricating Soft Actuators (231)

Purnendu, Daniel Leithinger, Eric Acome, Christoph Keplinger

THING Lab

Vegetable oil-filled thin poly sheets configured using a modified CNC machine show promise for the development of flexible pumps, valves and actuators, opening the door to new shape-changing interfaces that are low-cost, modular, soft and conformable. (A collaboration with the Keplinger Research Group in Mechanical Engineering at CU Boulder.)

Furniture Music (105)

Matt Bethancourt

Whaaat!? Lab

An interactive experience combining furniture placement with soundscape manipulation.

HOT SWAP: All Hands on Deck (229)

Peter Gyory, Clement Zheng, Ellen Do, Daniel Leithinger

ACME Lab

HOT SWAP is an award-winning, collaborative naval combat game with five shared controllers that must be constantly swapped for the team to survive ongoing attacks from pirate ships. HOT SWAP won the 2019 Indiecade “Innovation in Interaction Design” award for their use of novel interchangeable controllers.

Immersive Analytics (208)

Matt Whitlock, Keke Wu, Danielle Szafir

VisuaLab

This project examines how to use immersive analytics most effectively and which domains would most benefit from the application of virtual and augmented realities for on data visualization and interaction.

LEGO ChemBot (204)

Kailey Shara

Laboratory for Emergent Nanomaterials

This automated robot, capable of performing repetitive lab work (weighing chemicals, temperature control, and remote sensing and actuation) is constructed with thousands of LEGO pieces, and aims to provide similar functionality to commercially available robotic lab equipment at a fraction of the cost.

Mechamarkers (229)

Clement Zheng, Peter Gyory, Farjana Ria Khan, Daniel Leithinger, Ellen Do

ACME Lab

Mechamarkers is a system for interaction designers that facilitates making and sensing low-cost physical inputs for 3D interfaces.

Mindfulness in the Classroom (225)

Annie Bruns, Autumn Stevens

Metta Cognition Lab

This study gauges the impact on wellbeing for 100 college students when they engage in a three-week social media fast, combined with self-reflection and journaling practice.

Motion Capture Studio (2B29)

Peter Gyory, Daniel Leithinger, Ellen Do, Mark Gross

CMAF

The Motion Capture Studio's state-of-the-art facility allows for live capture of actors and objects, enabling research in virtual reality, design, assistive technologies, animation, game design, theater and more.

Personal Biochips (206)

Mirela Alistar

Living Matter Lab

This work explores whether new programmable microfluidic biochips that use electrical voltage to transport and combine droplets of fluid across an array of small electrodes can take the place of lengthy and expensive medical diagnostic tests currently completed by hand.

REFORM: Recognizing F-formations for Social Agents (234)

Hooman Hedayati, Annika Muehlbradt, Dan Szafir

IRON Lab

This project introduces an algorithm that helps robots identify conversational groups, known as F-formations, which are associated with focused, intent discussion. By recognizing such interactions, based on relative position and orientation of participants, robots can be programmed to react appropriately and avoid unnecessary interruptions.

RoboGraphics: Dynamic Tactile Graphics Powered by Mobile Robots (234)

Darren Guinness, Annika Muehlbradt, Daniel Szafir, and Shaun K. Kane

IRON Lab, Superhuman Computing Lab

RoboGraphics, involving dynamic tactile graphics that combine a touch screen tablet with static tactile overlays and small mobile robots, help the visually-impaired explore data quickly and accurately.

Robot Manipulation Using VR (234)

Arth Beladiya, Michael Walker

IRON Lab

This project involves controlling a one-armed manipulator robot using virtual reality controller inputs. The arm follows the controller inputs in real-life and can be used to tele-operate the robot in a unique and simplistic manner.

RoomShift (231)

Ryo Suzuki, Hooman Hedayati, James L Bohn, Clement Zheng, Daniel Szafir, Ellen Yi-Luen Do, Mark D Gross, Daniel Leithinger

THING Lab

RoomShift is a room-scale dynamic haptic environment for virtual reality, based on a small swarm of adapted Roomba robots capable of moving furniture around a room.

ShapeBots (231)

Ryo Suzuki, Clement Zheng, Yasuaki Kakehi, Tom Yeh, Ellen Yi-Luen Do, Mark D. Gross, Daniel Leithinger

THING Lab

These shape-changing swarm robots are a new type of computer interface consisting of a swarm of self-transformable devices that display information, actuate objects, act as tangible controllers, visualize data and more.

Shape and Size Perception (208)

Danielle Szafir, David Burlinson

VisuaLab, Information Science, CMCI

This project explores how people see shapes, structures and patterns, and how these elements can be used to create better charts and graphs.

Tech Tattoos (204)

Carson Bruns, Jesse Butterfield, Sean Keyser

Laboratory for Emergent Nanomaterials

Tattoos of the future could give you real-time information about your physiology or environment. The Laboratory for Emergent Nanomaterials is one of the first research groups in the world to begin developing the unique inks and compounds needed to realize this vision.

Unfabricate: Designing Smart Textiles for Disassembly (207)

Shanel Wu, Laura Devenorf

Unstable Design Lab

With the e-textile industry still in its infancy, an opportunity exists to establish design standards that facilitate disassembly, recycling and reuse of used yarn and conductive thread. Unfabricate demonstrates one such approach with a design that makes unraveling for reuse quick and easy.

Visualization for People with Cognitive Disabilities (208)

Keke Wu, Emily Shea Tanis, Danielle Albers Szafir

VisuaLab

To help individuals with cognitive disabilities make sense of budgetary data and become better self-advocates, this project explores how different visual design elements, such as chart types, chart embellishments and data continuity, impacts visual communication. (In collaboration with Coleman Institute for Cognitive Disabilities.)

Wearable Friends (207)

Sasha de Koninck

Unstable Design Lab

A wearable textile composed of tactile knot structures is combined with embedded interactive technology to provide soothing sensations to the wearer when under stress.



ATLAS is an interdisciplinary institute for radical creativity and invention at the University of Colorado Boulder. An academic community with close ties to the College of Engineering and Applied Science, ATLAS transforms ingenious ideas into reality through research, experimentation and critical thinking.

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