The Jacobs Institute for Design Innovation supports students in...
... learning the design process that lets them tackle “wicked problems”...
...understanding & defining unmet needs in the world around them....
...prototype and test solutions...
... through a wide variety of spaces in which to design, innovate, & make.
“Today, it is not enough to provide our future engineering leaders with technical skills. They must also learn to work in interdisciplinary teams, how to iterate designs rapidly, how to manufacture sustainably, how to combine art and engineering, and how to address global markets... to create our future.”

Paul Jacobs
EECS ’84, ’86 ‘89
DESIGNED IN CALIFORNIA
Wozniak+Jobs:
From Electronics to User Experience
Vacuum Tube  
(Fleming 1904)

Transistor  
(Bardeen, Bratten, Shockley 1947)

Integrated Circuit  
(Kilby 1958)
Apple 1 - 1976

Apple Macintosh - 1984
PRECURSORS
DESIGN IN THE COLLEGE OF ENGINEERING

PhD
- BiD - Design Research Lab

Masters
- Jacobs Institute
- Sutardja Center (CET)

Undergraduate
- Design-Led

Extracurricular
- DeCal Groups
- Engineering- & Entrepreneurship-Led
THE 21ST CENTURY WORKSHOP

- DESIGN SOFTWARE
- DIGITAL FABRICATION TOOLS
- PROGRAMMABLE ELECTRONICS
PROGRAMS
PER SEMESTER:

10+ departments

20+ courses

1200+ students enrolled
TECHNICAL STAFF

JOEY GOTTBRAITH

STACY JO SCOTT

MATT WOLPE

GARY GIN

CHRIS PARSELL

KENT WILSON
STUDENT SUPERVISORS

**SHOTA OKUI**
Student Supervisor

Shot loves basketball. But when he’s not refining his graceful three-point shot, he likes to fill his free time working with wood, metal, and software. Talk to him if you’re working on an innovative project.

**JOSHUA MOULEDOUX**
Student Supervisor

Joshua works with laser-cutters, electronics lab, and 3D printers, and he has experience in CNC subtractive machining. In his free time, he loves doing parquetry, building random projects, and watching Netflix.

**TIFFANY CHEUNG**
Student Supervisor

Tiffany loves hearing about ongoing projects at Jacob Hall, as well as completing DIY projects herself. Her favorite project from DES INV 22 was her LED nameplate and drawing machine. Talk to her about anything!

**ADAM CASTIEL**
Student Supervisor

Adam is a mechanical engineering student. Apart from this, he enjoys playing tennis, mountain biking, and getting way too excited about cars.

**ALICE CHIN**
Student Supervisor

Alice is a second-year intended computer science major. When she’s not studying, you can find her playing tennis, sleeping, or looking for her next project to create at Jacob Hall.

**CHARLENE SHONG**
Student Supervisor

Charlene is a mechanical engineering major, interested in UAVs, robotics, and the maker culture. She enjoys playing PC games, working on DIY projects, and laser-cutting and 3D printing at Jacob Hall.

**MELISSA SU**
Student Supervisor

Melissa holds the record for most spoofs of PLA used. She loves to (re)design functional and aesthetic projects. Her goal is to be proficient in all equipment at Jacob Hall.

**JOSHUA YUAN**
Student Supervisor

Joshua is studying computer science. You can find him playing ultimate frisbee or spending lots of time at Jacob Hall as a student supervisor and laser-cutter trainer.

**NICOLE KIM**
Storytelling Assistant

Nicole is a third-year urban studies student. She loves taking photos, recording music, and eating ridiculous amounts of ice cream. When she’s not working on creative projects, she’s often coming up with ideas of what to make next.

**DAPREE DOYLE**
Storytelling Assistant

Dapree enjoys making videos. In his free time, you can find him adventuring in the hills, listening to music, or finding something random to make a video about. If you want a project to come to life in a video, let him know!
PROGRAMS & ACTIVITIES

CURRICULAR
- DES INV Courses
- Student-taught DeCals
- Courses From COE Departments & Other Colleges

Berkeley Certificate in Design Innovation

CO-CURRICULAR
- Maker Pass: Lab + Tool Access
- Fellowships/ AiR
- Design Nights
- Student Club Meetings & Events

PUBLIC
- Invited Design Events
- Talks
- Design Showcases

Core Jacobs Institute Programs
Connections to other units/groups
JACOBS CURRICULUM

Interdisciplinary Projects / Design in Major

DES INV Project Courses

UI Design
New Product Development
Design of CPS

Skills

Design Methodology
Visual Communication
Prototyping & Fabrication

Survey

Discovering Design

Year 1

Year 4
GET INFORMED:

Hold talks and info sessions to keep people informed.

More information about the bills and众候选人

Encourage more travel to politically different areas.

Encourage people to take state legislature more seriously.

Inform people on more local politics.
SOME OTHER COURSES

- Bio-Inspired Design
- User Experience Design
- Intro to Manufacturing
- How It’s Made
- Industrial Design and Human Factors
- Critical Making
- Critical Practices
- Reimagining Mobility
- Eat. Think. Design.
- Reimagining Slums
- Collaborative Innovation
- Social Entrepreneurship
- Social Innovation On-Ramp
- New Product Development
- Product Management Essentials
- Design of Cyber-Physical Systems
- Sustainable Residential Design
- Interactive Device Design
- Designing for the Human Body
- Reimagining Mobility
STUDENT-LED PROGRAMS
DESIGN CONVERSATIONS

- Bernie Roth (Stanford d.school)
- Benjamin Joffe (General Partner, HAX Hardware Accelerator)
- Ellen Lupton (Curator, Cooper-Hewitt National Design Museum)
- Carla Diana (Interaction & Robot Design, University of Pennsylvania)
- Steve Johnson (VP UX, LinkedIn)
- Yoon Lee (SVP Product Innovation, Samsung)
- Greg Petroff (CXO, GE Digital)
- Elizabeth Gerber (Design for America / Northwestern)
- James Tichenor & Joshua Walton (Microsoft Hololens)
- Marc Tarpenning (Co-Founder, Tesla)
- Plus Design Field Notes: Charles Huang (Guitar Hero), Misha Cornes (Lunar), Amy Wibowo (BubbleSort), Alec Rivers (Shaper Tools), …
EXAMPLE CLASS:
INTERACTIVE DEVICE DESIGN
flow

Zach Wasson
Jackie Leverett
Tim Lee
Personal Environmental Control System (PECS)
Michael Andersen, Joseph Bynoe
Zinfandel Batch is reading loud and clear. It has been running for 21 days.

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<thead>
<tr>
<th>Measurement Data</th>
<th>Expected Brix Curve</th>
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Done with this batch? Mark it as finished!

Warning! Once a tank is marked as finished, the tank will no longer receive or record measurements.

Anthony Sutardja
Maxwell Micali
Christine Dierk
Zachary Gima
Simon Scott, Will Porter, Yi Tong, Mitchell Karchemsky
IR Emitter
Using power tools can be a daunting proposition for beginners. But Drill Sergeant, a group of augmented power tools that coach you with real-time feedback and safety tips, can help you build confidence when you’re starting out. A small digital projector transmits helpful images onto the surface you’re working on, with visualizations also available via tablet, in order to help you safely master the tool while you’re using it.

CREATORS

Michelle Nguyen, Eldon Schoop
Augmented Drill

- Laser Projector
- Distance Sensors
- Computation
Buttons to start an on-demand scan or continuously refresh at 200Hz

LED Bars
Indicate voltage readings
THE JACOBS INSTITUTE FOR DESIGN INNOVATION

EXPLORE
a space where

PLAY
in one of our walk-

LEARN
design by doing
A Research Agenda for Academic Makerspaces

Björn Hartmann
Jacobs Institute for Design Innovation, University of California, Berkeley; e-mail: bjoern@berkeley.edu

INTRODUCTION

A key characteristic of academic makerspaces that distinguishes them from fab labs in secondary schools, non-profit community spaces, or for-profit membership facilities is of course that they are embedded in institutions with significant research activity. Yet academic makerspaces also differ from traditional research labs in that they are open to a broader set of constituents and expertise levels, and often support a larger variety of possible uses. While many emerging academic makerspaces are primarily associated with instruction and student service goals, we argue that research and making can and should intersect in productive ways. This paper lays out the landscape of possible engagements based on our own experience and observations.

A tight connection to academic research promises benefits for both sides:
1) Educational research and qualitative observational research can improve our fundamental understanding of the values of making for students, as well as elucidate the conceptual and pragmatic hurdles makers face today through careful study of making in practice.
2) Makers can serve as a new target audience for technology research and development in engineering disciplines.
3) Research projects in a large number of domains can leverage makerspace resources to accelerate their progress and engage students to turn fundamental discoveries into usable devices and services.

In addition to these intellectual threads, research integration can also contribute to important pragmatic and operational goals, for example ensuring that makerspaces receive appropriate institutional attention, credit, and funding.

We next present our own institutional context, review the literature, and present our vision for a research agenda that integrates and enhances the research and practice that takes place in academic makerspaces.

The Value of Campus Collaboration for Higher Education Makerspaces

P. Zachary Ali\(^1\), Malcolm Cooke\(^2\), Martin L. Culpepper\(^3\), Craig R. Forest\(^4\), Björn Hartmann\(^5\), Mario Kohn\(^6\), Vincent Wileczynski\(^7\)

\(^1\)Carnegie Mellon University, \(^2\)Case Western University, \(^3\)Massachusetts Institute of Technology, \(^4\)Georgia Institute of Technology, \(^5\)University of California, Berkeley, \(^6\)Stanford University, \(^7\)Yale University

INTRODUCTION

The concepts of community and collaboration are essential characteristics of makerspaces. The value of collaboration has been highlighted as an idea accelerator by a number of authors including Jon Gertner’s history of Bell Labs and its reliance on innovation as the fuel for discovery. Gertner described the “Black Box” lab as an innovation hub that relied on forced interactions to mesh “many interlocking small parts grouped physically near enough to one another” to create a powerful and purposeful machine [1]. The value of collaboration in the maker-movement was presented by Chris Anderson as critical to establish “open-innovation communities” where participants voluntarily join and contribute to common causes [2]. According to Anderson, the value of the work draws talented participants, and the openness of the activities in makerspaces serves as an invite for people to contribute to projects.

The importance of innovation within academic settings leads to opportunities for researchers to collaborate with makers and make use of the facilities. Such collaborations can take many forms and can be structured to focus on various goals.

CARNEGIE MELLON UNIVERSITY: INTEGRATIVE DESIGN, ARTS & TECHNOLOGY NETWORK (IDeAte)

CMU IDeAte Overview: At Carnegie Mellon University, innovation through efficient technical practices is supported through the Integrative Design, Arts & Technology (IDeAte) Network [3]. IDeAte serves as a campus-wide resource for the maker community, providing interdisciplinary courses, spaces, and resources that encourage collaboration between programs, faculty, students and staff. IDeAte facilities reside in Hunt Library and consist of five types of defined areas:
- Hybrid lecture, collaboration, and project spaces
- Studio lecture and collaboration spaces
- Dedicated collaboration spaces
- Dedicated equipment spaces
- Lending and administrative spaces

All activities and the associated work areas span across three floors, providing about 10,000 square feet of dedicated space.
Where Be Dragons? Charting the Known (and Not So Known) Areas of Research on Academic Makerspaces

Leah F. Rosenbaum\textsuperscript{1} and Björn Hartmann\textsuperscript{2}

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\textsuperscript{2}Björn Hartmann; Jacobs Institute for Design Innovation, University of California, Berkeley; e-mail: bjoern@berkeley.edu