Be A Maker at UNC

Partnering to support teaching, learning, and maker technology

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We are

1. Trusted partners who are
2. Extending our reach through
3. Critical making,
4. Making as a literacy and assisting faculty in
5. Creating authorship learning experiences.
1. Trusted partners who are
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5. Creating authorship learning experiences.
• Connects students and faculty to services, tools, programming, and technology to support new kinds of research.
• Provides spaces for collaboration, sharing and highlighting research and creative output, and engaging scholars.
We are UNC-Chapel Hill's pan-university faculty development center. Our mission is to enable faculty members in all disciplines to reach their goals in teaching, research, and leadership throughout their careers.
Agenda

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BeAM network

Hanes Art Center

Kenan Science Library

Murray Hall
Making

Studio Art

Engineering

Entrepreneurship

Neurobiology

Education

Biology

And more!
BeAM Vision

Inspire every UNC Tar Heel to
Take a risk, Make a difference, Be A Maker.

BeAM Mission

Cultivate and empower a UNC community and
culture to imagine, design and create things that
solve, fascinate and inspire.
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Critical Making: Constructivist & Authorship Learning
Learning happens best when learners construct their understanding through a process of constructing things to share with others.

– Jonan Donaldson

http://www.hybridpedagogy.com/journal/constructionism-reborn/
Authorship learning is...

facilitated most powerfully through a process of having [learners] construct meaningful physical or digital things in the real world which are intended for a real audience...these artifacts are constructed in collaboration with others through negotiated roles and through a process which involves systematic metacognition.

– Jonan Donaldson

http://www.hybridpedagogy.com/journal/constructionism-reborn/
“...to use material forms of engagement with technologies to supplement and extend critical reflection...”

- Matt Ratto, University of Toronto
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What do faculty and students need to engage with making in the academic context?
A simple model of competence


Making as a literacy
Making as a literacy

Technologies

• Design & modeling materials
• Laser cutting, CNC milling
• 3D printing & 3D scanning
• Arduino programming & electronics
• Wood and metal working
• Sewing & e-textiles
Making as a literacy

Skills

• Creative problem solving
• Design thinking
• Iterative testing / Learning through mistakes
• Recognizing & explaining technology affordances
• Matching technology affordances to problem needs (as a way of problem solving)
• Articulating WHY something works (or doesn’t)
• Using tools and technologies (competence)
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An effective consultation

1. IDENTIFY learning outcomes
2. REVIEW syllabus
3. DESIGN activities and assignments
4. PLAN assessment and evaluation
Authorship Learning Experiences

- Studio Art
- Engineering

- Entrepreneurship
- Neurobiology
- Education
- Biology

What else?
Learning spaces

BeAM@Hanes Art Center

BeAM@Kenan Science Library

1789 Entrepreneurship Space

Regular classroom
EDUC 890: Special Topics in Education

Dr. Kelly Ryoo

Relevant Course Objectives

• Develop a basic understanding of and gain experience with a range of emerging technologies in education

• Analyze and evaluate the current use of emerging technologies in various educational settings

Workshop Goals

• Expose students to a range of technologies being used in teaching and learning environments so they can understand emerging technologies in education

• Inspire the technology designs for their semester-long projects.
## EDUC 890: Special Topics in Education

<table>
<thead>
<tr>
<th>Technologies</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ 3D design</td>
<td>✓ Creative problem solving</td>
</tr>
<tr>
<td>✓ Arduino programming &amp; electronics</td>
<td>✓ Design thinking</td>
</tr>
<tr>
<td>✓ E-textiles</td>
<td>✓ Recognizing &amp; explaining technology affordances</td>
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<tr>
<td>✓ Prototyping</td>
<td>✓ Matching technology affordances to problem needs (as a way of problem solving)</td>
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<td></td>
<td>✓ Articulating why something works (or doesn’t)</td>
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<tr>
<td></td>
<td>✓ Using tools and technologies (competence)</td>
</tr>
</tbody>
</table>
4 workshops

1. Arduino/Scratch
2. E-Textiles
3. Cardboard prototyping
4. 3D design

I really liked the ones where we got to design our own things.

The workshops were really cool; I don't see how they could be used in the classroom.

I loved the E-textiles lesson and the gears in my head were turning around ideas about how to integrate a lesson like this into the elementary classroom, as well as how to get a session like this in place for the Student Teachers in following years.
BIOL 202: Molecular Biology and Genetics

Dr. Kelly Hogan

Relevant Course Objectives

• Learn to communicate concepts learned in class using maker technologies
• Have fun and feel the creative process

Workshop Goals

• Before workshop, introduce students to makerspace technologies using demonstration videos.
• In workshop, have students brainstorm a project using makerspace equipment
BIOL 202: Molecular Biology and Genetics

Scenario

Welcome to your first day of work at the Modern Museum of Art and Science. We’re looking forward to your designs for communicating ideas about Genetics and Molecular Biology to the general public.
BIOL 202: Molecular Biology and Genetics

Technologies
- ✓ 3D printing
- ✓ Prototyping
- ✓ Laser cutting
- ✓ Vinyl Cutting
- ✓ T-shirt press

Skills
- ✓ Creative problem solving
- ✓ Design thinking
- ✓ Recognizing & explaining technology affordances
- ✓ Matching technology affordances to problem needs (as a way of problem solving)
- ✓ Articulating why something works (or doesn’t)
ECON 057H: First Year Seminar

Relevant Course Objectives

• To understand and apply the design thinking process;
• To conceptualize, to design and to fabricate a physical object;
• To have a basic understanding of currently available design and fabrication tools including 3D Printing.

Workshop Goals

• Introduce and orient students to the resources of BeAM
• Introduce students to the use of 3D design with Tinkercad
Making as a literacy

Technologies
- Design & modeling materials
- Laser cutting
- 3D printing

Skills
- Creative problem solving
- Design thinking
- Iterative testing / Learning through mistakes
- Matching technology affordances to problem needs (as a way of problem solving)
- Using tools and technologies (competence)
4 workshops, 2 each on:

1. BeAM at Hanes Orientation
2. 3D Design with Tinkercad
NBIO 890: Microscopy Principles & Applications

Dr. Vladimir Ghukasyan

Relevant Course Objectives

• Build scientific equipment on their own or adapt the equipment built by others
• Overcome the limitations of commercially available equipment
• Develop independent thinking

Workshop Goals

• Introduce and orient students to the resources of BeAM
• Introduce students to the use of 3D design, 3D printing, soldering of electronics
4 workshops
1. 3D Printing
2. 3D Design
3. Soldering
4. Electronics
Arts 302/402: Intermediate and Advanced Painting

Lien Truong

Students were trained on the intro woodworking tools in order to build stretchers for painting canvases
Best Pedagogical Practices

- Align with outcomes
- Be explicit
- Start small
- Iterate
What’s next?
Growing a community of maker faculty

• Intro to Making workshop for faculty
• Showcases, conferences, symposia
• Faculty & staff advisors to BeAM
• Course development grants
• New faculty orientation
Multidisciplinary Making

Image source: