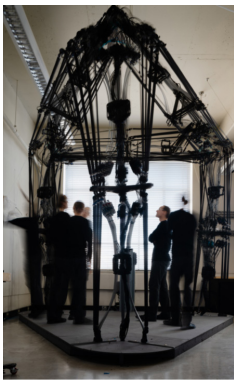
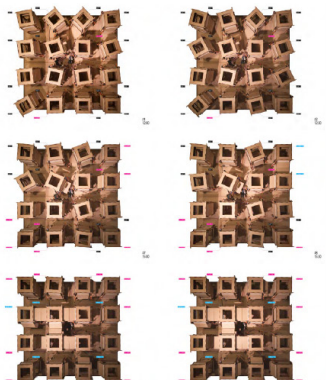
4.184 Embodied Computation Workshop

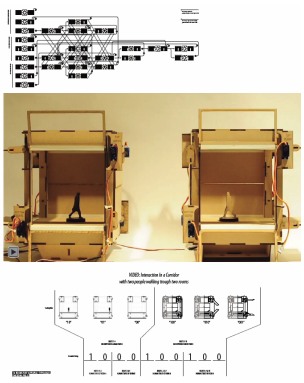
Syllabus

Spring 2022
Instructor: Axel Kilian
credits: (3-0-6)G
Time: First meeting Thursday 9.30am-12.30pm room 5-231 - final time TBD in first meeting
contact: Axel Kilian akilian@mit.edu office hours sign up sheet



The Flexing Room
Axel Kilian 2019





16 people 16 rooms studio project
Ji Shi

Description: The design research workshop is structured around developing in depth student defined design experiments.

We will start with gathering individual research interests through design per student in the realm of architecture with an emphasis on prototype-based experiments, then develop a hypothesis, create a preliminary precedent review, derive a design-based experiment with a prototype to test the hypothesis, evaluate the outcome and summarize the method and results in a short technical paper.

The process is accommodated by labs that support the development of the computational approach bridging digital and physical using electronics and fabrication to develop prototypes that embody computation. Work is shared and discussed amongst the workshop participants in assignment updates and reviews to give feedback and support.

Research themes are encouraged to be experimental and based on physical-computational hybrid prototypes - exploring the evolving relations between people and sensing built constructs in the architectural realm.

The goal is to engage with computation and technology critically to materialize novel scenarios in architecture and make them experiencable. The workshop serves as an introduction to communicate findings in a technical paper and help expand the range of voices and topics in the field.

Assignment summaries

A sequence of assignments structures the development of a prototype that is the materialization of a design speculation critically addressing the impact of computation on material constructs and the consequences on human cohabitation with architectural robotic constructs

Assignment 1

Define a design specualtion in the realm of embodied computation. Formulate a hypothesis and a response in the form of a design proposal for a physical/computational prototype that allows you to explore and test your thesis.

Assignment 2

Construct your first iteration hybrid physical computational artifact in response to your design proposal.Support your physical artifact with a written narative to state your hypothesis and critical position. How does the artifact or sample frame your hypothesis ?

Assignment 3

Setup an evaluation framework in which you test your next iteration of your prototype with respect to your hypothesis and document the process and results.

Assignment 4

Finalize your prototype and evaluation iteration and write a short technical paper to document and discuss your results and present your overall work during final exam presentation.

Schedule draft:

2/3	Intro embodied computation - lab associative design - handout assignment 1
2/10	Presentation proposal assignment 1 - lab grasshopper and plugin infrastructure
2/17	Prototypes - Final presentation assignment 1 – handout assignment 2
2/24	Proposal presentation assignment 2 - Lab Prototype and Arduino electronics
3/3	Update presentation assignment 2 - Lab Protoype and actuation
3/4	Add Date
3/10	Final Presentation assignment 2 – handout assignment 3
3/17	Proposal assignment 3 – lab prototype and sensing
3/24	Spring Break
3/31	Update assignment 3 – lab evaluation and data- processing intro
4/7	Presentation assignment 3 – handout assignment 4
4/14	Proposal assignment 4 – Lab hands on help and project specific topics
4/19	Drop Date
4/21	Lab hands on help and project specific topics
4/28	Update presentation assignment 4 - Lab Prototypes-simulation links- project help
5/5	Lab Technical Paper writing
5/12	no class meetings allowed for MArchs
5/13-18	Final Review Assignment 4 + Final technical Paper date scheduled by registrar in final exam week

Grading:
Participation 10%
Assignment 1 20%
Assignment 2 20%
Assignment 3 20%
Assignment 4 20%
Paper report 10%

References:

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Learning Objectives:
The course consists of four assignments expanding the concept of embodied computation from matter to behavior. Students should be able to engage with an increasing level of design research through iterative prototypes and move fluidly between different modes and scales of operation. At the core of the course is the Experimentation with different physical and electronic media to develop design prototypes and to reflect critically on its implications for design. A technical final paper is expected in documenting the final outcome and semester progress.

Completion Requirements:
Completion of each of the assignments, rigor in process and clarity in representation, as well as the overall progress of the semester (including attendance) will be fundamental to completing the course.

Evaluation Criteria and Grading:
All students are expected to attend all synchronous classes and participate in presentation updates, final presentations and discussion of presented work. If attending the synchronous class is not possible please contact the instructor beforehand to arrange an alternative. Regular attendance of synchronous weekly sessions is crucial for design development and live project discussions.
The following criteria will be used for the evaluation of student's work, both in terms of helping their progress and in final grading. (01) Thesis: How clearly is the student articulating the conceptual intentions? (02) Translation of Thesis: How well is the student using their thesis to develop a design response to given problems? (03) Representation Appropriateness: How well matched is their choice of representational means to their intentions? (04) Prototyping Quality: How accomplished are they with drawing, modeling, digital representation, and prototyping? (05) Oral Presentation Skills: How clearly are they presenting their ideas orally, whether at their desk, in class discussions, or to a more formal jury? (06) Participation in Discussions: How actively and how constructively are they involved in class discussions, both formally and informally? (07) Response to Criticism: How do they effectively take advantage of criticism from instructors, classmates and outside jurors? (08) Auto-Critical Skills: To what extent are they able to critique their own work regularly and effectively? (09) Attendance – attendance to all classes is mandatory, please email beforehand for excused absence. (10) Group work – contributing to the group dynamic and willingness to collaborate .

Backup Plans in terms of learning continuity regrading Covid
We will make an effort to record all course sessions via zoom both for future reference and for anyone who maybe out in isolation or sick at any time. We will also support isolating students as good as we can to help them keep up with the course material. If the instructor has to isolate we will shift the course to remote via the posted zoom room and use the established digital tools slack and dropbox to continue teaching and collaborating. Everything else will happen in person as it stands now.

A: Excellent - Project surpasses expectations in terms of inventiveness, appropriateness, verbal and visual ability, conceptual rigor, craft, and personal development. Student pursues concepts and techniques above and beyond what is discussed in class.
B: Above Average - Project is thorough, well researched, diligently pursued, and successfully completed. Student pursues ideas and suggestions presented in class and puts in effort to resolve required projects. Project is complete on all levels and demonstrates potential for excellence.
C: Average - Project meets the minimum requirements. Suggestions made in class are not pursued with dedication or rigor. Project is incomplete in one or more areas.
D: Poor - Project is incomplete. Basic skills including graphic skills, model-making skills, verbal clarity or logic of presentation are not level-appropriate. Student does not demonstrate the required design skill and knowledge base.
F: Failure - Project is unresolved. Minimum objectives are not met. Performance is not acceptable. This grade will be assigned when you have excessive unexcused absences.

Diversity
MIT values an inclusive environment. I hope to foster a sense of community in this classroom and consider this classroom to be a place where you will be treated with respect. I welcome individuals of all backgrounds, beliefs, ethnicities, national origins, gender identities, sexual orientations, religious and political affiliations – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class. If this standard is not being upheld, please feel free to speak with me.

Writing Center
The WCC at MIT (Writing and Communication Center) offers free one-on-one professional advice from communication experts. The WCC is staffed completely by MIT lecturers. All have advanced degrees. All are experienced college classroom teachers of communication. All are all are published scholars and writers. Not counting the WCC's director's years (he started the WCC in 1982), the WCC lecturers have a combined 133 years' worth of teaching here at MIT (ranging from 4 to 24 years).
The WCC works with undergraduate, graduate students, post-docs, faculty, staff, alums, and spouses.
The WCC helps you strategize about all types of academic and professional writing as well as about all aspects of oral presentations (including practicing classroom presentations & conference talks as well as designing slides). No matter what department or discipline you are in, the WCC helps you think your way more deeply into your topic, helps you see new implications in your data, research, and ideas. The WCC also helps with all English as Second Language issues, from writing and grammar to pronunciation and conversation practice.
The WCC is located in E18-233, 50 Ames Street). To guarantee yourself a time, see the WCC's page About Appointments where you can then schedule an appointment online."

Mental Health

As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may impact your ability to attend class, concentrate, complete work, take an exam, or participate in daily activities.

Undergraduates: Please discuss this with Student Support Services (S3). You may consult with Student Support Services in 5-104 or at (617) 253-4861.

Graduate Students: Please reach out to the deans for personal support in the Office of Graduate Education.

For urgent or after-hours concerns, please contact MIT Police

Academic integrity

MIT's expectations and policies regarding academic integrity should be read carefully and adhered to diligently: http://integrity.mit.edu/.

From the Office of Student Citizenship, W20-507, (617) 258-8423

In this course, I will hold you to the high standard of academic integrity expected of all students at the Institute. I do this for two reasons. First, it is essential to the learning process that you are the one doing the work. Failing to do the work yourself will result in a lesser understanding of the content, and therefore a less meaningful education for you. Second, it is important that there be a level playing field for all students in this course and at the Institute so that the rigor and integrity of the Institute's educational program are maintained.

Please review the Academic Integrity policy and related resources (e.g., working under pressure; how to paraphrase, summarize, and quote; etc.) and contact me if you have any questions about appropriate citation methods, the degree of collaboration that is permitted, or anything else related to the Academic Integrity of this course..