

# HUMAN-CENTERED SEMINAR - CSCE 667 600 (Fall 2019)

Fabricating future interaction techniques for Human-machine Collaboration

Seminar + Studio combined class. In this class, you will learn various details of cutting-edge technologies and prototyping techniques to make tangible computers for human-computer interaction. The intent of this class is to provide general understandings on HCI theories, design principles, late-breaking research in future interaction techniques and underlying technologies, then to offer fundamental skills for prototyping to investigate users' needs in technology development.

## Learning Outcomes

With the focus on digital fabrication and a broad spectrum of HCI, you will know (1) fundamental HCI principles and how they support the process of technology development, (2) late-breaking HCI research and underlying technologies (Muscle actuated computers, Mechanical Turk, 4D printing, Gesture interactions, etc., ) (3) how to prototype physical artifacts using machines and tools (e.g. laser cutting, 3D printing, electronics design), and (4) how to prototype hardware and software systems for future interaction techniques.

## Instructor

Jeeun Kim (<http://jeeeunkim.com/>)

Email: [Jeeun.kim@tamu.edu](mailto:Jeeun.kim@tamu.edu)

Office: HRBB 403

Office hours: Wednesday 12-2pm

## Location

Lecture (Tuesday): HRBB 126

Studio (Thursday): Langford A107C, Makerplace

## Course Site

<http://CSE667.slack.com>

## Grading Policies

### Scale

|        |   |
|--------|---|
| 95-100 | A |
| 80-95  | B |
| 70-80  | C |
| 60-70  | D |
| <60    | F |

## Weight

Participation: 10%

Assignments + In-studio activities (Mainly individual, can work as a group if preferred): 10%

Presentation: 10%

Midterm project (Group project): 30%

Final project (Group project): 40%

No written exam, no quiz

## Deliverables

Assignment: Outcome of studio activities and project milestones.

Submit through the slack. Always due by **Sunday 11:59 pm** (CT) unless specified

Mid-term project: YouTube video on a replicated product from [Instructables](#) and new documentation of yours

You can also choose a project from well-documented fabrication processes

e.g., YouTube How-to Videos, [How to make almost anything](#), MIT Media Lab, Center for Bits and Atoms

Final-term project: prototype of your own systems/things

1) Project website showcasing your work; include

- Detailed descriptions on design decision and development process
- Video of your prototype describing the story of its motivation and process to implement it
- Photos of your prototype

2) Presentation of your final project

## Requirements

- No prerequisite, **I welcome all students with various backgrounds** (CS/CE, EE, ME, Architecture, Design, and Material Science, etc.)
- Come to class, preferably on-time
- Bring something to sketch with
- No texting/Facebooking/Instagramming during the class -- **No exception**
- Be ready for heavy hands-on projects; you will be likely to spend 6+ hours per week
- **Expect to invest some money to purchase studio materials.** Basic materials will be provided.
- This class will introduce a wide variety of topics in rapid prototyping and late-breaking interaction technologies with VERY quick turnarounds. You don't need to be a geek, but **you should become a fast learner**: acquire new skills, and self-advance to the (semi)expert level with your own investment.
- Bring your own passion and motivation-- This course will help you build your portfolio & research experiences with QUALITY, not your course credits with QUANTITY

## Reading

Week 1: [Reflective Physical Prototyping through Integrated Design, Test, and Analysis](#) (UIST'06)

Björn Hartmann, Scott R. Klemmer, Michael Bernstein, Leith Abdulla, Brandon Burr, Avi Robinson-Mosher, Jennifer Gee

Week 2: [Organic User Interfaces & Tangible Interfaces](#) (Communications of ACM)

Roel Vertegaal, Ivan Poupyrev, Hiroshi Ishii

Week 3: [What do Prototypes Prototype?](#) (In Handbook of Human-computer interaction, 2nd ed.)

Stephanie Houde, Charles Hill

Week 4: [Integrating Craft Materials and Computation](#)

Glenn Blauvelt, Thomas Wrensch, Michael Eisenberg

Week 5: [Creativity Support Tools](#)

Ben Shneiderman

(More to be announced)

## Course Schedule (Tentative)

The schedule below is provisional, subject to change (likely be reduced) based on the progress.

| Week | Date      | Class Type | Lecture & Studio activities  | Assignment   | Note  |
|------|-----------|------------|--|--|---|
| 1    | Aug. 27th | Lecture    | <b>Course Intro</b><br>What's HCI/Digital fabrication and state-of-art interaction technologies?   | 1. Material for 5min. self-intro<br>2. Complete <a href="#">this form about you</a>      |   |
|      | 29th      | Studio     | Part 1: Student introduction<br>Part 2: Warm-up exercise <a href="#">Paper pinhole camera</a>  | (both due before the studio, 29th)   |   |
| 2    | Sep. 3rd  | Lecture    | <b>Part 1: Late-breaking Interaction Technologies</b><br><b>Part 2: Research ideas &amp; curation</b>  | 1. Instagram account for your observation research                                       |   |
|      | 5th       | Studio     | Group Formation & Cardboard prototyping  | 2. Fill <a href="#">this form</a> about a mid-term project plan (Group work)             |   |
| 3    | Sep. 10th | Lecture    | <b>Part 1: Sensing &amp; Actuation</b><br><b>Part 2: 2.5D prototyping: Laser cutting basics and advanced techniques</b>  | Keep collect your observation from instagram   |   |
|      | 12th      | Studio     | Laser cutting (special studio w/ Makerspace staff)   |  |   |
| 4    | Sep. 17th | Lecture    | <b>Physical computing &amp; Arduino setup</b>  | Laser cut Business card  | Sign up <a href="#">a project idea meeting</a> w/ Jeeun |
|      | 19th      | Studio     | <a href="#">Arduino</a> + Node.js basics<br>add interactivity into your cardboard fabrication<br>Read <a href="#">this tutorial</a> about Arduino before the lecture | Fill <a href="#">this form</a> about final project research & proposal (individual work) |   |
| 5    | Sep.      | Lecture    | <b>Part 1: High-Low prototyping</b>  | Interactive Interface  |   |

|    |           |         |  |  |                     |
|----|-----------|---------|--|--|---------------------|
|    | 24th      |         | <b>Part 2: Interactive Screen Interfaces</b>   | ended in P5.js   |                     |
|    | 26th      | Studio  | Programming in <a href="#">P5.js</a> (Processing javascript ver.):<br>Light up your LED based on mic input   | No assignment;<br>Work on your mid-term project                              |                     |
| 6  | Oct. 1st  | Lecture | <b>AI &amp; Computer vision in Digital Fabrication:</b><br>Guest Lecture, <a href="#">Anhong Guo</a> , Ph.D. candidate at CMU, School of Computing & HCI Institute   | 5-10 min. video of your <b>mid-term project</b>                              |                     |
|    | 3rd       | Studio  | Programming in <a href="#">P5.js</a> : create a local server for connecting with your Arduino<br>Programming in <a href="#">OpenCV.js</a> : contour extraction using your laptop camera image. <a href="#">Robust guideline for starting with Deep Learning using OpenCV</a> |  |                     |
| 7  | Oct. 8th  | Lecture | <b>Midterm project presentation &amp; critique</b><br><a href="#">Fill this form</a> about midterm vote/feedback for your cohorts during the class   | Camera-based feature extraction using OpenCV. Details to be announced.       |                     |
|    | 10th      | Studio  | Work on your final term project  |  |                     |
| 8  | Oct. 15th | Lecture | <b>Parametric 3D modeling &amp; 3D printing</b><br>Fusion360 + <a href="#">CraftML</a> + <a href="#">OpenSCAD</a> modeling<br>Group 1 gives 20-min. paper summary talk   | 3D printed keychain + original design file/code                              |                     |
|    | 17th      | Studio  | <a href="#">Cura</a> & 3D printer set up   |  |                     |
| 9  | Oct. 22nd | Lecture | (No class) Work on your final projects   | <i>No assignment;<br/>Work on your final-term project</i>                    | Jeeun is at UIST'19 |
|    | 24th      | Studio  | (No class) Work on your final projects   |  |                     |
| 10 | Oct. 29th | Lecture | <b>Soft circuits &amp; Wearable</b><br>Group 2 gives 20-min. paper summary talk  | Halloween photo with wearables made by you                                   |                     |
|    | 31st      | Studio  | Wearables Design for Halloween ( <a href="#">Reference</a> )   |  |                     |
| 11 | Nov. 5th  | Lecture | <b>Digital fabrication application 1: Bridging the gap between physical world &amp; digital world</b><br>Guest Lecture, <a href="#">Youngwook Do</a> , Ph.D. student at Georgia Tech, School of Interactive Computing  | Final project idea presentation material (team submission, due 7th, 10:59am) |                     |
|    | 7th       | Studio  | Final project interim: present concept/progress and critique   |  |                     |
| 12 | Nov. 12th | Lecture | <b>Digital fabrication application 2:</b><br>Improving everyday lives with digital fabrication<br>Group 3 gives 20-min. paper summary talk   | Fill this form about ideas on measurement representation                     |                     |
|    | 14th      | Studio  | Work on your final projects  |  |                     |
| 13 | Nov. 19th | Lecture | (No class) Work on your final projects   | <i>No assignment - work on your final project</i>                            | Jeeun is at KAIST,  |

|    |           |         |   |   |       |
|----|-----------|---------|---|---|-------|
|    | 21st      | Studio  | (No class) Work on your final projects  |   | Korea |
| 14 | Nov. 26th | Lecture | <b>Digital fabrication application 3:</b><br>Human-Fabrication Machine Interaction<br><del>Group 4 gives 20 min. paper summary talk</del> | <i>No assignment -<br/>work on your final<br/>project</i>   |       |
|    | 28th      | Studio  | (No class) Happy Thanksgiving!  |   |       |
| 15 | Dec. 3rd  | Lecture | Final presentation & demo I<br>20 min (including 3 min. Q&A)/team   | Complete <a href="#">this form</a><br>for peer review<br>Project website of<br>your <b>Final term<br/>project</b> |       |
|    | 5th       | Studio  | Final presentation & demo II  |   |       |

## Late Assignment Policy

Extensions can be given 12 hours prior to the deadline. 20min + due will be given as a grace period. Otherwise, **50% off from the credit you got for that submission.**

## Email Policy

Like many professors, I get a ton of emails. When you email me, please be sure that the question you ask requires my answer in one or two short sentences. Otherwise, I put it back to respond with a full (long) context, then unfortunately, may forget.

## Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit <http://disability.tamu.edu>.

## Academic Integrity

*“An Aggie does not lie, cheat or steal, or tolerate those who do.”*

For additional information please visit: <http://aggiehonor.tamu.edu>)

## Attendance & makeup policies

If an absence is excused, make an appointment with the instructor ([jeeeun.kim@tamu.edu](mailto:jeeeun.kim@tamu.edu)) for make-up work. The subject and task will vary upon your absent assignment and deliverables. The make-up work must be completed in a timeframe not to exceed 30 calendar days from the last day of the initial absence.

The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for the absence. Among the reasons absences are considered excused by the university are the following (see

Student Rule 7 for details <http://student-rules.tamu.edu/rule07>). The fact that these are university-excused absences does not relieve the student of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.

1) Participation in an activity that is required for a class and appears on the university authorized activity list at <https://stuactonline.tamu.edu/app/sponsauth/index>

2) Death or major illness in a student's immediate family.

3) Illness of a dependent family member.

4) Participation in legal proceedings or administrative procedures that require a student's presence.

5) Religious holy day. NOTE: Prior notification is NOT required.

6) Injury or illness that is too severe or contagious for the student to attend class.

a) Injury or illness of three or more class days: Student will provide a medical confirmation note from his or her medical provider within one week of the last date of the absence (see Student Rules 7.1.6.1)

b) Injury or illness of less than three class days: Student will provide one or both of these (at instructor's discretion), within one week of the last date of the absence:

(i.) Texas A&M University Explanatory Statement for Absence from Class form available at <http://attendance.tamu.edu>

(ii.) Confirmation of visit to a health care professional affirming date and time of visit.

c) An absence for a non-acute medical service does not constitute an excused absence.

7) Required participation in military duties.

8) Mandatory admission interviews for professional or graduate school that cannot be rescheduled.

9) Mandatory participation as a student-athlete in NCAA-sanctioned competition.

10) In accordance with Title IX of the Educational Amendments of 1972, Texas A&M University shall treat pregnancy (childbirth, false pregnancy, termination of pregnancy and recovery therefrom) and related conditions as a justification for an excused absence for so long a period of time as is deemed medically necessary by the student's physician. Requests for excused absence related to pregnancy should be directed to the instructor.

Other absences may be excused at the discretion of the instructor with prior notification and proper documentation.

In cases where prior notification is not feasible (e.g., accident or emergency) the student must provide notification by the end of the second working day after the absence, including an explanation of why notice could not be sent prior to the class.

Accommodations sought for absences due to the observance of a religious holiday can be sought either prior or after the absence, but not later than **two** working days after the absence.