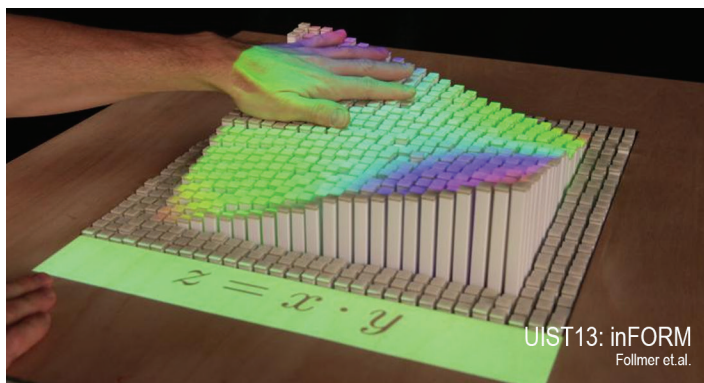




# Interactive Technologies in Human-Computer Interaction

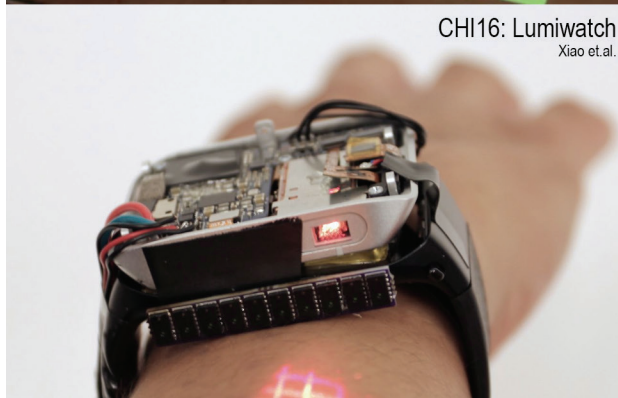
## CMSC 730 | Fall 2023 | Huaishu Peng



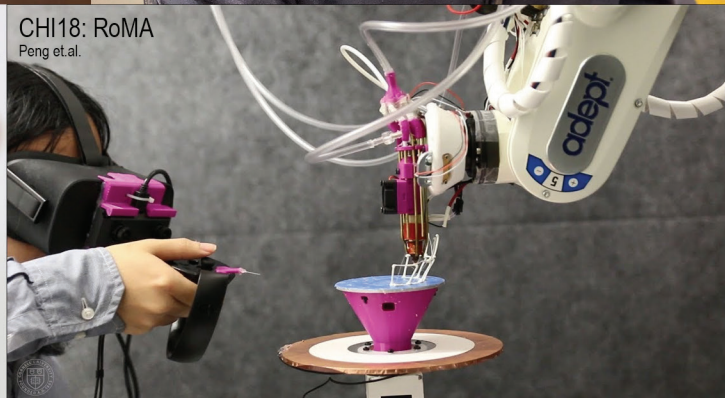
UIST13: inFORM  
Follmer et.al.



IMWUT Sep 2022: Calico  
Sathya et.al.



CHI16: Lumiwatch  
Xiao et.al.



CHI18: RoMA  
Peng et.al.

## Overview

This graduate-level, research-oriented course covers broad areas of interactive technology and HCI topics. The course activities include readings, small lab assignments, term projects, and a final exam. Topics include ubiquitous and mobile computing, wearables, virtual/augmented reality, natural user interfaces, tangible UIs, interactive fabrication, and more.

After successfully completing this course, you will be able to:

- Have a thorough understanding of the technologies behind cutting-edge interactive techniques.
- Learn the state-of-art topic and the recent advancement of technical HCI research and learn how to evaluate and understand its contribution.
- Gain rapid prototyping skills (including modeling, simple electronics, and fabrication) that allow you to design and build interactive devices, gadgets, and sensing systems.

## Required Resources

Course website: <http://piazza.com/umd/fall2023/cmssc730>

**Dr. Huaishu Peng**

[huaishu@cs.umd.edu](mailto:huaishu@cs.umd.edu)

### Class Meets

Monday & Wednesday  
3:30pm – 4:45am  
IRB 2107

### Office Hours

Wed 2 – 3 pm  
and by appointment  
IRB 4206 or Zoom  
<https://umd.zoom.us/my/huaishu>

### TA

Zeyu Yan  
[zeyuy@umd.edu](mailto:zeyuy@umd.edu)

### Prerequisites

N/A

### Course Communication

Course-related material will be posted on ELMS before or right after the class. You are welcome to email me to discuss questions, absences, or accommodations directly. You can discuss course-related info on Piazza.

## Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit <https://president.umd.edu/administration/policies/section-iii-academic-affairs/iii-120a> and follow up with me if you have questions.

## Activities, Learning Assessments, and Expectations for Students

Before Class: Install the **required software/toolkit** and complete all listed readings. You are responsible for keeping up with readings per the schedule in the syllabus. You are responsible for getting the required software ready and bringing the required hardware for in-class practice. You are responsible for knowing where we are in our class discussions.

Attendance: Your attendance will be part of your participation in this class. I expect students to come to all classes unless there is a university-accepted reason (e.g., illness). Much of the learning for the course and a significant amount of project work occurs in class.

- Class starts on time: Being late for class affects our learning experience. Come to class on time.
- Absences: If you have to miss a class due to an illness or similar reason, contact me before the class begins.

During Class: We will have lectures, discussions, and hands-on practice during class. Please bring a laptop (and course material, if applicable) with you. You are encouraged to participate in class discussions. Your participation grade will reflect the amount of participation you contribute to course discussions and in-class activities.

Semester-Long Project: You will work on a semester-long project with your team members throughout this semester. The projects are to build interactive devices/gadgets that can sense/respond to environmental triggers and behave accordingly, but with different focuses. You will present individual projects with demo videos and/or reports.

Robot Competition: You will work with another classmate to build a robot that can climb along a pipe. You will be graded based on the design of the robot and its performance.

Weekly Assignments: There will be weekly assignments, including hands-on building practice and/or reading reports that help with your learning in this course.

Final Exam: A final exam will be administered to test your understanding of the concepts and skills introduced throughout the course.

Late Assignments: All assignments must be submitted by 11:59 pm on the day they are due unless other due time is specified. The general policy in this class is that late assignments (both individual and team assignments) will be deducted 5% of their points after 11:59 pm and an additional 5% of their points each day they are late. Late assignments will be accepted according to this policy up to three days after the assignment due date. Assignments more than three days late will not be accepted unless approved by instructors in written format. It is at the instructor's discretion to accept late work and assign a late point deduction. Because the assignments of this course accumulate for the final project, it is crucial to follow the assignment schedule.

No Extra Credit Work: Extra credit work will not be given on an individual basis.

## Grades

Your grade is determined by your performance on the learning assessments in the course and is assigned individually (not curved). If earning a particular grade is crucial to you, please speak with me at the beginning of the semester so that I can offer some helpful suggestions for achieving your goal.

All assessment scores will be posted on the course webpage. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet in my office.

Gradings	Category Weight
<b>Assignments:</b> 2D/3D drawing, laser cutting/3D printing, circuit, etc.	10%
<b>Mini Robot Competition</b>	15%
<b>Semester-Long Project:</b>	
Milestone 1	5%
Milestone 2	10%
Milestone 3	25%
<b>Participation</b>	5%
<b>Final Exam</b>	30%
<b>100%</b>	

## Tentative Course Schedule

Class Date		Topic and Skills
Week1	Mon	0. Course Overview
	Wed	1. Skill -> 3D Modeling 1: Basics
Week2	Mon	No Class   Team decided
	Wed	2. Skill -> 3D Modeling 2: Assembly
Week3	Mon	3. Concept -> Multitouch
	Wed	4. Milestone 1 – Idea Presentation
Week4	Mon	5. Concept -> Phone/Smartwatch interaction
	Wed	6. Skill -> Electronics: Digital IO Skill
Week5	Mon	7. Concept -> Wearable
	Wed	8. Skill -> Electronics: Analog and Sensing
Week6	Mon	9. Concept -> Tangible Interaction

	Wed	10. Skill -> Electronics: IMU 1 with I2C
Week7	Mon	11. Concept -> Display
	Wed	12. Skill -> Electronics: IMU 2
Week8	Mon	13. Concept -> VR
	Wed	14. Skill -> Shift Register
Week9	Mon	15. Concept -> VR and Haptic
	Wed	16. Milestone 2 project clinics
Week10	Mon	17. No Class. UIST 2022   Work on Milestone 2
	Wed	No Class. UIST 2022.   Work on Mini Robot Competition
Week11	Mon	18. Concept -> Fabrication 1
	Wed	19. Skill -> Electronics: Servo and Ultrasonic Sensor
Week12	Mon	20. Concept -> Accessibility (Guest Lecture)
	Wed	21. Mini Robot Competition
Week13	Mon	22. Concept -> Fabrication 2
	Wed	No Class
Week14	Mon	23. Concept -> HRI
	Wed	24. Skill -> Laser Cutting
Week15	Mon	Final prototype clinics
	Wed	Final prototype clinics
Week16	Mon	Milestone 3 – DEMO Day!

**Note:** This is a **tentative** schedule and subject to change as necessary – monitor the course webpage for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.