

# Winter 2023: Action and Perception

**Course Number:** EECS 598

**Credit Hours:** 3 credits

**Location:** EECS 1303 on M/W 10:30-12pm

**Instructors:** [Stella Yu](#), [Benjamin Kuipers](#), [Andrew Owens](#)

**Assistants:** [Zilin Wang](#), [Sangryul Jeon](#)

**Prerequisites:** Basic knowledge of machine learning, computer vision, and robotics.

**Background:** The areas of computer vision and robotics have seen a lot of successes using machine learning with handcrafted supervision and data curation. However, these computational models remain specialized and restrictive to the tasks and the data they are trained on. In contrast, from entirely undivided sensations and crude motor controls, without being taught how to see and act, human babies develop the ability to perceive the world and control their own bodies, and in the process understand the physical 3D world they live in. Contrasting current computational modeling methods and biological development would help us gain fresh perspectives into how intelligence could emerge, by purely learning without supervision, from interactive sensory data acquisition and motor control with the environment.

**Scope:** In this graduate-level course, we will study research papers on the development of visual, audio, and tactile perception and body control in humans, in comparison with the latest machine learning methods in computer vision and robotics, on tasks such as ocular motor control, reaching, grasping, manipulation, locomotion etc.

**Requirements:** This course is not meant to teach you basic skills in machine learning, computer vision, and/or robotics, but to survey research papers with a critical and thoughtful mind, and examine them in connection to what we know about development of action and perception in humans. Summaries of weekly readings, 1-2 presentations, active participation in class discussions, and a final project are required. The final project could be a well formulated investigation based on published work and code, or novel research related to action and perception.

**Sign-Up:** If you need to be considered for a registration override or put on the wait-list, please sign up [at this form](#).

**Grading:**

1. 40%: Written summaries, active discussions (1+ post) before and during class
2. 30%: 1-2 high quality paper presentations during the semester
3. 30%: Final project, could be solo work or team work of no more than 3 students

**Weekly Submissions:**

- There will be two paper readings per class, resulting in 4 papers per week.
- Each student will submit a written summary of each paper.
- Two students will present a paper and its discussions on piazza before the class.
- Final slides will be released after incorporating in-class discussions afterwards.
- Submissions will be made on [Gradescope](#).

**Piazza Rules:**

- We use [Piazza](#) for discussions on conceptual and technical questions among classmates. There is no anonymity. Please be respectful to your classmates.
- Please post your questions, answers, and comments in dedicated folders. Each paper we read in the class has its own thread of discussions.
- Please check Piazza for already posted questions before posting a new one. Unnecessarily clogging up Piazza makes the platform less usable for everybody.
- Please use Piazza for all communications, private or public, as much as possible. Others will benefit from answers and discussions on public questions.
- Piazza is moderated by the teaching staff.

**Email Rules:**

- Please email [syu-eecs598@umich.edu](mailto:syu-eecs598@umich.edu) only if the Piazza private channel does not work for you. Emails to individual teaching staff members will be ignored.
- This single contact ensures that your concerns are addressed in the most timely manner, with the clarity of a single voice that represents the entire instruction team.

**Special Thanks to:**

[Jitendra Malik](#), [Alyosha Efros](#), [Marty Banks](#), [Bruno Olshausen](#), [Karen Adolph](#) for paper suggestions on robotics, computer vision, human vision, vision development, and motor development respectively!