The goal of the ex-cool project in Natural Intelligence Lab (NILab) is to experience the full process of a research project. Through the experience, you are expected to formulate a scientific research question, design an experiment, and analyze data to test hypotheses. The details of the project depends on your interest, passion, and skill set (e.g., coding experience, knowledge about neural network models, electrical circuit and signal processing, etc.). The most important thing is that you must have fun doing this project!

There are 4 potential topics, which differ in terms of experimental method, theoretical background, and implementation difficulty. You can propose your own project too.

- Does generative AI like GPT-4 have number sense or abstract concept about number? We will probe generative AI's number sense using a large database of natural images (e.g., cocodataset.org) and compare it with human behavior, if possible.
- Does human eye movement reflect complex storytelling of simple abstract video? A classic work by Heider & Simmel (1944) shows that humans extract a social narrative even from a movie composed of abstract objects. We will collect and analyze eye movements while human subjects extract different stories out of multiple movies.
- How is humans' number estimation (or visual perception, generally) affected by walking? We will test it with virtual reality (VR) setting (e.g., Apple vision pro) in human subjects walking in treadmill: check https://www.nature.com/articles/s41467-024-45780-4
- Can we measure the spiking activity of the motor unit in the octopus arm? Measuring spikes from motor unit is key to developing a new human computer interface as in Meta (facebook)'s new bracelet: https://youtu.be/Kx_nVrEKwTE?si=zqM-D8YYmB3wZBer. We will use cheap equipment from https://backyardbrains.com/ to test whether we can do it in smart octopus https://www.netflix.com/title/81045007