Casey Chu
Ph.D. Student in Computational and Mathematical Engineering, admitted Autumn 2016

Bio

Hi! I'm a first-year PhD student at ICME, interested in understanding the nature of data, information, and inference.

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Over the course of my PhD, I hope to become fluent in:

- Logic, computability theory, computational complexity theory, information theory: what kinds of information is obtainable in principle?
- Bayesian statistics: a theory that formalizes learning from evidence
- Machine learning, data science: practical tools for extracting knowledge from observations
- Classical mechanics, thermodynamics, statistical mechanics, quantum mechanics, particle physics: the most successful instance of inference in history; I want to generalize techniques used in physics to apply to inference problems in general

I think the following tools will be important to learn very well:

- Category theory: allows for powerful analogies, especially between physics and computation
- Representation theory: extraordinarily successful in physics, especially particle physics, so there's no reason it can't be generalized to more general inference problems
- Geometry and topology: powerful ways to think about data, already very successfully used in physics