The goal of this course has been to prepare you to engage with current research on dependent type theory, so your final project is to read and summarize a research paper on this topic. You may choose to do this in one of two ways:

1. Give a 30–45 minute “chalk talk” on a research paper.

2. Write a 5–10 page paper summarizing the results and ideas of the paper.

In both cases, you should target fellow Ph.D. students in this course, i.e., at someone who understands the material presented thus far in the course. We encourage students in the course to attend the talks of those who choose to give presentations.

The presentation or summary should focus on what the goals and contributions of the paper are, why these are the goals, and how they are achieved. Spend time identifying the broader context in which the paper was written, including briefly summarizing some earlier papers as necessary. Include some substantive technical details but don’t just paraphrase large blocks of text. Standard academic writing principles apply and try to give proper attribution for ideas.

Please let Daniel know via email as soon as possible which paper you intend to study and which method of presentation you prefer. We will announce a schedule for paper presentations once we have the relevant information.
Suggested papers

Here are some suggestions for suitable papers sorted roughly by topic. Particularly technical papers are marked with a ★. Feel free to propose a different paper that is about (not just uses) full-spectrum dependent type theory and its syntax, semantics, or implementation.

Even if you choose a paper listed below, we strongly suggest that you skim it before committing, and chat with Daniel about possible references to read first or sections you can skip. Note that longer papers are not necessarily harder!

Categorical semantics of type theory


• Steve Awodey. “Natural models of homotopy type theory”. In: Mathematical Structures in Computer Science 28.2 (2018), pp. 241–286. DOI: 10.1017/S0960129516000268


Logical frameworks


Taichi Uemura. “A general framework for the semantics of type theory”. In: Mathematical Structures in Computer Science 33.3 (2023), pp. 134–179. DOI: 10.1017/S0960129523000208

Observational type theories


Homotopy type theory and cubical type theory


Modal type theories


• Daniel Gratzer, G. A. Kavvos, Andreas Nuyts, and Lars Birkedal. “Multimodal Dependent Type Theory”. In: Logical Methods in Computer Science 17.3 (July 2021). doi: 10.46298/lmcs-17(3:11)2021


Type-checking and metatheory


• Andreas Abel, Thierry Coquand, and Miguel Pagano. “A Modular Type-checking algorithm for Type Theory with Singleton Types and Proof Irrelevance”. In: *Logical Methods in Computer Science* 7.2 (May 2011). doi: 10.2168/LMCS-7(2:4)2011


**Conservativity**


**Extending definitional equality**


Elaborating dependent pattern matching


Universes


Inductive types

