Introduction

- mathematics – 3,000,000 articles, 100,000 per year
- formalization of modern mathematics
- verification of code
- set theory – sets and propositions
- type theory
  - . . . as in some computer languages
  - more meaningful types
  - a formal language
  - a proof is certified code
  - proofs are first class objects
- Peano axioms for the natural numbers
- identity

- Homotopy Type Theory
  - two proofs of $x = y$ might not be equal to each other
  - definitions of *proposition* and *set*
  - paths
- Univalence Axiom
  - distracting statements out the window
  - transportation of proofs
  - a new foundation for mathematics

Some *Homotopy Type Theory* links:

- these slides: http://dangrayson.com/Lectures/
- the web site: http://homotopytypetheory.org/
- the blog: http://homotopytypetheory.org/blog/
- the book: http://homotopytypetheory.org/book/
- code (proofs) under development based on Voevodsky's foundations: https://github.com/UniMath/UniMath
- another development based on the same ideas: https://github.com/HoTT/HoTT
- the paper I'm working to check the proofs of: http://arxiv.org/abs/1310.8644
- a research grant: http://bit.ly/1o4Jae7
- CACM article: http://bit.ly/1mL8XXA

The authors of the book, at the Special Year at the Institute for Advanced Study in Princeton, 2012-2013: