Mathematical Logic at Penn State

September 16, 2013

- Logic Seminar: `http://www.math.psu.edu/simpson/logic/seminar/`
- Logic Lunch: weekly at nearby eating establishments.
- Logic Web Page: `http://www.math.psu.edu/simpson/logic/`
- Logic Research Personnel:
  - Stephen G. Simpson, Professor, `simpson@math.psu.edu`
  - Jan Reimann, Assistant Professor, `reimann@math.psu.edu`
  - Jason Rute, Postdoctoral Fellow, `jmr71@math.psu.edu`
  - Sankha Basu, Lecturer, `basu@math.psu.edu`
  - Adrian Maler, Ph.D. Candidate, `maler@math.psu.edu`
  - John Pardo, Ph.D. Candidate, `pardo@math.psu.edu`
- Logic Courses:
  - MATH 457, Introduction to Mathematical Logic
  - MATH 459, Computability and Unsolvability
  - MATH 557, Mathematical Logic
  - MATH 558, Foundations of Mathematics
  - MATH 559, Recursion Theory
  - MATH 561, Set Theory
  - MATH 574, Topics in Logic and Foundations
  - MATH 597, Special Topics

Historically, mathematical logic grew out of profound investigations concerning the most basic concepts and logical structure of mathematics. Among the great names are Georg Cantor, David Hilbert, Kurt Gödel, and Alan Turing.

- Cantor – father of set theory, the currently accepted foundation for all of mathematics.
- Hilbert – the leading mathematician of his time. The problem list of 1900. Foundations of geometry. The predicate calculus. The finitist program in foundations of mathematics.
- Gödel – *the* great figure in foundations of mathematics. Semantic completeness of the predicate calculus. The Gödel Incompleteness Theorem. Unprovability of consistency. The Gödel Hierarchy. Relative consistency of the Continuum Hypothesis.
- Turing – father of computer science. Analysis of computability via Turing machines. Unsolvability of the Halting Problem.

Important Note:

1. Gödel and Turing are the only mathematicians in Time Magazine's list of the 20 most influential thinkers of the 20th century.
2. MATH 557 and MATH 558 are an exposition of the ideas of Gödel and Turing.