

Xinhe Wu

Massachusetts Institute of Technology, Department of Linguistics and Philosophy,
77 Massachusetts Avenue 32-D8085, Cambridge, MA 02139, USA

Email: xinhewu@mit.edu

Phone: (+1)720-771-2091

RESEARCH AND TEACHING INTERESTS

AOS: Philosophical Logic, Mathematical Logic, Philosophy of Language,
Metaphysics

AOC: Philosophy of Mathematics, Epistemology, Philosophy of Mind,
History of Logic

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA 2017-2022
Ph.D. in Philosophy.
Minor: Mathematical Logic
Dissertation: *Boolean-Valued Models and Their Applications*
Committee: Vann McGee, Agustín Rayo, Stephen Yablo

University of Notre Dame, Notre Dame, IN 2013-2017
B.A. in Philosophy and Mathematics. *summa cum laude*.
Senior Thesis: *Sorites Paradox, Context Sensitivity and Knowability*
Advisor: Jeff Speaks

EMPLOYMENT

Department of Philosophy, University of Bristol, Bristol, UK 2022–Present
Postdoctoral Research Associate on the ERC project “Truth and Semantics”
(Principal Investigator: Johannes Stern)

PAPERS

1. “Boolean Mereology” (Forthcoming). *Journal of Philosophical Logic*.
2. “Boolean-Valued Models, Boolean Valuations, and Löwenheim-Skolem Theorems” (Under Review).
3. “Boolean-Valued Models of Set Theory with Urelements”, with Bokai Yao (Under Review).

PRESENTATIONS

- 2022 “Boolean Valued Models, Boolean Valuations, and Löwenheim-Skolem Theorems”
Colloquium Logicum, University of Konstanz. (September 2022)
- “A Theory of Boolean-Valued Models”
Philosophy of Logic, Math, and Physics (LMP) Graduate Student Conference,
Western University.
- 2021 “Boolean Mereology”
Work in Progress Seminar, MIT
- “A Theory of Boolean-Valued Models”
Midwest PhilMath Workshop, University of Notre Dame.
- 2020 “Vagueness: A Cognitive Perspective”
MITing of the Minds, MIT. Comments by Stephen Yablo.
- “More Puzzles of Ground and a Way Out”
Colloquium: Grounding and Metaphysical Explanation, 2020 APA Pacific.
(Accepted but canceled due to pandemic)
- 2019 “Higher-Order Logics”
Llamm Reading Group, MIT. Three-day presentation series.
- “Vague Predicates as Circular Concepts”
Massachusetts and Rhode Island Graduate Student Conference, University of
Massachusetts Amherst. Comments by Louis Gularte.
- “Vague Predicates as Circular Concepts”
MATTI Seminar, MIT.
- 2018 “What Grounds $T(p)$?”
MATTI Seminar, MIT.

AWARDS AND FELLOWSHIPS

- 2017 Presidential Fellowship for Graduate Studies (MIT)
- 2017 The Dockweiler Medal in Philosophy (Notre Dame)
- 2017 The John A. Oesterle Award in Philosophy (Notre Dame)
- 2013 Notre Dame Greater China Scholarship (Notre Dame)

TEACHING

As Course Developer

- Fall 2021 Paradox and Infinity
(MITx Link: <https://mitxonline.mit.edu/courses/coursev1:MITxT+24.118x/>)

As Teaching Assistant (instructor in parentheses)

- Fall 2020 Problems of Philosophy (Alex Byrne)
- Spring 2020 Minds and Machines (Jackson Kernion)
- Spring 2019 Paradox and Infinity (Agustín Rayo)

SERVICE

- Fall 2020 - Spring 2021 Representative to the Committee on Departmental Life (MIT)
- Fall 2020 - Spring 2021 Organizer of MIT “Philosophy of Language, Logic, Metaphysics & Mind” Reading Group
- Fall 2019 - Spring 2022 Organizer of the Harvard-MIT Philosophy Graduate Conference
- Fall 2017 - Spring 2019 Organizer of MIT Colloquium Series

GRADUATE COURSEWORK

(* = audit)

Logic

- 24.244 Modal Logic (McGee, MIT), Fall 2017
- 24.891 Independent Study: Philosophy and Model Theory (McGee, MIT), Fall 2017
- *PHIL 243 Philosophy of Mathematics (Koellner, Harvard), Spring 2018
- 24.711 Deflationism About Truth and Reference (McGee, MIT), Fall 2018
- 24.891 Independent Study: Formal Theories of Truth (McGee, MIT) Fall 2018
- *24.711 Aboutness (Yablo and Khoo, MIT) Spring 2019
- *24.245 Theory of Models (McGee, MIT) Spring 2020

- *24.711 Vague Language (McGee, MIT) Spring 2021
- *24.711 Unrestricted Quantification (McGee, MIT), Spring 2022

Metaphysics and Language

- *24.501 Color and its Place in Nature (Byrne, Pautz and Spencer, MIT), Fall 2017
- 24.729 Conditionals (McGee and Khoo, MIT) Fall 2017
- *24.951 Introduction to Syntax (Pesetsky, MIT), Fall 2017
- 24.410 Humean Themes in Contemporary Metaphysics (Van Cleve, MIT), Fall 2018
- *24.501 Problems in Metaphysics (Spencer and Skow, MIT) Fall 2018
- *24.729 Indeterminacy (Spencer and Khoo, MIT) Spring, 2020

Other

- 24.601 The Ethics of Climate Change (Hare and Setiya, MIT), Spring 2018
- 24.805 Norms of Credence (White and Schoenfield, MIT), Spring 2018
- 24.410 British Moralists (Schapiro, MIT), Spring 2019
- 24.400 Proseminar-Philosophy I (White and Spencer, MIT), Fall 2017
- 24.401 Proseminar-Philosophy II (Yablo and Skow, MIT) Spring 2018

Graduate Coursework Taken as an Undergraduate

- PHIL 83901 Intermediate Logic (Franks, Notre Dame) Fall 2014
- PHIL 93903 Incompleteness (Bays, Notre Dame) Spring 2015
- PHIL 93536 Possible and Impossible Worlds (Nolan, Notre Dame), Fall 2016
- PHIL 93930 Foundations of Mathematics (Detlefsen, Notre Dame) Fall 2016

REFERENCES

Vann McGee

Professor of Philosophy

vmcgee@mit.edu

Agustín Rayo

Professor of Philosophy, Kenan Sahin Dean of MIT School of Humanities, Arts, and Social Sciences

arayo@mit.edu

Stephen Yablo

David W. Skinner Professor of Philosophy

yablo@mit.edu

DISSERTATION ABSTRACT: BOOLEAN-VALUED MODELS AND THEIR APPLICATIONS

Classical models are bivalent: there are two truth values, 1 and 0. The set of classical truth values form the smallest non-trivial complete Boolean algebra. Boolean-valued models generalize classical two-valued models by allowing complete Boolean algebras of arbitrary sizes as value ranges. The goal of my dissertation is to study Boolean-valued models and explore their philosophical and mathematical applications.

In Chapter 1, I build a robust theory of first-order Boolean-valued models that parallels the existing theory of two-valued models. I develop essential model-theoretic notions like “Boolean-valuation”, “diagram”, “elementary extension”, and prove a series of theorems on Boolean-valued models, including the (strengthened) Soundness and Completeness Theorem, the Löwenheim-Skolem Theorems, the Elementary Chain Theorem, and many more.

Chapter 2 gives an example of a philosophical application of Boolean-valued models. I apply Boolean-valued models to the language of mereology to model indeterminacy in the parthood relation. I argue that Boolean-valued semantics is the best degree-theoretic semantics for the language of mereology. In particular, it trumps the well-known alternative - fuzzy-valued semantics. I also show that, contrary to what many have argued, indeterminacy in parthood entails neither indeterminacy in existence nor indeterminacy in identity, though being compatible with both.

Chapter 3 gives an example of a mathematical application of Boolean-valued models. Scott and Solovay famously used Boolean-valued models on set theory to obtain relative consistency results. In Chapter 3, I investigate two ways of extending the Scott-Solovay construction to set theory with urelements. I argue that the standard way of extending the construction faces a serious problem, and offer a new way that is free from the problem.