

# Isaac Wilhelm

CV as of Oct, 2020

Rutgers University  
106 Somerset St., 5th floor  
New Brunswick, NJ 08901

isaac.wilhelm@rutgers.edu  
765-277-1274  
[isaacwilhelm.com](http://isaacwilhelm.com)

## EDUCATION

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### Rutgers University

- Ph.D. Philosophy Expected 2021
- Dissertation: "Towards a General Theory of Explanation".
  - Committee: Barry Loewer (co-chair), Jonathan Schaffer (co-chair), David Albert, Karen Bennett, Jill North, Ted Sider, Michael Strevens (external).
- M.S. Mathematics 2016-18
- Thesis: "Typical: A Theory of Typicality and Typicality Explanation".
  - Committee: Sheldon Goldstein (chair), Michael Kiessling, Joel Lebowitz.

### Tufts University

- M.A. Philosophy 2013-15

### University of Chicago

- B.A./B.A. Mathematics, Cinema and Media Studies (both honors) 2007-11

## INTERESTS

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AOS: metaphysics, philosophy of science, philosophy of physics.

AOC: feminist philosophy, formal epistemology, logic, philosophy of biology, philosophy of mathematics.

Teaching competence: bioethics.

## PUBLICATIONS

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| Forthcoming | <b>The Counterfactual Account of Explanatory Identities</b><br><i>The Journal of Philosophy.</i> |
| Forthcoming | <b>Intrinsicity and Entanglement</b><br><i>Mind.</i>   |
| Forthcoming | <b>Centering the Principal Principle</b><br><i>Philosophical Studies.</i>                        |

Forthcoming	<b>Comparing Mathematical Explanations</b> <i>The British Journal for the Philosophy of Science.</i>
Forthcoming	<b>Grounding and Propositional Identity</b> <i>Analysis.</i>
Forthcoming	<b>Explanatory Priority Monism</b> <i>Philosophical Studies.</i>
Forthcoming	<b>Interventionist Explanation and the Problem of Single Variable Boundary Constraints</b> <i>Noûs.</i>
Forthcoming	<b>Typical: a Theory of Typicality and Typicality Explanation</b> <i>The British Journal for the Philosophy of Science.</i> - Featured in the OUP “Best of Philosophy 2019” article collection.
Forthcoming	<b>The Logic of Typicality</b> In Valia Allori, ed., <i>Statistical Mechanics and Scientific Explanation: Determinism, Indeterminism and Laws of Nature.</i> World Scientific. (with Harry Crane)
2020	<b>A Statistical Analysis of Luck</b> <i>Synthese</i> 197: 867-885.
2020	<b>An Argument for Entity Grounding</b> <i>Analysis</i> 80: 500-507.
2020	<b>The Stage Theory of Groups</b> <i>Australasian Journal of Philosophy</i> 98: 661-674.
2019	<b>Celestial Chaos: The New Logics of Theory-Testing in Orbital Dynamics</b> <i>Studies in History and Philosophy of Modern Physics</i> 65: 97-102.
2019	<b>The Ontology of Mechanisms</b> <i>The Journal of Philosophy</i> 116: 615-636.
2018	<b>New Data on the Representation of Women in Philosophy Journals: 2004-2015</b> <i>Philosophical Studies</i> 175: 1441-1464. (with Sherri Conklin and Nicole Hassoun)
2018	<b>The Representation of Belief</b> <i>Journal of Philosophical Logic</i> 47: 715-732.

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#### **WORKS IN PROGRESS OR UNDER REVIEW (SELECTED)**

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“Fine-Grained Propositions and the Russell-Myhill Argument” (under review).

“Gender is Essential to Some, But Not All, Individuals” (under review).

“The Physical Content of Mathematical Expressions” (under review).

“Centering the Everett Interpretation” (under review).

“Identity by Grounding” (in progress).

“Talk About Types” (in progress).

“The Explanation Analysis of Causation” (in progress).

“The Value of Naturalness” (in progress).

## **PRESENTATIONS (SELECTED)**

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“Gender is Essential to Some, But Not All, Individuals”

- Notre Dame Graduate Course, Oct 2020 (invited).

“Centering the Everett Interpretation”

- Laws Workshop, August 2020 (invited).

“Pluralities, Counterparts, and Groups”

- Social Ontology, July 2020.

“Possible Worlds and the Upper Bound Problem”

- Central APA (colloquium), New Orleans LA, February 2021.
- Joint Session, University of Kent, July 2020.

“Centering the Principal Principle”

- Eastern APA (symposium), Philadelphia PA, January 2020.
- Philosophy of Physics Workshop, CCNY, May 2019 (invited).

“The Big Bang, Fine Tuning, and the Existence of God”

- Look at Life, Richmond IN, April 2019 (invited).

“Typical”

- Eastern APA (symposium), New York NY, January 2019.
- Munich Center for Mathematical Philosophy, June 2018 (invited).

“Climate Surveying” (with Savannah Kincaid)

- Eastern APA, Skill Building and Improving the Profession MAP session, New York NY, January 2019.

“Explanatory Priority Monism”

- Central APA (colloquium), Denver CO, February 2019.
- FraMEPhys Workshop on Explanatory Pluralism, University of Birmingham, June 2018 (invited).

“Comparative Structure”

- Canadian Society for the History and Philosophy of Science, University of Regina, May 2018.
- Society for Exact Philosophy, University of Connecticut, May 2018.
- Eastern APA (colloquium), Savannah GA, January 2018.
- British Society for the Philosophy of Science, Edinburgh, July 2017.

“The Ontology of Mechanisms”

- Society for the Metaphysics of Science, Toronto, November 2019.
- Composition Workshop, Rutgers, May 2018 (invited).
- Rutgers-Bochum Workshop, April 2018 (invited).

“Intrinsicity and Quantum Entanglement”

- Fifth International Summer School in the Philosophy of Physics, Saig, July 2017.
- Canadian Philosophical Association, Toronto, May 2017.

“Lawhood and Computational Tractability”

- Pacific APA (colloquium), Seattle WA, April 2017.
- Western Canadian Philosophical Association, University of Alberta, October 2016.

“Sufficient and Necessary Conditions for Representability”

- NASSLLI, Rutgers University, July 2016.

“Chaos Regained: On the Possibility of a New Era of Orbital Dynamics”

- Society for the Philosophy of Science in Practice, Rowan University, June 2016.
- History of Philosophy of Science Conference, University of Minnesota, June 2016.
- Tufts University, July 2015.

“Quantity, Property, and Fundamental Law”

- The Metaphysics and Epistemology of Grounding and Fundamentality, CUNY, December 2015.

## COMMENTS

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“Constraining Inductive Metaphysical Inferences by Help of Internal Unification”, Kian Salimkhani, Society for the Metaphysics of Science, New York, October 2017.

“Grounding, Dependence and Mathematical Explanation”, Bill D’Alessandro, Eastern APA, Baltimore, January 2017.

## GRANTS AND AWARDS

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SCP-Templeton Graduate Fellowship for Cross-Training in Physics (\$30,000)	2017-18
Rutgers Excellence Fellowship for Doctoral Studies	2015-17
Summer Special Studies Award (x2)	2016-17
Rutgers Conference Travel Award (x4)	2016-19

Kartemquin Labs Film Screening Review	2013
Fire Escape Films: Travel Grant	2012
Chicago Filmmakers Sponsorship Grant	2012
Seidel Scholars PRISM Grant for Film Equipment (co-recipient)	2011

## TEACHING

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### Teacher Training Certificate Spring 2019

- Completed a training program on philosophy pedagogy and classroom management.

### University Teaching

- Instructor
  - Introduction to Formal Reasoning and Decision-Making (online) Summer 2020
  - Introduction to Formal Reasoning and Decision-Making Fall 2019
  - Bioethics (online) Summer 2019
  - Introduction to Philosophy of Science Spring 2019
  - Introduction to Philosophy Summer 2018
    - Part of the New Jersey Educational Opportunity Fund, which supports students from disadvantaged backgrounds.
- Teaching Assistant
  - Logic, Reasoning, and Persuasion, Andy Egan Fall 2020
  - Introduction to Philosophy, Ted Sider Fall 2018
  - Graduate Logic, George Smith (Tufts) Fall 2014
  - Undergraduate Logic, Susan Russinoff (Tufts) Spring 2014
  - Calculus, Diane Herrmann (Chicago) 2008-10
- Grader
  - Introduction to Logic, Anthony Gillies Fall 2020
  - Applied Symbolic Logic, Anthony Gillies Spring 2020
  - Intermediate Logic I, Ted Sider Spring 2019
  - Applied Symbolic Logic, Ted Sider Fall 2017
  - Intermediate Logic, Anthony Gillies Spring 2016

### Grade School Teaching (select courses; see my website for full list)

- Instructor
  - Young Scholar's Program (Chicago) 2008-10
  - Saturday Program for Gifted Youth (Northwestern)
    - Set Theory Spring 2013
    - Paradigm Shifts in Science Fall 2012
    - Statistics Fall 2011
  - Summer Program for Gifted Youth (Northwestern)
    - Documentary Filmmaking 2014

- Prove It! Math and Multimedia Proof 2013

## Adult Education

- Instructor
  - Whatcom Literacy Council: English Instructor (Bellingham WA) Fall 2020
  - Teach English skills to adults who are ESL.
- Teaching Assistant
  - SESAME: Adult Mathematics Education (Chicago) Summer 2010
  - Taught new instructional methods to grade school teachers.

## Dark Foan Education 2011-13

Founded a tutoring business that offered one-on-one instruction to grade school students at the University of Chicago Laboratory Schools. Worked personally with 22 students, 18 of whom were with me for at least a full academic year.

## Non-Credited Courses in Mathematics (for Philosophers) 2017-19

I organized and ran tutorials on topics in mathematics. These tutorials met multiple times, and they were attended by both professors and graduate students.

- The Russell-Myhill Paradox Spring 2019
- Introduction to Measure Theory Fall 2018
- Introduction to Category Theory Summer 2017

## SERVICE

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Climate Committee, Rutgers Philosophy Department 2015-20

- Organized three departmental climate surveys.
- Organized the Rutgers Undergraduate Philosophers Mentorship program.

Managing Editor 2019-20

- Oxford Studies in Philosophy of Religion, Volume 9.
- Oxford Studies in Metaphysics, Volume 12.

Marc Sanders Prizes 2019-20

- Organizer for the Sanders Prize in Philosophy of Religion.
- Organizer for the Sanders Prize in Metaphysics.

Referee 2017-20

- Analysis (x2), Erkenntnis (x3), Journal of the APA, Philosophical Studies (x3), Philosophy of Science, Statistical Science, Theoria.

Metro Area Philosophy of Science (MAPS) 2017-19

- Organized three to five talks for the MAPS group each semester.

Rutgers-Columbia Workshop: Quantum Field Theories 2018

- Co-organized a two-day international workshop on the philosophy of QFT.

MAPS Pre-Workshop Workshop	2018
- Organized an international workshop on structure in physics.	
Philosophy of Science Reading Group	2016-18
- Organized the Rutgers philosophy of science reading group.	
Filming/Editing Talks and Courses	2016-18
- Foundations of Probability Seminar.	
- Metaphysics of Fine Tuning Conference.	
- Center for Philosophy of Religion, Marc Sanders Lectures.	
Data Collection on Representation of Women in Philosophy	2016
- Project to determine proportion of journal publications by women.	

## FILM PRODUCTION

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Sanders Lectures: 2017, 2018

2018 (Fall). 2 hours; credited as editor. Published online.

2018 (Spring). 2 hours; credited as editor. Published online.

2017. 2 hours; credited as editor. Published online.

Luke Barnes on Fine Tuning, Rutgers Philosophy of Religion 2017

2 hours; credited as editor: audio and video recording of Luke Barnes' 2017 lecture on fine tuning, sponsored by the Rutgers Center for the Philosophy of Religion. Published online.

Newton's Principia

75 hours; 2015; credited as editor: audio and video recording of a two-semester course on the science and philosophy of Newton's *Principia*.

American Diner

105 minutes; 2013; credited as director, DP, editor: a documentary about three small-town diners. Screenings: Kartemquin, Chicago; Doc Films, Chicago.

The Point

15 minutes; 2011; credited as director, sound producer, DP, editor: a documentary about Promontory Point. Screenings: Film Studies Center, University of Chicago.

## GRADUATE COURSEWORK

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Metaphysics

- Advanced Topics in Metaphysics (Barry Loewer, Jonathan Schaffer)
- Advanced Topics in Metaphysics (Karen Bennett; audit)
- Aristotle's Metaphysics (Tufts: Christiana Olfert, George Smith)

- Chance and Causation (Princeton: Adam Elga, Boris Kment; audit)
- Explanation (Jonathan Schaffer)
- Explanation Across Disciplines (NYU: Laura Franklin-Hall, Michael Strevens; audit)
- Higher-Order Metaphysics (Ted Sider; audit)
- Objects (Tufts: Jody Azzouni)
- Structuralism in the Metaphysics of Science (Ted Sider; audit)
- The Nomological (Jonathan Schaffer, Ted Sider, John Hawthorne; audit)
- The Philosophy of David Lewis (Tufts: David Denby)
- Truth (Tufts: Jody Azzouni)

### **Philosophy of Science and Philosophy of Physics**

- Advanced Topics in Philosophy of Physics: Space and Time (Jill North)
- Advanced Topics in Philosophy of Physics: Spacetime (David Albert)
- Advanced Topics in Philosophy of Physics: Time (David Albert)
- Advanced Topics in Philosophy of Quantum Mechanics (David Albert; audit)
- Doing Good Science (Michigan: Laura Ruetsche; audit)
- Evolution of Mind and Morals (Tufts: Patrick Forber)
- Newton's *Principia* (Tufts: George Smith)
- Philosophy of Quantum Mechanics (David Albert)
- Philosophy of Quantum Mechanics (Jill North, Ted Sider)
- Science Before Newton's *Principia* (Tufts: George Smith)
- Spacetime (NYU: Tim Maudlin; audit)

### **Logic and Philosophy of Mathematics**

- Computation Theory (Tufts: George Smith)
- Formal Methods (Anthony Gillies; audit)
- Independent Study: Advanced Topics in Philosophy of Mathematics (Harvard: Peter Koellner, Hugh Woodin)
- Logic (Tufts: George Smith)
- Modal Logic (Tufts: Dilip Ninan)
- Topics in Logic (Michael Glanzberg; audit)

### **Courses in Mathematics Department**

- Abstract Algebra I (Vladimir Retakh)
- Algebraic Topology (Feng Luo)
- Foundations of Probability I (Harry Crane)
- Foundations of Probability II (Harry Crane)
- Seminar on the Foundations of Probability I (Harry Crane)
- Seminar on the Foundations of Probability II (Harry Crane; audit)
- Statistical Mechanics I: Equilibria (Joel Lebowitz)
- Statistical Mechanics II: Non-Equilibria (Joel Lebowitz)



- Theory of Functions of a Real Variable I (Daniel Ocone)
- Typicality in Physics (Sheldon Goldstein)

### Other Philosophy Courses

- Advanced Topics in Epistemology (Ernest Sosa; audit)
- Advanced Topics in Philosophy of Language (Jeff King)
- Dissertation Seminar (Alex Guerrero)
- Independent Study: Representation and Fragmentation (Andy Egan, Adam Elga, Agustín Rayo)
- Kant's Theoretical Philosophy (Chicago: Thomas Land)
- Proseminar (Frances Egan, Brandon Fitelson)
- Third Year Seminar (Ruth Chang)

## DISSERTATION ABSTRACT

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How do all the different explanatory relations—causation, grounding, and so many others—back explanations? Do causal, metaphysical, and mathematical explanations share a common, unified structure? Or are these different kinds of explanations fundamentally disunified?

I argue for their unity. In particular, I argue that there is a single ‘explanatory determination’ relation which (i) backs all cases of explanation, and (ii) explains why all other explanation-backing relations are explanatory. The explanatory determination relation can be used to overcome a series of explanatory challenges. It also accounts for the epistemic unity of explanation, and it can be enveloped in the formalism of structural equation models. This part of my dissertation is forthcoming in *Philosophical Studies*.

In addition, I investigate explanation in specific disciplines, focusing in particular on science and mathematics. In my discussion of scientific explanation, I argue that typicality facts—for instance, the fact that gases typically evolve to equilibrium—can be explanatory. I analyze the notion of typicality, I propose an account of how typicality facts explain, and I argue that typicality is not the same thing as probability. This part of my dissertation is forthcoming in *The British Journal for the Philosophy of Science*.

In my discussion of mathematical explanation, I formulate a theory of what makes some proofs at least as explanatory as others. I propose a formalism for that ‘at least as explanatory as’ relation among mathematical proofs, and I discuss two accounts of it. One account takes that relation to be primitive. The other analyzes it in terms of various properties that proofs possess: roughly, one proof is more explanatory than another just in case the former strikes a better balance between simplicity and structural depth—that is, the extent to which the proof illuminates mathematical structures—than the latter. This part of my dissertation is forthcoming in *The British Journal for the Philosophy of Science*.

My dissertation is part of a larger research program on explanation, a program which I will pursue throughout my academic career. According to the main idea of that program, explanation is among the most important, central, and basic notions in philosophy. It can be

used to analyze many other things: causation, mechanisms, and more. Several of my papers contribute to this research program: in addition to the chapters of my dissertation, I have papers carrying this program out in *The Journal of Philosophy*, *Noûs*, and *Analysis*.