

Joshua Eistenthal

California Institute of Technology
1200 E. California Blvd. MC 20-7
Pasadena, CA 91125

Email: josheistenthal@gmail.com
Website: www.josheistenthal.com
Phone: +1 (412) 265-5242

Areas of Specialization

Philosophy of Science (Physics), Early Analytic Philosophy

Areas of Competence

Logic, Metaphysics, Philosophy of Language

Employment **California Institute of Technology; Einstein Papers Project**
Research Assistant Professor, 2019–present

University of Pittsburgh
Visiting Lecturer, 2018–2019

Education **University of Pittsburgh**
Ph.D., Philosophy, 2011–2018

Canterbury Christ Church University
Post-Graduate Certificate in Education (Teach First), 2009–2010

University of Oxford
MPhysPhil, Physics and Philosophy, 2005–2009
– Visiting Student at Princeton University, 2008–2009

Dissertation **“Models and Multiplicities: Logical Pictures in Hertz and Wittgenstein”**

Although Hertz was one of Wittgenstein’s earliest and longest-lasting influences, the explicit references to Hertz in the *Tractatus* have been almost entirely neglected. I argue that Hertz’s analysis of mechanical systems in *Principles* was a precedent for Wittgenstein’s analysis of sentences in the *Tractatus* and that, despite certain appearances to the contrary, neither Hertz nor Wittgenstein was aiming to reveal fundamental ontological structure. Rather, they were aiming to clarify the *essential features* of ordinary descriptions, in classical mechanics and in natural language respectively.

Committee: Mark Wilson (co-chair), Thomas Ricketts (co-chair), James Shaw, Kenneth Schaffner, Warren Goldfarb.

Publications **“Mechanics without Mechanisms”**
Studies in History and Philosophy of Science Part B: Studies in History and Philosophy of Modern Physics, 62: 45–55, 2018

“A Raum with a View: Hermann Weyl and the Problem of Space”
Co-authored with Neil Dewar
Einstein Studies (forthcoming)

Manuscripts **“Hertz’s *Mechanics* and a Unitary Notion of Force”**
(revise and resubmit)

“Models and Multiplicities”
(revise and resubmit)

Awards **Du Châtelet Prize in Philosophy of Physics**
– Duke University, 2020

Elizabeth Baranger Excellence in Teaching Award
– University of Pittsburgh, 2018

BSHP Graduate Student Essay Prize (runner up)
– British Society for the History of Philosophy, 2018

Nicholas Rescher Dissertation Fellowship
– University of Pittsburgh, 2017

Wesley C. Salmon Research Fund
– University of Pittsburgh, 2016

J. Walker Tomb Prize in Philosophy of Time
– Princeton University, 2009

John Martyn Warbeke Prize in Metaphysics and Epistemology (co-winner)
– Princeton University, 2009

Alexander Guthrie McCosh Prize (co-winner)
– Princeton University, 2009

Elizabeth Anscombe Prize (Physics and Philosophy nominee)
– University of Oxford, 2009

Presentations **“A New Role for Ontology”**
– 3rd TiLPS History of Analytic Philosophy Workshop, Tilburg, July 2019
– Society for the Study of the History of Analytic Philosophy, Boston, June 2019

“Wittgenstein’s *simple objects* and Hertz’s *dynamical models*”
– Society for the Study of the History of Analytic Philosophy, Hamilton, June 2018

“Matching Multiplicities: Analysis and Simplicity in the *Tractatus*”
– American Philosophical Association, Chicago, February 2018

“A Logical Obscurity”
– European Congress of Analytic Philosophy, Munich, August 2017
– Society for the Study of the History of Analytic Philosophy, Calgary, May 2017

“Mechanics without Mechanisms”
– History of Science Society Biannual Meeting, Atlanta, November 2016
– London School of Economics Foundations of Physics, London, July 2016
– British Society for the Philosophy of Science Annual Meeting, Cardiff, July 2016

“Logically-oriented Physics”

- “Logic in Kant’s Wake” workshop, Hamilton, May 2016

“Wittgenstein’s so-called Logical Atomism”

- Spanish Society for Logic, Methodology and Philosophy of Science, Barcelona, July 2015

“The Problem of Space”

- British Society for the Philosophy of Science, Manchester, July 2015
- Irvine-Pittsburgh-Princeton Conference, Princeton, March 2015
- Philosophy of Logic Mathematics and Physics Conference, London Ontario, June 2014

Teaching

Lecturer:

- Introduction to Logic, Fall 2018 and Spring 2019
- Philosophy and Science, Spring 2019
- The *Tractatus* and Early Analytic Philosophy, Spring 2018

Writing Instructor:

- Problems of Philosophy (with James Shaw), Spring 2017
- History of Ancient Philosophy (with Jessica Gelber), Fall 2016

Recitation Instructor:

- Philosophy and Public Issues (with David de Bruijn), Fall 2017
- Introduction to Logic (with Thomas Ricketts), Spring 2015
- Introduction to Logic (with Kent Schmor), Fall 2014
- Philosophy of Science (with Giovanni Valente), Spring 2013
- History of Modern Philosophy (with Andrew Chignell), Fall 2012

Coursework

Philosophy of Science:

- Recent Topics in Philosophy of Science (Adam Caulton)
- Philosophy of Mathematics (Ken Manders)*
- Scientific Explanation (Jim Woodward and Mark Wilson)*
- Philosophy of Space and Time (Eleanor Knox)
- Thermodynamics and Statistical Mechanics (Giovanni Valente)
- General Philosophy of Science (John Norton)

Theoretical philosophy:

- Frege (Thomas Ricketts)*
- The Rise of Modern Logic (Dan Isaacson)*
- Wittgenstein’s *Philosophical Investigations* (William Child)*
- Frege, Russell, Wittgenstein (James Studd)*
- Wittgenstein (Thomas Ricketts)
- Advanced Logic (Anil Gupta)*
- Metaphysics and Epistemology (James Shaw)

Practical philosophy:

- Rawls’ *A Theory of Justice* (Japa Pallikkathayil)
- Aristotle’s *Nicomachean Ethics* (Kristen Inglis)
- Ethics (Kieran Setiya)
- Kantian Ethics (Nicholas Rescher)

[*audited]

Professional Affiliations

- Philosophy of Science Association
- British Society for the Philosophy of Science
- Society for the Study of the History of Analytic Philosophy
- British Society for the History of Philosophy
- American Association of Philosophy Teachers

Professional Service

Journal referee

- *Philosophy of Science*
- *Studies in History and Philosophy of Modern Physics*
- *History of Philosophy of Science*
- *International Studies in the Philosophy of Science*

Departmental Service

- Graduate Student Representative (President), 2016–2017
- Student-Faculty Liaison Committee, 2016–2017
- Philosophy Mentoring Program (co-supervisor), 2016–2017
- Departmental Climate Committee, 2015–2016
- Graduate Teaching Assistant Mentor, 2015–2016

Academic References

Mark Wilson
Distinguished Professor of Philosophy
Department of Philosophy, University of Pittsburgh

Thomas G. Ricketts
Professor of Philosophy
Department of Philosophy, University of Pittsburgh

Kenneth F. Schaffner
Distinguished University Professor of History and Philosophy of Science Emeritus
Department of History and Philosophy of Science, University of Pittsburgh

James Shaw
Associate Professor of Philosophy
Department of Philosophy, University of Pittsburgh

Lydia Patton
Professor of Philosophy
Department of Philosophy, Virginia Tech

David G. Stern
Professor of Philosophy and Collegiate Fellow
Department of Philosophy, The University of Iowa

Teaching Reference

Anil Gupta
Alan Ross Anderson Distinguished Professor of Philosophy
Department of Philosophy, University of Pittsburgh

Dissertation Summary

Models and Multiplicities: Logical Pictures in Hertz and Wittgenstein

My dissertation provides a novel interpretation of Heinrich Hertz's *Principles of Mechanics* and accounts for the most important aspect of its influence on Wittgenstein's *Tractatus*. This addresses the most long-standing debate in the *Tractatus* literature, the debate between *ontologically-oriented* and *logically-oriented* interpretations. I show that recognising the extent of Hertz's influence on Wittgenstein emerges as a striking piece of evidence in favour of a logically-oriented interpretation, and offers novel insights into what logically-oriented analysis achieves.

A central claim in the *Tractatus* is that ordinary colloquial sentences are truth-functions of *elementary sentences*; sentences which consist of names of *simple objects*. According to an ontologically-oriented interpretation, the *Tractatus* accounts for the sense of colloquial sentences by showing that the fundamental structure of language mirrors the fundamental structure of reality: it is because of the correlations between names and simple objects that language can describe the world. According to a logically-oriented interpretation, however, the *Tractatus* makes no appeal to a self-standing conception of the fundamental structure of reality, independent of language and thought, in order to account for the sense of colloquial sentences. On a logically-oriented view, the purpose of re-writing colloquial sentences as truth-functions of elementary sentences is simply to *clarify* colloquial sentences; to bring their logical relationships to the surface.

I argue that Wittgenstein's first explicit reference to Hertz at 4.04 in the *Tractatus*—which has been almost entirely neglected in the literature—is strong evidence in favour of a logically-oriented view. Like the *Tractatus*, *Principles* appears to present an unfamiliar ontology. In particular, Hertz's hypothesis of 'hidden masses' has typically been interpreted as an unwieldy proposal for the underlying constituents of the ether. However, such an interpretation makes Hertz's work appear both speculative and implausible. In the contrasting interpretation of *Principles* that I defend, Hertz's hypothesis of hidden masses *rules out* knowledge of fundamental ontological structure. I argue that Hertz's aim is to capture the essential features of ordinary mechanical descriptions through 'dynamical models'. A dynamical model is an abstract description of a system's *degrees of freedom*—the set of quantities that are necessary and sufficient for characterising its behaviour. Hertz makes clear that, from his perspective, describing the degrees of freedom of a system is the ultimate achievement of mechanics. For example, once a system has been characterised as undergoing simple harmonic motion, mechanics has nothing further to add. Thus a pendulum, a mass on a spring, and a vibrating string are all instantiations of the *same* mechanical system, despite their obvious ontological differences. On this view, degrees of freedom comprise the *essential features* of a mechanical description—what all descriptions of a given system must have in common.

When Wittgenstein refers to *Principles* at 4.04 in the *Tractatus*, he indicates that dynamical models are particularly helpful for seeing how a sentence has the same 'logical multiplicity' as the situation it represents. Wittgenstein thus invites a comparison between analysing a sentence into a truth-function of elementary sentences, and analysing a mechanical system into a dynamical model. As Hertz's dynamical models do not describe the ontological elements of mechanical systems, this suggests that Tractarian elementary sentences do not describe the ontological elements of reality. Just as Hertzian analysis captures the essential features of a mechanical system, Tractarian analysis captures *the essential features of a sentence*—what all sentences that express the same sense have in common. I thus show that neither Hertz nor Wittgenstein was aiming to reveal underlying ontological structure; rather, they were aiming to clarify the essential features of ordinary descriptions, in classical mechanics and in natural language respectively.