

Christopher Arledge

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Areas of Specialization

Philosophical Foundations of Physics (esp. Philosophy of Quantum Gravity), History and Philosophy of Science

Areas of Competence

Formal Logic, Philosophy of Mathematics and Statistics

Education

Ph.D. - Philosophy, Johns Hopkins University (May 2025)

Advisors: Robert Rynasiewicz and Sean Carroll

Dissertation: *From Chaos to Order: Assessing the Foundations of Emergent Gravity*

M.A. Philosophy, Johns Hopkins University

M.A. Philosophy, Ohio University

B.A. Philosophy and Religion and A.S. STEM Mathematics w/honors, Magna cum laude, Liberty University.

Employment

Instructor of Philosophy - University of Maryland Baltimore County (2019-Present)

Knowledge Analyst (NASA Contractor) - Teltrium Inc. (2023-2025)

Teaching Experience

Instructor of Record

Introduction to Philosophy, University of Maryland Baltimore County (4 semesters).

Principles of Reasoning, Ohio University (2 semesters).

Critical Thinking, Wayne State University (Summer Term).

Philosophy of Space and Time, University of Maryland Baltimore County (1 semester)

Philosophy of Quantum Mechanics, Johns Hopkins University (Winter 2019, 2020, 2022).

Philosophy of Physics, University of Maryland Baltimore County (2 semesters).

Graduate Instructor

Introduction to Ethics, Ohio University (3 semesters).

Critical Thinking, Wayne State University (2 semesters).

Philosophy and Science: An Introduction to Both, Johns Hopkins University (2 semesters)

Introduction to Formal Logic, Johns Hopkins University (2 semesters)

Presentations

Conference Presentations (Peer Reviewed)

Is the Holographic Principle a Principle of Quantum Gravity? - Philosophy of Science Association Biannual Meeting, Baltimore, MD, November 13 2021.

On Some Recent Attempted Non-Metaphysical Dissolutions of the Hole Argument (with Robert Rynasiewicz) - Second Irvine-London-Munich-PoliMi-Salzburg Conference in Philosophy and Foundations of Physics, University of Salzburg, September 2-4 2019.

Simplicity in Statistical Model Selection - International Conference on Simplicities and Complexities, The Epistemology of the Large Hadron Collider, University of Bonn, May 22 2019.

Information-Theoretic Model Selection and Cosmology - European Philosophy of Science Association (EPSA17), University of Exeter, September 9 2017.

A Relativistic Proposal for the Problem of the Receptacle - The 2015 Annual Meeting of the South Carolina Society of Philosophy, Wofford College, March 27 2015.

Kant and Non-Euclidean Geometry: A Reassessment - The Pittsburgh Area Philosophy Colloquium (Working Group), September 6 2014.

Kant and Non-Euclidean Geometry: A Reassessment - The 2014 Annual Meeting of the Ohio Philosophical Association, Kenyon College, April 5.

Kant and Non-Euclidean Geometry: A Reassessment - The 2014 Annual Meeting of the South Carolina Society of Philosophy, Furman University, February 14-15 2014.

Department Presentations

What is Black Hole Entropy?, The Hammond Society Colloquium Series, December 4 2020.

Is the Holographic Principle a Principle of Quantum Gravity?, The Hammond Society Colloquium Series, October 26th 2018.

Unconceived Alternatives and Skepticism, The Hammond Society Colloquium Series, March 2 2018, with Ryan Ross.

Conformal Transformations and the Theory of Linear Structures, The Hammond Society Colloquium Series, February 23 2018.

Surrealistic Bohmian Trajectories: A Reappraisal, The Hammond Society Colloquium Series, November 10 2017.

Information-Theoretic Model Selection and Cosmology, The Hammond Society Colloquium Series, April 28 2017.

Workshops

Discussant for the 2017 New Directions in the Foundations of Physics Conference, Tarquinia Italy, May 26-28.

Discussant for the 2018 New Directions in the Foundations of Physics Conference, Viterbo Italy, June 8-10. item Participant in the First Biennial Midwest Summer School in Philosophy of Physics, University of Chicago, July 22-27 2018.

Awards and Fellowships

Graduate Student Cross-Training Fellowship - Specialization: Astrophysics - John Templeton Foundation, administered by the Society for Christian Philosophers (2020-2021)

COVID-19 Relief Dissertation Completion Fellowship - Johns Hopkins University (Fall 2022)

Sachs Dissertation Completion Fellowship - Department of Philosophy - Johns Hopkins University (Spring 2022)

The Frederick C. Copleston Award in the History of Philosophy - Liberty University (Spring 2012)

Relevant Coursework

Johns Hopkins University

Philosophy

Speculation: Scientific and Philosophical • Foundations of Probability and Evidence • Philosophy of Space and Time • Philosophy of Cosmology • Physical Principles • Bananaworld and the Philosophy of Quantum Mechanics • The Hole Argument • Emergence of Space and Time • New Foundations for Mathematics • Mathematical Logic I and II • Axiomatic Set Theory • Philosophical Logic

Physics

General Relativity • Cosmology • Black Hole Physics • Quantum Field Theory • Radiative Astrophysics • Astrophysical Dynamics • Stellar Structure and Evolution • Interstellar Medium • Astrophysical Plasmas

Dissertation Abstract

The exploration of the relationship between gravity and thermodynamics has provided valuable insights into the search for a unified framework that reconciles gravity with quantum mechanics. In the 1970s, Jacob Bekenstein and Stephen Hawking established the thermodynamic nature of black holes, demonstrating that they possess entropy and thermal characteristics. Building on this foundation, Ted Jacobson's work in the 1990s revealed a direct connection between the Einstein Field Equations and the thermodynamics of local causal horizons, hinting at a deeper link between gravity and thermodynamics. In the 2000s, Erik Verlinde introduced an entropic perspective on gravity, proposing that gravity arises as an entropic force driven by changes in information entropy. These developments suggest that gravity may fundamentally emerge from thermodynamic principles, prompting an inquiry into the nature of gravitational phenomena and their potential unification with quantum mechanics.

My dissertation explores the philosophical implications of emergence and reduction in thermodynamic approaches to quantum gravity. The historical development of emergent gravity is examined, tracing mechanistic explanations of gravity back to Isaac Newton. The validity of black hole thermodynamics is also assessed, countering recent philosophical skepticism by demonstrating that considerations of semiclassical quantum effects, such as the Unruh and Hawking effects, render such skepticism unfounded. Furthermore, the concepts of emergence and reduction are analyzed within the framework of Thermodynamic Gravity, revealing that it presents a case of emergence that remains consistent with reduction. Additionally, the principle of holography is explored in the context of Holographic Gravity, where I argue that gravity emerges as a manifestation of multi-scale entanglement relations.

References

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Sean Carroll
Homewood Professor of Natural Philosophy
Email: scarro30@jhu.edu

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