Christopher Arledge - Ph.D. Candidate

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Areas of Specialization

Philosophical Foundations of Physics (esp. Philosophy of Space and Time), History of Physics, Philosophy of Science

Areas of Competence

Philosophy of Religion, Formal Logic, Philosophy of Data and Statistics

Education

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

Advisor: Robert Rynasiewicz

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

Ph.D Student - Philosophy, Wayne State University (2015-2016)

M.A. Philosophy, Johns Hopkins University (2021)

M.A. Philosophy, Ohio University (2015)

B.A. Philosophy and Religion (2013) and A.S. STEM Mathematics (2021) w/honors, Magna cum laude, Liberty University.

Employment

Adjunct Professor of Philosophy - University of Maryland Baltimore County (2019-Present)

Knowledge Analyst - Teltrium Inc. (2023-Present)

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.

Teaching Experience

Instructor of Record

Introduction to Philosophy, University of Maryland Baltimore County (3 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)

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

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

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 yielded insights in the search for a unified framework that combines gravity and quantum mechanics. In the 1970s, Bekenstein and Hawking established the thermodynamic nature of black holes, revealing the black holes had an entropy and thermal characteristics. Building on this foundation, Ted Jacobson's work in the 1990s demonstrated 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 and T. Padmanabhan further developed the emergent or entropic gravity approaches. Verlinde proposed gravity as an entropic force arising from changes in information entropy, while Padmanabhan expanded on Jacobson's work on the thermodynamics of horizons. Collectively, these theories suggest that gravity may fundamentally emerge from thermodynamic principles, prompting a compelling investigation into the essence of gravitational phenomena and its potential unification with quantum mechanics.

This dissertation is a philosophical investigation into the concepts of entropy, emergence, and spacetime that arise in the emergent thermodynamic approaches to quantum gravity. The first part of the thesis investigates the storied history of microscopic explanations of gravity from Newton to the 1960s. I emphasize that the emergent gravity framework envisions by Verlinde has been (implicitly) in physical theorizing since at least as far back as Newton. In the second part of this study, since emergent gravity theories often depend on the relation between thermodynamics and spacetime highlighted by black hole thermodynamics, I argue (contra some contemporary philosophers) for the thesis that black holes are thermodynamic objects. In the third part of the study, I investigate the relation between emergence and explanation in the emergent gravity paradigm. In the final part of the study, I investigate the relation between information and the Einstein Equations (i.e., gravity), and argue for a duality between information (encoded in entanglement entropy) and the gravity.

<center>Last updated: December 7, 2024</center>