

J. Brian Pitts, Ph.D., Ph.D.
Curriculum Vitae

Departments of Physics and Philosophy
225 Nieuwland Science Hall/100 Malloy Hall
University of Notre Dame
Notre Dame, Indiana 46556 USA
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Areas of Specialization

Philosophy of Physics (Gravitation, Cosmology, Classical Field Theory, Foundations of Physics, History of Physics, Public Understanding of Science), General Philosophy of Science

Areas of Competence

Philosophy of Time, History of Science, Philosophy of Religion

Positions

Research Assistant Professor, Department of Physics, University of Notre Dame, September 2011-present.

Adjunct Research Assistant Professor, Department of Philosophy, University of Notre Dame, August 2010-present.

Adjunct Research Assistant Professor, Department of Physics, University of Notre Dame, September 2010-August 2011.

Visiting Scholar, The John J. Reilly Center for Science, Technology, and Values, University of Notre Dame, July 2010-June 2011.

Edward Sorin Postdoctoral Fellow, Department of Philosophy, University of Notre Dame, August 2008-June 2010.

Education

Ph.D., Philosophy, University of Notre Dame, August 2008. Dissertation: “General Covariance, Artificial Gauge Freedom and Empirical Equivalence,” supervisor Don Howard.

M.A., History and Philosophy of Science, University of Notre Dame, January 2006.

Ph.D, Physics, The University of Texas at Austin, August 2001.

B.S., Physics (with highest honors), Georgia Institute of Technology, June 1995.

Selected Papers and Reviews

“The Nontriviality of Trivial General Covariance: How Electrons Restrict ‘Time’ Coordinates, Spinors (Almost) Fit into Tensor Calculus, and 7/16 of a Tetrad Is Surplus Structure,” forthcoming in *Studies in History and Philosophy of Modern Physics*; Philsci-archive.pitt.edu; [arXiv:1111.4586](https://arxiv.org/abs/1111.4586).

“Universally Coupled Massive Gravity, II: Densitized Tetrad and Cotetrad Theories,” *General Relativity and Gravitation*, DOI: 10.1007/s10714-011-1280-9; [arXiv:1110.2077](https://arxiv.org/abs/1110.2077).

“Irrelevant Conjunction and the Ratio Measure or Historical Skepticism,” *Synthese*, DOI: 10.1007/s11229-011-9961-1; Philsci-archive.pitt.edu.

“Permanent Underdetermination from Approximate Empirical Equivalence in Field Theory: Massless and Massive Scalar Gravity, Neutrino, Electromagnetic, Yang-Mills and Gravitational Theories,” *The British Journal for the Philosophy of Science* **62** (2011) 259-299.

“Massive Nordström Scalar (Density) Gravities from Universal Coupling,” *General Relativity and Gravitation* **43** (2011) 871-895; [arXiv:1010.0227](https://arxiv.org/abs/1010.0227).

“Gauge-Invariant Localization of Infinitely Many Gravitational Energies from All Possible Auxiliary Structures,” *General Relativity and Gravitation* **42** (2010) 601-622; [arXiv:0902.1288](https://arxiv.org/abs/0902.1288), Philsci-archive.pitt.edu.

“Why the Big Bang Singularity Does Not Help the Kalām Cosmological Argument for Theism,” *The British Journal for the Philosophy of Science* **59** (2008) 675-708.

“Universally Coupled Massive Gravity,” with W. C. Schieve, *Theoretical and Mathematical Physics* **151** (2007) 700-717, [gr-qc/0503051](https://arxiv.org/abs/gr-qc/0503051); also in Russian.

“Absolute Objects and Counterexamples: Jones-Geroch Dust, Torretti Constant Curvature, Tetrad-Spinor, and Scalar Density,” *Studies in History and Philosophy of Modern Physics* **37** (2006) 347-371; Philsci-archive.pitt.edu, [gr-qc/0506102](https://arxiv.org/abs/gr-qc/0506102).

“Constrained Dynamics of Universally Coupled Massive Spin 2-spin 0 Gravities,” *Journal of Physics: Conference Series* **33** (2006) 279-284. Talk at Fourth Meeting on Constrained Dynamics and Quantum Gravity “QG05,” Cala Gonone, Sardinia, Italy, September 2005; [hep-th/0601185](https://arxiv.org/abs/hep-th/0601185).

Review of George Kean Sweetnam’s *The Command of Light: Rowland’s School of Physics and the Spectrum* (American Philosophical Society, Philadelphia, 2000), in *Aestimatio* **2** (2005) [33-8](#).

“Null Cones and Einstein’s Equations in Minkowski Spacetime,” with W. C. Schieve, *Foundations of Physics* **34** (2004) 211-238; [gr-qc/0406102](https://arxiv.org/abs/gr-qc/0406102).

“Some Thoughts on Relativity and the Flow of Time: Einstein’s Equations Given Absolute Simultaneity,” *Chronos: The Annual Proceedings of the Philosophy of Time Society* **6** (2003-4) 1-21; Philsoci-archive.pitt.edu.

“Nonsingularity of Flat Robertson-Walker Models in the Special Relativistic Approach to Einstein's Equations,” with W. C. Schieve, *Foundations of Physics* **33** (2003) 1315-1321; IARD 2002 proceedings; gr-qc/0406103.

“Slightly Bimetric Gravitation,” with W. C. Schieve, *General Relativity and Gravitation* **33** (2001) 1319-1350; gr-qc/0101058.

“Gravitation in Flat Spacetime with a Preferred Temporal Foliation,” with W. C. Schieve, *Foundations of Physics* **31** (2001) 1083-1104; IARD2000 proceedings; gr-qc/0101099.

“Light Cone Consistency in Bimetric Gravitation,” with W. C. Schieve, in *Relativistic Astrophysics: 20th Texas Symposium* (December 10-15, 2000, Austin, Texas), ed. John C. Wheeler and Hugo Martel, pp. 763-765, AIP; gr-qc/0101097.

“On the Form of Parametrized Gravitation in Flat Spacetime,” with W. C. Schieve, *Foundations of Physics* **29** (1999), 1977-1985.

“On Parametrized General Relativity,” with W. C. Schieve, *Foundations of Physics* **28** (1998) 1417-24.

Grant Proposals Submitted

“20th Century Space-time Theory in Light of Particle Physics and Einstein’s Physical Strategy in Pursuit of General Relativity,” National Science Foundation (USA), Science, Technology, and Society, J. B. Pitts (PI), Katherine Brading and Don Howard, submitted August 1, 2011.

“Finite-Range Massive Gravities, Astrophysics, and Stability: Numerical and Analytic Investigation,” National Science Foundation (USA), Physics---Gravitational Theory, J. B. Pitts (PI), In-Saeng Suh, Grant Mathews and Scott Hawley, submitted October 26, 2011.

Invited Participation

Oxford Bibliographies Online, Invited Article “Science and Religion,” submitted.

Invited Discussant, Center for Philosophy of Science, University of Pittsburgh, Workshop: Underdetermination in Science, 21-22 March, 2009. Synopsis and Discussion by Greg Frost-Arnold, David Harker, P. D. Magnus, John Manchak, John Norton, J. Brian Pitts, Kyle Stanford, and Dana Tulodziecki, Philsoci-archive.pitt.edu.

Selected Works in Progress

G. J. Mathews, T. Kajino, W. Aoki, W. Fujiya, and J. B. P., “Preference for an Inverted Neutrino Mass Hierarchy from ν -Process Nucleosynthesis with Finite θ_{13} Mixing”

“How to See Remote Things Quickly in General Relativity, with Notes on Euler and Lambert on Stars Not Yet Visible and on ‘Olbers’ Paradox”

“Change in Canonical General Relativity from the Lack of Time-like Killing Vectors, Or, The Problem of Time Is Neither Canonical Nor Problematic”

“Rationally Reconstructing 20th Century Space-time Theory with Massive Scalar Gravity: Priority of Field Equations over Geometry, Conventionality, and Underdetermination”

“Empirical Equivalence, Artificial Gauge Freedom and a Generalized Kretschmann Objection,” Philsoci-archive.pitt.edu, [arXiv:0911.5400](https://arxiv.org/abs/0911.5400)

“Inequivalent Notions of General Covariance: Anderson-Friedman Absolute Objects *vs.* Variational Principles and/or Clock Fields and How Einstein's Theory Violates the Former”

“Energy Conservation and Mental Causation”

“Gravitation as a Spin 2 Field: Universal Forces and the Conventionality of Geometry in Light of Modern Particle Physics”

“Universally Coupled Massive Gravity, III: Ogievetsky-Polubarinov Theories”

“Universally Coupled Massive Gravity, IV: Arbitrary Mass and Self-Interaction Terms”

Selected Presentations

“How Massive Nordström Scalar Gravities Rationally Reconstruct 20th Century Space-time Theory: Priority of Field Equations over Geometry, Physical Strategy *vs.* Principles, and Conventionality and Underdetermination.” Boulder Conference on the History and Philosophy of Physics (27th Boulder CHPS), University of Colorado at Boulder, September 24, 2011.

“How Massive Nordström Scalar Gravities Rationally Reconstruct 20th Century Space-time Theory: Priority of Field Equations over Geometry, Conventionality, Underdetermination, *etc.*” Midwest Workshop in Philosophy of Science and Philosophy of Mathematics, Indiana University-Purdue University, Fort Wayne, April 16, 2011.

“Gravitational Energy Is an Infinite-Component Localized Thing, Or, Why Pseudotensors Are Okay,” Astrophysics Seminar, Department of Physics, University of Notre Dame, April 27, 2010.

“Gauge Invariant Localization of Infinitely Many Gravitational Energies from all Possible Auxiliary Structures, Or, Why Pseudotensors are Okay,” 19th Annual Midwest Relativity Meeting, University of Michigan, October 3, 2009.

“Gauge-Invariant Localization of Infinitely Many Gravitational Energies from All Possible Auxiliary Structures, Or, Why Pseudotensors Are Okay,” Chicagoland Philosophy of Physics “Work in Progress” Workshop, University of Chicago, August 20, 2009.

“Gauge-Invariant Localization of Infinitely Many Gravitational Energies from All Possible Auxiliary Structures,” DPF 2009, Field and String Theory session, Division of Particles and Fields, American Physical Society, Wayne State University, Detroit, July 26-31, 2009.

“Gauge-Invariant Localization of Infinitely Many Gravitational Energies from All Possible Auxiliary Structures,” 12th Eastern Gravity Meeting EGM2009, Rochester Institute of Technology, New York, June 15-16, 2009.

“Empirical Equivalence, Artificial Gauge Freedom and a Generalized Kretschmann Objection,” Chicagoland Philosophy of Physics Group, University of Illinois at Chicago, February 11, 2009.

“Why the Big Bang Singularity Does Not Help the Kalām Cosmological Argument for Theism,” University of Waterloo, January 30, 2009.

“Addressing Underdetermination between Massless and Massive Gravity Numerically in Spherical Symmetry?” 18th Midwest Relativity Meeting, October 24-5, 2008, University of Notre Dame.

“Why the Big Bang Singularity Does Not Help the Kalām Cosmological Argument for Theism,” God, Nature and Design: Historical and Contemporary Perspectives, St. Anne's College, Oxford, July 10-13, 2008.

“Spinors in Coordinates: How Ogievetsky and Polubarinov Avoid a Tetrad,” 11th Eastern Gravity Meeting (EGM11), Pennsylvania State University, May 12, 2008.

“Is General Relativity Generally Covariant? Anderson-Friedman Absolute Objects, Spinors and the Metric’s Determinant,” Foundations of Physics Group, University of Maryland, February 4, 2008.

“Empirical Equivalence and General Covariance: Insights from Artificial Descriptive Redundancy,” Department of Philosophy, University of Leeds, January 9, 2008.

Commentator on Yuri Balashov’s “Against Alexandrov Present and Alexandrov Coexistence,” Philosophy of Time Society, American Philosophical Association, Eastern Division, December 29, 2007.

“Seeing Stars: Astronomical Ages and *Genesis*,” NDVIII: Eighth Biennial History of Astronomy Workshop, University of Notre Dame, July 2007.

“General Covariance and the Absolute Object in General Relativity,” Tenth Eastern Gravity Meeting EGM10, Cornell University, June 2007. <http://baba.astro.cornell.edu/~ecgm10/>

“Absolute Objects, Counterexamples and General Covariance,” 15th UK and European Meeting on the Foundations of Physics, University of Leeds, Leeds, England, UK, March 2007. <http://philsci-archive.pitt.edu/archive/00003284/>

“The Anderson-Friedman Absolute Objects Program: Several Successes, One Difficulty,” PSA 2006: Philosophy of Science Association, Vancouver, British Columbia, November 2006. <http://philsci-archive.pitt.edu/archive/00003005/>

Commentator on Bradford Skow’s “Sophisticated Substantivalism and Spacetime Symmetries,” American Philosophical Association, Central Division, April 2006.

“Astronomical Ages and *Genesis*: Starlight Transit Time and Its Theological Reception,” The History of Science Society 2005 Annual Meeting, November 2005, Minneapolis.

“Universally Coupled Massive (Spin 2-spin 0) Finite-range Gravity,” Astrophysics Seminar, Department of Physics, University of Notre Dame, February 2005.

“Universally Coupled Massive (Spin 2-spin 0) Gravity,” Center for Relativity, Department of Physics, University of Texas at Austin, November 2004.

“Universally Coupled Massive Gravity,” 14th Midwest Relativity Meeting, October 2004, University of Wisconsin—Milwaukee. <http://www.lsc-group.phys.uwm.edu/mwrm14/>

“Gravity as (Really) a ‘Spin 2’ Universal Force in Minkowski Spacetime,” International Conference on the Ontology of Spacetime, Concordia University, Montreal, May 2004.

“Updating Reichenbach on Universal Forces and Geometric Conventionality,” 12th International Congress of Logic, Methodology and Philosophy of Science, Oviedo, Spain, August 2003.

“The Special Relativistic Approach to Einstein’s Equations,” 11th UK Conference on the Foundations of Physics, University of Oxford, September 2002.

“The Special Relativistic Approach to Einstein’s Equations,” 18th Pacific Coast Gravity Meeting, University of California at Davis, March 2002.

Teaching Experience

Philosophy, History and Philosophy of Science

Instructor, Philosophy 26999, Special Topics: Philosophical Issues, University of Notre Dame, Spring 2010.

Instructor, Science and Religion in Historical Perspective, Philosophy 20624/Science, Technology & Values 20164, University of Notre Dame, Fall 2008 and Fall 2009.

Instructor, Philosophy of Science, Philosophy 43701/Science, Technology & Values 40135, University of Notre Dame, Spring 2009.

Instructor, Introduction to Philosophy, Philosophy 20101/10101, University of Notre Dame, Fall 2006 and Spring 2009.

Teaching Assistant, Medical Ethics discussion, Philosophy 22602, for Prof. David Solomon, University of Notre Dame, Fall 2005.

Teaching Assistant for Introduction to Philosophy, Philosophy 101/10101, for Prof. William Ramsey, University of Notre Dame, Fall 2003 and Fall 2004.

Physics and Mathematics

Teaching Postdoctoral Fellow, Mathematics Department, St. Edward's University, Austin, Texas, 2001-2.

Head Teaching Assistant, Engineering Physics Laboratory I: Mechanics, The University of Texas at Austin, Fall 1998-Spring 2001; Teaching Assistant, Spring 1997-Spring 1998.

Teaching Assistant, Engineering Physics Laboratory II: Electromagnetism and Optics, The University of Texas at Austin, Fall 1995 and Fall 1996.

Teaching Assistant, algebra-based physics for disadvantaged students, The University of Texas at Austin, Summer 1996.

Senior Teaching Assistant, Calculus (first quarter, honors third quarter, third quarter), Georgia Institute of Technology, Fall 1994-Spring 1995.

Fellowships, Awards and Funding

Sorin Postdoctoral Fellowship, University of Notre Dame, 2008-10.

University of Notre Dame Presidential Fellowship, 2002-7.

Downes Travel Grant, University of Notre Dame, for courses at The Faraday Institute, St. Edmund's College, Cambridge University, July 16-29, 2006.

Honorable Mention, National Science Foundation Graduate Fellowship competition, 1996.

Honorable Mention, National Defense Science and Engineering Graduate Fellowship Program, 1995.

Languages

Spanish: reading, speaking, writing; French: reading; German: reading.

Selected Professional Memberships

Philosophy of Science Association

American Philosophical Association

American Physical Society

International Society on General Relativity and Gravitation

Refereeing Service

General Relativity and Gravitation

Foundations of Physics, Foundations of Physics Letters

Studies in History and Philosophy of Modern Physics

The British Journal for the Philosophy of Science

Philosophy of Science

Faith and Philosophy

American Catholic Philosophical Quarterly

Reviewer for Rowman & Littlefield Publishers

Other Service

University Committee on Libraries, University of Notre Dame, 2005-2007