

# Erik Curiel

Munich Center for Mathematical Philosophy  
Ludwig-Maximilians-Universität  
Ludwigstraße 31  
80539 München  
Germany

Black Hole Initiative  
Harvard University  
20 Garden Street  
Cambridge, MA 02138  
USA

ofc phone: +49 189 2180 6655  
mobile: +49 176 7267 0115  
email: [erik@strangebeautiful.com](mailto:erik@strangebeautiful.com)  
webpage: <http://strangebeautiful.com>

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## EDUCATION

**University of Chicago** Department of Philosophy, Ph.D., June, 2005

Primary Joint Advisors: Prof. David Malament and Prof. Howard Stein  
Physics Advisors: Prof. Robert Geroch and Prof. Robert Wald

**Harvard University** Physics and Philosophy (double major), A.B., June, 1990.

Philosophy Advisor: Prof. Hilary Putnam  
Physics Advisor: Prof. Sheldon Glashow

## AREAS OF SPECIALIZATION

**Philosophy of Physics** Spacetime Theories; Quantum Field Theory on Curved Spacetime;  
Cosmology; Thermodynamics and Statistical Mechanics; Classical Mechanics; Quantum Gravity

**Philosophy of Science** Semantics of Theories; Methodology, Models, and Experiment;  
Scientific Reasoning and Epistemology; Ontology; Realism and Instrumentalism; Causality

**Physics** General Relativity; Quantum Field Theory on Curved Spacetime; Thermodynamics; Cosmology;  
Classical Mechanics

## AREAS OF COMPETENCE

**Ancient Greek Philosophy** (including the ancient Greek texts)

**Physics** Quantum Gravity; Thermodynamics and Statistical Mechanics; Cosmology

**History of 20th Century Analytic Philosophy**

**Moral Psychology/Action Theory**

**History of Physics**

## ACADEMIC APPOINTMENTS

**Black Hole Initiative** Senior Research Fellow, Harvard University, Sep. 2016–Aug. 2019 (4 months a year); by invitation

**Munich Center for Mathematical Philosophy** Assistant Professor, LMU Munich, May 2016 (ongoing, 8 months a year); fully funded by competitive Einzelförderung (Single PI) grant from the Deutsche Forschungsgemeinschaft (German Research Foundation)

**Munich Center for Mathematical Philosophy** Postdoctoral Research Fellow, LMU Munich, Sep. 2013–Apr. 2016

**Rotman Institute for Philosophy** Assistant Professor/Postdoctoral Fellow, University of Western Ontario, Sep. 2010–Aug. 2013

**London School of Economics** Tutorial Fellow, Department of Philosophy, Logic and Scientific Method, Sep. 2009–Aug. 2010

**Center for Philosophy of Science** Postdoctoral Fellow, University of Pittsburgh, Sep. 2008–Aug. 2009

**Stanford University** Humanities Fellow, Sep. 1999–Aug. 2000

**Stanford University** Lecturer, Philosophy Department, Sep. 1998–Aug. 1999

**University of Chicago** Lecturer, Philosophy Department, Winter Term 1997

## VISITING FELLOWSHIPS

**University of Florence** Erasmus Fellow, Department of Letters and Philosophy, Mar. 2017

**Trinity College** Visiting Scholar, University of Cambridge, Jun.–Aug. 2010

## PUBLICATIONS

“Philosophical Problems of Black Holes”, forthcoming 2018 in *A Companion to the Philosophy of Physics*, E. Knox and A. Wilson (eds.), Routledge

“Newtonian Abduction as Framework Confirmation”, forthcoming 2018 in *Synthese*, special issue “Reasoning in Physics”, B. Eva and S. Hartmann (eds.)

“The World-Soul as Ancestor of Some Fundamental Principles in Contemporary Physics”, forthcoming 2018 in *The World-Soul: The History of a Concept*, James Wilberding (ed.), The Oxford Philosophical Concept Series, Oxford University Press

“Space”, forthcoming 2018 in *Internet Encyclopedia of Philosophy* (<<http://www.iep.utm.edu/>>), B. Dowden (general ed.)

“Continuum Spacetime as the Limit of Discrete Structure”, forthcoming 2017 in *Synthese*, special issue “Infinite Idealizations in Science”, S. Fletcher, P. Palacios, L. Ruetsche, and E. Shech (eds.)

“ $3+1 \neq 4$ , and Stranger Forms of Indeterminism in General Relativity”, forthcoming 2017 in *Foundations of Physics*, special issue “The Hole Argument”, B. Roberts and J. Weatherall (eds.)

“Kinematics, Measurement and Coordination: What We Get Wrong about What Reichenbach Got Right” (with F. Padovani), forthcoming 2017 in *Neo-Kantian Perspectives on the Exact Sciences*, F. Biagioli and M. Giovanelli (eds.), Routledge

“Singularities, Black Holes, and Thermodynamics in Relativistic Spacetimes”, forthcoming 2017 in *The Stanford Encyclopedia of Philosophy* (On-Line), Edward N. Zalta (ed.)

“On Geometric Objects, the Non-Existence of a Gravitational Stress-Energy Tensor, and the Uniqueness of the Einstein Field Equation”, *Studies in History and Philosophy of Modern Physics*, forthcoming 2017 (preprint: [arXiv:0908.3322v3 \[gr-qc\]](https://arxiv.org/abs/0908.3322v3))

- “A Primer on Energy Conditions”, in *Towards a Theory of Spacetime Theories*, D. Lehmkuhl, G. Schieman, and E. Scholz (eds.), Einstein Studies, Birkhäuser, 2017, doi:10.1007/978-1-4939-3210-8 (preprint: arXiv:1405.0403 [gr-qc])
- “On the Existence of Spacetime Structure”, *British Journal for Philosophy of Science*, 2016, doi:10.1093/bjps/axw014 (early online publication, free access: <<http://bjps.oxfordjournals.org/content/early/2016/08/18/bjps.axw014>>; preprint: arXiv:1503.03413 [physics.hist-ph]). A manuscript containing technical appendices for the constructions and arguments, and further discussion, is available at <<http://strangebeautiful.com/papers/curiel-exist-st-struct-tech-apdx.pdf>>.
- “Classical Mechanics Is Lagrangian; It Is Not Hamiltonian”, *British Journal of Philosophy of Science*, 2014, 65(2):269–321, doi:10.1093/bjps/axs034
- “General Relativity Needs No Interpretation”, *Philosophy of Science*, 2009, 76(1):44–72, doi:10.1086/599277
- “Singularities and Black Holes in Relativistic Spacetimes” (with co-author P. Bokulich), 2009, *The Stanford Encyclopædia of Philosophy* (Fall 2012 Edition), Edward N. Zalta (ed.), URL = <<http://plato.stanford.edu/archives/fall2012/entries/spacetime-singularities/>>
- “Against the Excesses of Quantum Gravity: A Plea for Modesty”, *Philosophy of Science*, 2001, 68(3):S424–S441, doi:10.1086/392926
- “The Constraints General Relativity Places on Physicalist Accounts of Causality”, *Theoria*, 2000, 15(1):33–58, URL = <<http://www.jstor.org/stable/23918569>>
- “The Analysis of Singular Spacetimes”, *Philosophy of Science*, 1999, 66(S1):S119–S146, URL = <<http://www.jstor.org/stable/188766>>; a revised and extended version is available at <<http://strangebeautiful.com/phil-phys.html>>
- “ $\alpha_1$ -Antitrypsin Deficiency Caused by the  $\alpha_1$ -Antitrypsin Null<sub>Mattawa</sub> Gene”, with D. Curiel, M. Brantly, L. Stier and R. Crystal, *Journal of Clinical Investigation*, 1989, 83(4):1144–1152, doi:10.1172/JCI113994

## MANUSCRIPTS SUBMITTED FOR PUBLICATION

- “A Simple Proof of the Uniqueness of the Einstein Field Equation in All Dimensions”, submitted to *General Relativity and Gravitation*, Apr. 2017 (arXiv:1601.03032 [gr-qc])
- “Classical Black Holes Are Hot”, submitted to *General Relativity and Gravitation*, Apr. 2016 (arXiv:1408.3691 [gr-qc])
- “Are Classical Black Holes Hot or Cold?”, submitted to *Foundations of Physics*, Feb. 2017 (arXiv:1408.3691 [gr-qc])
- “Measure, Topology and Probabilistic Reasoning in Cosmology”, submitted to *British Journal of Philosophy of Science*, Sep. 2016 (arXiv:1509.01878 [gr-qc])
- “If Metrical Structure Were Not Dynamical, Counterfactuals in General Relativity Would Be Easy”, submitted to *Erkenntnis*, Sep. 2016 (arXiv:1509.03866 [physics.hist-ph])
- “Kinematics, Dynamics, and the Structure of Physical Theory”, submitted to *Philosophy of Science*, Mar. 2016
- “On the Structure of Phronēsis and the Nature of Practical Truth in *Nicomachean Ethics*”, submitted to *Oxford Studies in Ancient Philosophy*, Feb. 2016

["On the Propriety of Physical Theories as a Basis for Their Semantics"](#), submitted to *Noûs*, Feb. 2016

["Why Rigid Designation Cannot Stand on Scientific Ground"](#), submitted to *Mind*, Jan. 2016

## REFEREED TALKS

**European Philosophy of Science Association** Biennial Conference (Exeter, UK, Sep. 2017): "Semantics: Epistemology, Yes; Ontology, No" (part of the symposium "The Semantics of Theories")

**Ninth European Congress of Analytic Philosophy** Triennial Conference (Ludwig-Maximilians-Universität, Munich, Aug. 2017): "Why Rigid Designation Cannot Stand on Scientific Ground"

**Philosophical Society of South Africa** Annual Conference (Grahamstown, SA, Jan. 2017): "Why Rigid Designation Cannot Stand on Scientific Ground"

**Philosophy of Science Association** Biennial Conference (Atlanta, Nov. 2016): "Kinematics, Dynamics and the Structure of Physical Theory"

**NEB-17: Recent Developments in Gravity** Hellenic Society for Relativity, Gravitation and Cosmology Annual Conference (Mykonos, Sep. 2016): "A Strengthened Zeroth Law for Black-Hole Thermodynamics"

**Foundations of Physics 2016** The 18th UK and European Conference on Foundations of Physics (London, Jul. 2016): "On the Mathematical, Physical, and Conceptual Cogency of Quantum Field Theory On Curved Spacetime"

**University of Pittsburgh Center for Philosophy of Science** Quadrennial Fellows Conference, Plenary Session (Lund, Sweden, Jul. 2016): "Kinematics, Dynamics and the Structure of Physical Theory"

**British Society for Philosophy of Science** Annual Conference (Cardiff, Jul. 2016): "On the Mathematical, Physical, and Conceptual Cogency of Quantum Field Theory On Curved Spacetime"

**Deutsche Physikalische Gesellschaft (German Physics Society)** Annual Conference (Hamburg, Mar. 2016): "Energy Conditions and the Cogency of Quantum Field Theory on Curved Spacetime"

**University of Konstanz** Philosophy Faculty Conference "Neo-Kantian Perspectives on Contemporary Philosophy of Science", (Jan. 2016): "Kinematical Constraints as Constitutive *A Priori* Components of Physical Theory"

**European Philosophy of Science Association** Biennial Conference (Düsseldorf, Sep. 2015): "The Delicacy of Counterfactuals in General Relativity (Or: If Metrical Structure Were Not Dynamical, Counterfactuals in General Relativity Would Be Easy)"

**15th Congress of Logic, Methodology and Philosophy of Science** Triennial Conference (Helsinki, Aug. 2015): "Measure, Topology and Probabilistic Reasoning in Cosmology"

**British Society for Philosophy of Science** Annual Conference (Manchester, Jul. 2015): "The Delicacy of Counterfactuals in General Relativity (Or: If Metrical Structure Were Not Dynamical, Counterfactuals in General Relativity Would Be Easy)"

**Philosophy of Science Association** Biennial Conference (Chicago, Nov. 2014): "Classical Black Holes Are Hot" (symposium "Foundations of Gravity and Thermodynamics", organized by myself, with

fellow speakers Robert Wald, Craig Callender, David Wallace and Karim Thébeault)

**British Society for Philosophy of Science** Annual Conference (Cambridge, Jul. 2014):

“Classical Black Holes Are Hot”

**HOPOS** Annual Conference (Ghent, Jul. 2014): “On Newton’s Third Rule of Reasoning in Philosophy, ‘The Universal Qualities of Bodies’ and the Speciation of Physical Systems”

**Italian Society for Logic and Philosophy of Sciences** Triennial Conference (Rome, Jun. 2014): “Carnot Cycles and Black Hole Entropy”

**Philosophy of Science Association** Biennial Conference (San Diego, Nov. 2012): “On the Physical and Thermodynamical Character of Cosmological Singularities” (symposium “New Horizons for Singularities in Classical Spacetime Theories”, co-organized with fellow speakers J. Manchak and J. Weatherall)

**Canadian Society for the History and Philosophy of Science** Annual Conference (Waterloo, ON, May 2012): “Animadversions on the Semantic View of Theories”

**European Philosophy of Science Association** Biennial Conference (Athens, Oct. 2011): “On the Thermodynamical Character of Black Holes in Classical General Relativity”

**British Society for the Philosophy of Science** Annual Conference (Dublin, July. 2010): “There Is No Gravitational Stress-Energy Tensor”

**University of Pittsburgh Center for the Philosophy of Science** Conference “Newton and Empiricism” (Apr. 2010): “On Newton’s Third Rule of Reasoning in Philosophy, ‘the Universal Qualities of Bodies’ and the Speciation of Physical Systems”

**The Joint Session of the Aristotelian Society and the Mind Association** Annual Conference (Norwich, Jul. 2009): “On the Dissipation of the Concept of Energy in General Relativity”

**Philosophy of Science Association** Biennial Conference (Pittsburgh, Nov. 2008): “Does General Relativity Need an Interpretation?”

**Third International Conference on the Nature and Ontology of Spacetime** (Montreal, Jun. 2008): “On the Existence of Spacetime Structure”

**Philosophy of Science Association** Biennial Conference (Vancouver, Nov. 2000): “Against the Current Excesses of Quantum Gravity: A Plea for Modesty”

**Philosophy of Science Association** Biennial Conference (Kansas City, MO, Oct. 1998): “The Analysis of Singular Spacetimes”

**American Philosophical Association** Eastern Division Annual Conference (Atlanta, Dec. 1996): “Bell’s Theorem and the Delicacy of Causal Ascription”

## INVITED TALKS

**Hebrew University** Joint MCMP/Edelstein Center Conference “Reduction and Emergence in Philosophy of Science and Philosophy of Mind” (Jerusalem, Mar. 2018): “Entropy of Brain States, Entropy of Mental States”

**Institut des Hautes Études Scientifiques** Conference “Quantum Gravity: Physics and Philosophy” (Paris, Oct. 2017): “Continuum Spacetime as the Limit of Discrete Structure”

**University of Oxford** Department of Physics Workshop “Fine-Tuning in Cosmology” (Oxford, Oct. 2017): “Measure, Topology and Probabilistic Reasoning in Cosmology”

**Leibniz Universität** Institut für Philosophie Conference “Symmetries in Physics” (Hannover, Jul. 2017): “The Problem of Approximate Symmetries in General Relativity”

**Munich Center for Mathematical Philosophy** Conference “Making and Breaking Theories: Applying Physical Models” (LMU Munich, June 2017): “Schematizing the Observer and the Epistemic Content of Theories”

**Perimeter Institute of Theoretical Physics** Conference “Shape Dynamics Workshop” (Waterloo, ON, May 2017): “A Weyl-Type Theorem in Geometrized Newtonian Gravity, and How It May Bear on Shape Dynamics”

**Black Hole Initiative** Conference “First Annual BHI Conference on Black Holes” (Harvard University, May 2017): “Classical Black Holes Are Hot”

**Max Planck Institute for Radio Astronomy** Deutsche Physikalische Gesellschaft (German Physics Society) Conference “Do Black Holes Exist?—Physics and Philosophy of Black Holes” (Bad Honnef, Germany, Apr. 2017): “Classical Black Holes Are Hot”

**Deutsche Physikalische Gesellschaft (German Physics Society)** Annual Conference, Plenary Speaker (Bremen, Mar. 2017): “48 Years of Cosmic Censorship, and Still We Do Not Know What It Is”

**Center for Astrophysics** Institute for Theory and Computation Colloquium (Harvard University, Mar. 2017): “What Is the Einstein Field Equation, and Why Does It Matter for Quantum Gravity?”

**5th Bi-Annual South African Philosophy of Science and Logic Colloquium** Keynote Speaker (Rhodes University, Grahamstown, South Africa, Jan. 2017): “How Can Physics Bear on Ontology?”

**First Annual Bristol-MCMP Workshop on Foundations of Physics** “Causal Horizons” (Bristol, Jan. 2017): “Two Paths to the Einstein Field Equation from Horizon Thermodynamics”

**Laboratoire des Recherches sur les Sciences de la Matière (CEA-Saclay)** Conference “Symmetries in Physics” (Paris, Dec. 2016): “The Problem of Approximate Symmetries”

**Center for Advanced Studies** Conference “Reasoning in Physics” (Ludwig-Maximilians-Universität, Dec. 2016): “Newtonian Abduction (Not IBE!) as Framework Confirmation”

**Universidad Complutense** Methods of Causal Inference and Scientific Representation Group Colloquium (Madrid, Dec. 2016): “Animadversions on the Semantic View of Theories”

**University of Oldenburg** Institute of Physics, Mathematical Physics Colloquium (Nov. 2016): “Black Holes Really Are Thermodynamical Objects (Probably)”

**Ludwig-Maximilians-Universität** Philosophy Faculty colloquium (Munich, Nov. 2016): “On the Possibility of Progress in Philosophy”

**Venice International University** Conference “Social Choice and its Philosophical Applications” (Oct. 2016): “Aggregating Scientific Judgements in the Absence of Empirical Data”

**Max Planck Institute for Gravitational Physics** Albert Einstein Institute Conference “Dashed Hopes: What Hasn’t Worked in Quantum Gravity (and Why)?” (Berlin, Jul. 2016): “What Is the Einstein Field Equation, and Why Does It Matter for Quantum Gravity?”

**London School of Economics** Dept. of Philosophy, Logic and Scientific Method Workshop “The Hole Shebang: New Perspectives on the Hole Argument” (Jul. 2016): “Why the Four-Dimensional Einstein Field Equation Is Not Equivalent to the 3+1 Canonical Representation, Plus a Few (Mostly Dismissive) Remarks about the Hole Argument”

**Munich Center for Mathematical Philosophy** Conference “The Semantics of Physical Theories” (Jun. 2016): “Kinematics, Dynamics, and the Structure of Physical Theory”

**Trinity College (University of Cambridge)** Colloquium (May 2016): “Black Holes Really Are Thermodynamical Objects”

**Radboud University** High Energy Physics Group, 2 Colloquiums (May. 2016): “What Is the Einstein Field Equation, and Why Does It Matter for Quantum Gravity?”; “A Strengthened Zeroth Law for Black-Hole Thermodynamics”

**University of Bristol** Depts. of Philosophy and Physics Joint Colloquium (Apr. 2016): “Black-Holes Really Are Thermodynamical Objects”

**Hebrew University** Joint MCMP/Edelstein Center Conference “Probabilities in Science and Philosophy” (Jerusalem, May. 2016): “What Is Generic and What Is Special about the Universe?”

**University of Florence** Dept. of Physics and Astronomy Workshop “Black Holes and Thermodynamics” (Apr. 2016): “Foundational Problems in Black-Hole Thermodynamics”

**California Technical Institute** Division of the Humanities Colloquium (Jan. 2016): “Classical Black Holes Are Hot”

**Radboud University** High Energy Physics Group Colloquium (Oct. 2015): “Hot and Cold Cosmological Singularities”

**University of Western Ontario** Philosophy Dept., Annual Philosophy of Physics Conference (Jun. 2015): “On the Principle of Equivalence and the Speciation of Physical Systems”

**University of Ghent** Sarton Center for History of Science Colloquium (Mar. 2015): “On the Use and Abuse of Scientific Examples in the Philosophy of Science”

**University of Oxford** Faculty of Philosophy Colloquium (Oxford, Feb. 2015): “The Physical and Philosophical Significance of Energy Conditions in Spacetime Theories”

**Munich Center for Mathematical Philosophy** Conference “Foundations of Classical Field Theory”, (Dec. 2014): “Generalizations of Lagrangian Mechanics Based on Generalizations of Tangent-Bundle Geometry”

**University of Oxford** Philosophy of Cosmology Programme Conference “Philosophy of Cosmology” (Tenerife, Sep. 2014): “The Thermodynamics of Classical Black Holes”

**Munich Center for Mathematical Philosophy** Second International Summer School in Philosophy of Physics “Probabilities in Physics” (Lenzkirch-Saig, Germany, Jul. 2014): “Problematic Probabilities in Cosmology”

**NYU/Columbia/Rutgers Philosophy of Physics Group** Colloquium (New York City, Mar. 2014): “Classical Black Holes Are Hot”

**Rotman Institute of Philosophy** Colloquium (London, ON, Mar. 2014): “Some Puzzles and Theorems about Newtonian Gravitational Energy”

**Munich Center for Mathematical Philosophy** Colloquium (Dec. 2013): “Are Classical Black Holes Hot or Cold?”

**University of Western Ontario** Philosophy Dept. Annual Philosophy of Physics Conference (May 2013): "On the Existence of Spacetime Structure"

**Foundational Questions Institute (FQXi)** Conference "On Time in Physics" (University of California, San Diego, May 2012): "Singularities and the Cosmological Arrow of Time"

**Stanford University** Suppes Center for History and Philosophy of Science Colloquium (May 2012): "On the Status and Role of the Principle of Equivalence in General Relativity"

**University of Western Ontario** Dept. of Applied Mathematics Colloquium (Mar. 2012): "The Geometry of the Euler-Lagrange Equation"

**University of Western Ontario** Dept. of Physics and Astrophysics Colloquium, (Mar. 2012): "Are Classical Black Holes Thermodynamical Objects?"

**Perimeter Institute of Theoretical Physics** Colloquium, Southwestern Ontario Group on the Foundations of Physics (Waterloo, ON, Mar. 2012): "The Conceptual Structure of Classical Mechanics"

**University of Western Ontario** Colloquium, Dept. of Philosophy (London, ON, Jan. 2012): "A New Basis for the Semantics of Physical Theories"

**Southern California Group on the Philosophy of Physics** Colloquium, University of California (Irvine, Nov. 2011): "Black Holes as Thermodynamic Objects in Classical General Relativity"

**University of Bristol** Colloquium, Dept. of Philosophy (Mar. 2011): "On Lagrangian Mechanics, Hamiltonian Mechanics, and the Semantics of Physical Theories"

**University of Leeds** Colloquium, Dept. of Philosophy (Mar. 2011): "A New Basis for the Semantics of Physical Theories"

**Perimeter Institute of Theoretical Physics** Southwestern Ontario Group on the Foundations of Physics Colloquium (Oct. 2010): "On Tensorial Concomitants and the Non-Existence of a Gravitational Stress-Energy Tensor"

**Deutsche Physikalische Gesellschaft (German Physics Society)** Annual Conference (Bonn, Mar. 2010): "Classical Mechanics Is Lagrangian; It Is Not Hamiltonian"

**Queen Mary College** Dept. of Physics Colloquium (Jan. 2010): "Classical Mechanics Is Lagrangian; It Is Not Hamiltonian"

**University of Oxford** Faculty of Philosophy Colloquium (Nov. 2009): "On Tensorial Concomitants and the Non-Existence of a Gravitational Stress-Energy Tensor"

**London School of Economics** The Dept. of Philosophy, Logic and Scientific Method Colloquium (Nov. 2009): "On the Propriety of Physical Theories as a Basis for Their Semantics"

**The Sigma Club** Colloquium (London, Oct. 2009): "Classical Mechanics Is Lagrangian; It Is Not Hamiltonian; The Semantics of Physical Theory Is Not Semantic"

**University of Kent** Dept. of Philosophy Colloquium (Sep. 2009): "On Learning, Reading, and Writing Philosophy"

**Bucknell University** Dept. of Philosophy Colloquium (Feb. 2009): "Questions about Laplacian Determinism in Newtonian Mechanics"

**University of Pittsburgh** Center for the Philosophy of Science Colloquium (Feb. 2009): "Why Rigid Designation and the Causal Theory of Reference Cannot Stand"

**Carnegie Mellon University** Philosophy Dept. Colloquium (Jan. 2009): "On the Existence of



Spacetime Structure”

**University of Pittsburgh** Center for the Philosophy of Science Colloquium (Sep. 2008): “Classical Mechanics Is Lagrangian; It Is Not Hamiltonian”

**University of California, Berkeley** Committee on Ancient Philosophy Colloquium (Feb. 1999): “Taking ‘Pleasure’ in Plato’s *Republic*”

**Tufts University** Philosophy Dept. Colloquium (Jan. 1999): “Bell’s Theorem and Causality in Quantum Mechanics”

**Rutgers University** Dept. of Mathematics, Mathematical Physics Colloquium (Sep. 1998): “The Geometry of Configuration Space in Lagrangian and in Hamiltonian Mechanics”

**University of Pittsburgh** Dept. of the History and Philosophy of Science Colloquium (Sep. 1998): “The Analysis of Singular Spacetimes”

**Pennsylvania State University** Dept. of Physics, Center for Gravitational Physics and Geometry Colloquium (PA, Sep. 1998): “The Role of Configuration Space in Classical and in Quantum Mechanics”

**Midwest Workshop on the Foundations of Physics** Colloquium (Chicago, Feb. 1998): “Defining Gravitational Energy in Newtonian Theory and in General Relativity”

**Midwest Ancient Philosophy Workshop** Presentation (Chicago, Feb. 1998): “On the Translation and Interpretation of Aristotle’s *Generation and Corruption*, Book II, Chapter 6”

**University of Chicago** Physics Dept., Relativity Group Colloquium (Oct. 1997): “The Geometry of Lagrangian Mechanics”

**Midwest Ancient Philosophy Workshop** Presentation (Chicago, Nov. 1996): “On the Translation and Interpretation of Aristotle’s *Generation and Corruption*, Book II, Chapter 5”

**Midwest Workshop on the Foundations of Physics** Colloquium (Chicago, Mar. 1996): “Interpreting the Locality Condition in Bell’s Theorem: A Defense of Jarrett”

## TEACHING EXPERIENCE

### Ludwig-Maximilians-Universität

**Philosophical Problems of Thermodynamics and Statistical Mechanics** Winter 2017, Fakultät für Philosophie, Wissenschaftstheorie und Religionswissenschaft, graduate seminar

**The Structure and Semantics of Scientific Theories** Winter 2016, Fakultät für Philosophie, Wissenschaftstheorie und Religionswissenschaft, graduate seminar

**The Philosophy of Space, Time and Spacetime** Winter 2015, Fakultät für Philosophie, Wissenschaftstheorie und Religionswissenschaft, graduate seminar

**The Semantics of Scientific Theories** Summer 2015, Fakultät für Philosophie, Wissenschaftstheorie und Religionswissenschaft, graduate seminar

**Kant and the Philosophy of Science** Winter 2014, Fakultät für Philosophie, Wissenschaftstheorie und Religionswissenschaft, graduate seminar

**Singularities and Black Holes in Relativistic Spacetimes** Summer 2014, Fakultät für Physik (cross-listed, Fakultät für Philosophie, Wissenschaftstheorie und Religionswissenschaft), graduate seminar

**Einstein for Everyone** Summer 2014, Fakultät für Philosophie, Wissenschaftstheorie und Religionswissenschaft, undergraduate course

### **University of Western Ontario**

**Einstein for Everyone** Spring 2013, Dept. of Philosophy, undergraduate course

**Introduction to Ancient Philosophy** Fall 2012, Dept. of Philosophy, undergraduate course

**General Relativity** Fall 2011–Spring 2012, Dept. of Physics and Astronomy (cross-listed with Dept. of Philosophy), two-term graduate course

**Contemporary Metaphysics** Spring 2011, Dept. of Philosophy, advanced undergraduate course

**Philosophy of Quantum Mechanics** Fall 2010, Dept. of Philosophy, advanced undergraduate course

### **London School of Economics**

**Survey of the Philosophy of Science** Spring 2010, Dept. of Philosophy, Logic and Scientific Method, graduate course

**Morality and Values** (lectures on Aristotle's *Nicomachean Ethics*) Spring 2010, Dept. of Philosophy, Logic and Scientific Method, graduate course

**Fundamental Maths for Philosophy of the Special Sciences** Spring 2010, Dept. of Philosophy, Logic and Scientific Method, informal graduate lectures (volunteer course)

**The Philosophical Foundations of Physics** Fall 2009, Dept. of Philosophy, Logic and Scientific Method, graduate course

**The History and Philosophy of Scientific Revolutions** Fall 2009, Dept. of Philosophy, Logic and Scientific Method, advanced undergraduate course

### **Stanford University**

**Introduction to the Humanities** Fall 1999–Spring 2000, Core Freshman Curriculum

**Philosophy of Space, Time and Spacetime** Spring 1999, Philosophy Dept., graduate and upper-level undergraduate course

**Determinism in Physics** Winter 1999, Philosophy Dept., graduate seminar (co-taught with Prof. Patrick Suppes)

**Central Topics in Philosophy of Science** Winter 1999, Philosophy Dept., upper-level undergraduate course

**Survey of Early 20th Century Analytic Philosophy** Fall 1998, Philosophy Dept., graduate and upper-level undergraduate course

### **University of Chicago**

**Philosophical and Scientific Understandings of Causation** Winter, 1997, Committee on the Conceptual Foundations of Science, honors upper-level undergraduate seminar

## **RESEARCH GRANTS**

### **Deutsche Forschungsgemeinschaft (German Research Foundation)**

Einzelförderung Grant (sole PI) for €283,260, Munich Center for Mathematical Philosophy (LMU Munich), May 2016–Apr. 2019, full funding for research project “Gravitation, Quantum

Theory, and Thermodynamics: The Crossroads of Physics and Philosophy” (<http://gepris.dfg.de/gepris/projekt/312032894>) (<http://gepris.dfg.de/gepris/projekt/312032894>)

## CONFERENCE GRANTS

**British Society for the Philosophy of Science** £300, for First Annual Bristol-MCMP Workshop on Foundations of Physics “Causal Horizons”, University of Bristol and Munich Center For Mathematical Philosophy (Bristol, Jan. 2017)

**Deutsche Forschungsgemeinschaft (German Physics Society)** €6,000, for international conference “The Semantics of Scientific Theories”, Munich Center for Mathematical Philosophy (LMU Munich), Jun. 2016

## MEMBERSHIP IN PROFESSIONAL SOCIETIES

**Foundational Questions Institute (FQXi)** by invitation, Mar. 2016 (ongoing)

## ORGANIZATION OF INTERNATIONAL CONFERENCES AND SYMPOSIA

**All Things Reichenbach** Munich Center for Mathematical Philosophy (2018): three-day conference (co-organizer)

**Second Annual Bristol/MCMP Foundations of Physics Conference** Munich Center For Mathematical Philosophy (LMU Munich, Jan. 2018): one-day conference (co-organizer)

**The Second Law of Thermodynamics** Munich Center for Mathematical Philosophy (Sep. 2017): two-day conference

**Symmetries and Symmetry Breaking ii** Munich Center for Mathematical Philosophy (Jun. 2017): one-day conference (co-organizer)

**The Philosophy of Howard Stein** University of Chicago (Jun. 2017): two-day conference (co-organizer)

**The First Annual Black Hole Initiative Conference** Harvard University (May 2017): two-day conference (co-organizer)

**First Annual Bristol/MCMP Foundations of Physics Conference** “Causal Horizons”, University of Bristol (Jan. 2017): one-day conference (co-organizer), funding by competitive grant from the British Society for the Philosophy of Science

**The Semantics of Scientific Theories** Munich Center for Mathematical Philosophy (Jun. 2016): three-day conference, funding by competitive grant from Deutsche Forschungsgemeinschaft (co-organizer)

**The Foundations of Classical Field Theories** Munich Center for Mathematical Philosophy (Dec. 2014): one-day conference (co-organizer)

**Foundations of Gravity and Thermodynamics** Symposium, Philosophy of Science Association Biennial Conference (Chicago, Nov. 2014)

**New Horizons for Singularities in Classical Spacetime Theories** Symposium, Philosophy of Science Association Biennial Conference (San Diego, Nov. 2012)

**The Foundations of Physics** Philosophy Dept. and The Rotman Institute, University of Western Ontario (May 2011): annual two-day conference (co-organizer)

## MANUSCRIPTS IN PREPARATION FOR SUBMISSION

*The Enterprise of Meaning* (book manuscript)

“Energy Conditions and Methodology in Cosmology”, planning to submit to *Studies in History and Philosophy of Modern Physics*

“A Strengthened Zeroth Law for Black-Hole Thermodynamics”, planning to submit to *Physical Review Letters*

“Cosmological Singularities, Gravitational Thermodynamics, and the Arrow of Time”, planning to submit to *Foundations of Physics*

“Thermodynamics Determines the Structure of Black Holes in Shape Dynamics” (co-author: Sean Gryb), planning to submit to *General Relativity and Gravitation*

“Towards a Thermodynamical Classification of Cosmological Singularities”, planning to submit to *Classical and Quantum Gravity*

“The Analysis of Singular Spacetimes Revisited, in Light of Contemporary Cosmology”, planning to submit to *Philosophy of Science*

“On the Physical Cogency of Quantum Field-Theory On Curved Spacetime”, planning to submit to *British Journal of Philosophy of Science*

“What Is the Einstein Field Equation, and Why Does It Matter for Quantum Gravity?”, planning to submit to *Studies in History and Philosophy of Modern Physics*

“On the Meaning, Role and Status of the Principle of Equivalence in General Relativity”, planning to submit to *Philosophy of Science*

“Coordinate Systems as Violence, or, Why I Am a Selective Conscientious Objector, Not a Pacifist”, planning to submit to *Studies in History and Philosophy of Modern Physics*

“The Gloriously Rich and Schizophrenic Concept of Energy as a Physical Quantity”, planning to submit to *Synthese*

“Animadversions on the Semantic View of Theories”, planning to submit to *Erkenntnis*

“On Newton’s Third Rule of Reasoning in Philosophy, ‘the Universal Qualities of Bodies’ and the Speciation of Physical Systems”, planning to submit to *British Journal of Philosophy of Science*

“The Intrinsic Geometry of the Euler-Lagrange Equation and Tangent Bundles”, planning to submit to *Journal of Mathematical Physics*

“A Formal Model of the Regime of Propriety of a Physical Theory, with Applications to Problems in the Initial-Value Formulation of the Partial-Differential Equations of Mathematical Physics”, planning to submit to *Foundations of Physics*

“Against Denoting”, planning to submit to *Journal of Philosophy*

“On the Challenges the Sons of Ariston Pose to Socrates, and Socrates’ Confounding Responses”, planning to submit to *Apeiron*

## SERVICE TO THE PROFESSION

**External Grant Reviewer** John Templeton Foundation; Polish National Science Centre (Narodowe Centrum Nauki, governmental agency)

**Referee (Philosophy Journals)** *British Journal for the Philosophy of Science*; *Dialogue*; *Erkenntnis*; *HOPOS*; *International Studies in the Philosophy of Science*; *Mind*; *Philosophy of Science*; *Studies in History and Philosophy of Modern Physics*; *Studies in History and Philosophy of Science*; *Synthese*; *Theoria*

**Referee (Physics Journals)** *Classical and Quantum Gravity*; *European Journal of Physics*; *Foundations of Physics*; *General Relativity and Gravitation*

**Program Committee (Conferences)** British Society for Philosophy of Science Annual Conference, 2017

**Philosophy of Science Association** chief architect and webmaster (volunteer) for the PSA's website, <http://www.philsci.org>, Jan. 2008–Jun. 2009

## SERVICE TO THE LOCAL COMMUNITY

**Black Hole Initiative (Harvard University)** chair of the colloquium committee; conferences committee; organized and lead philosophy reading group

**Ludwig-Maximilians-Universität** appointments committees for faculty positions, post-doctoral fellows, and visiting fellows; organized bi-weekly philosophy of physics reading group; program committee (reviewer of submitted papers and abstracts) for most major conferences hosted by the MCMP; fostering active collaborative relationships with mathematics and physics departments; wrote a survey article on black holes and the arrow of time for the Ludwig-Maximilians-Universität student magazine *Cogito*

**University of Western Ontario** organized bi-weekly philosophy of physics reading group; organized bi-weekly general philosophy of science reading group; organized weekly reading group on James Clerk Maxwell's scientific writings; program committee (reviewer of submitted papers and abstracts) for every major philosophy of science conference hosted by the Philosophy Department and the Rotman Institute; fostered active collaborative relationships with mathematics and physics departments

**London School of Economics** organized weekly reading group on Plato's *Statesman* (one in English, and a subsidiary group for Greek readers); delivered weekly informal graduate lecture series on the fundamentals of topology and real analysis; fostered active collaborative relationships with mathematics department

**Stanford University** organized weekly reading groups on Russell's *The Analysis of Matter* and Carnap's *Meaning and Necessity*; fostered active collaborative relationships with mathematics and physics departments

## LANGUAGES

**Ancient Greek** reading (fluent)

**German** reading (fluent), speaking (basic)

**Spanish** reading and speaking (fluent)

## RECOMMENDERS

**Prof. David Malament (Emeritus)**, University of California, Irvine, Dept. of Logic and Philosophy of Science, [dmalamen@uci.edu](mailto:dmalamen@uci.edu), +1 949-824-7374

**Prof. Howard Stein (Emeritus)**, University of Chicago, Philosophy Dept., [hstein@uchicago.edu](mailto:hstein@uchicago.edu), +1 773-702-8513

**Prof. Michael Friedman**, Stanford University, Philosophy Dept., [mlfriedman@stanford.edu](mailto:mlfriedman@stanford.edu), +1 650-723-2547

**Prof. Harvey Brown**, Oxford University, Faculty of Philosophy, [harvey.brown@philosophy.ox.ac.uk](mailto:harvey.brown@philosophy.ox.ac.uk), +44 1865 276926

**Prof. Dr. Stephan Hartmann**, Ludwig-Maximilians-Universität, Munich Center for Mathematical Philosophy, Chair, [S.Hartmann@lmu.de](mailto:S.Hartmann@lmu.de), +49 189 2180 3320

**Prof. William Harper (Emeritus)**, University of Western Ontario, Philosophy Dept., [wlharp@uwo.ca](mailto:wlharp@uwo.ca), +1 519-661-2111

**Prof. Carlo Rovelli**, Centre de Physique Theorique de Luminy, Université de Marseille, [rovelli@cpt.univ-mrs.fr](mailto:rovelli@cpt.univ-mrs.fr), +33 (0) 6 14 59 38 85

## FURTHER REFERENCES

**Prof. John Earman (Emeritus)**, University of Pittsburgh, History and Philosophy of Science Dept., [jearman@pitt.edu](mailto:jearman@pitt.edu), +1 412-624-1052

**Dr. Jeremy Butterfield**, Senior Research Fellow, Trinity College, University of Cambridge, [jb56@cam.ac.uk](mailto:jb56@cam.ac.uk)

**Prof. Richard Kraut**, Northwestern University, Philosophy Dept., [rkraut1@northwestern.edu](mailto:rkraut1@northwestern.edu)

## ADDITIONAL INFORMATION

My academic research career has a lacuna of 8 years. From June of 2000 to August of 2008 I did not hold an academic position. During that time, my mother was chronically and acutely ill, and she had neither health insurance nor any other means to pay her medical bills. My academic position in 2000 at Stanford University did not pay enough for me to pay her medical bills. I therefore left Stanford and took employment in the computer industry, variously as a network engineer, a software engineer, and a software architect, in order to earn enough to pay her medical bills and otherwise support her. When I no longer had that obligation in 2008, I returned immediately to academic research.

That also explains why I held a lectureship in 1998-1999 and a post-doctoral position in 1999-2000, both at Stanford, but did not receive my Ph.D. until 2005: when I was hired for the positions at Stanford, it was with the agreement that I would finish my Ph.D. in 1999. My mother's illness prevented me from completing it then. I worked on it afterward when I could, while I held positions in software.