

Sébastien Rivat

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Research Interests

AOS: Philosophy of Physics, Philosophy of Science, History of Physics

AOC: Logic, Metaphysics, Early Modern Philosophy, Ethics

Academic Appointments

- 2024 – present **Munich Center for Mathematical Philosophy, LMU Munich**
Assistant Professor, Principal Investigator for the ERC starting grant research project *The Scale Revolution in Physics: Historical and Philosophical Perspectives*
- 2022 – 2024 **Munich Center for Mathematical Philosophy, LMU Munich**
Postdoctoral Fellow
- 2020 – 2022 **Max Planck Institute for the History of Science, Berlin**
Postdoctoral Fellow

Education

- 2013 – 2020 **Columbia University**
Ph.D., Philosophy (M.A., 2015; M.Phil, 2017)
- 2012 – 2013 **University of Cambridge, Queens' College**
M.Phil, History and Philosophy of Science and Medicine, first class honors
- 2011 – 2012 **University of Cambridge, Queens' College**
MASt (Part III), Applied Mathematics and Theoretical Physics, distinction
- 2008 – 2012 **Ecole Centrale Paris**
B.S. (eq.), Mathematics and Physics

Publications

7. Rivat, S., forthcoming, “Open Systems Across Scales”, *Synthese*. [Preprint]

6. Rivat, S., forthcoming, “Wait, Why Gauge?”, *The British Journal for the Philosophy of Science*. [\[Journal\]](#) [\[Preprint\]](#)
5. Rivat, S., 2021, “Drawing Scales Apart: The Origins of Wilson’s Conception of Effective Field Theories”, *Studies in History and Philosophy of Science*, 90, 321-338. [\[Journal\]](#) [\[Preprint\]](#)
4. Rivat, S., 2021, “Effective Theories and Infinite Idealizations: A Challenge for Scientific Realism”, *Synthese*, 198, 12107–12136. [\[Journal\]](#) [\[Preprint\]](#)
3. Rivat, S., & Grinbaum A., 2020, “Philosophical Foundations of Effective Field Theories”, *The European Physical Journal A*, 56, 90. [\[Journal\]](#) [\[Preprint\]](#)
2. Rivat, S., 2019, “Renormalization Scrutinized”, *Studies in History and Philosophy of Modern Physics*, 68C, 23-39. [\[Journal\]](#) [\[Preprint\]](#)
1. Rivat, S., 2014, “On the Heuristics of the Higgs Mechanism”, *Journal for General Philosophy of Science*, 45(2), 351-367. Part of a master’s thesis at Cambridge. [\[Journal\]](#) [\[Preprint\]](#)

Articles in Preparation

Under review

- Article on the reference of theoretical terms
- Article on the open systems view
- Article on lattice quantum field theories
- Article on the history of renormalization group methods

In progress

- “Steve Weinberg’s Early Concept of Effective Field Theory”
- “What is Effective Metaphysics?”
- “The Universe Could Be an Open System” (with Michael Cuffaro, Stephan Hartmann, James Ladyman, David Sloan, and Karim Thébault)

Research Grants, Fellowships & Awards

Research Grants & Fellowships

- 2024 ERC starting grant (1,455,058 €), European Research Council
- 2024 Individual research grant (349,164 €), German Research Foundation
- 2023 Pioneering research grant (400,300 €), Volkswagen Foundation
- 2018 – 2020 Core Curriculum Preceptorship (approx. \$150,000), Columbia University
- 2018 – 2020 Kluge Graduate Fellowship (approx. \$140,000), Columbia University (declined)
- 2018 Conference Funding (\$18,000), Workshop, Columbia University
- 2018 Conference Funding (\$16,000), Rutgers-Columbia Workshop, Rutgers University
- 2016 Space and Time After Quantum Gravity Summer Institute Grant, Chicago
- 2013 – 2018 GSAS Dean’s PhD Fellowship (approx. \$360,000), Columbia University

Awards

- 2019 D. H. Siff Award (\$250), Best Paper in Philosophy of Science, Columbia University

- 2018 D. H. Siff Award (\$250), Best Paper in Philosophy of Science, Columbia University
- 2016 Sidney Morgenbesser Fellowship, Faculty Nominated, Columbia University
- 2016 Lina Kahn Prize (\$500), Best Paper in Metaphysics, Columbia University
- 2015 Alliance Programme Award (\$4000), Columbia University
- 2012 Admitted to Queens' College Foundation
- 2012 Bachelor Scholarship (£300), Part III Distinction, Queens' College

Past and Upcoming Talks

- Feb. 2025 44. "Still No Peace on the Lattice", *Philosophy of High Energy Physics (PHEP-2) workshop*, University of Pittsburgh, USA
- Dec. 2024 43. "La Référence des Termes Théoriques à la Lumière des Théories Effectives", *Séminaire d'Histoire et Philosophie des Sciences*, CRHI, Université Côte d'Azur, France
- Nov. 2024 42. "The Open Systems View in Field Theory" (joint work with Stephan Hartmann), *Open system workshop*, Politecnico di Milano, Italy
- Oct. 2024 41. "The Open Systems View in Field Theory" (joint work with Stephan Hartmann), *IMPRS-QST Epistemology & Theory of Science for Physicists Seminar*, Physics Department, LMU Munich, Germany
- Sep. 2024 40. "Steve Weinberg's early concept of effective theory", *The Eleventh Conference of the European Society for the History of Science*, Pompeu Fabra University, Barcelona, Spain
- Feb. 2024 39. "La Référence des Termes Théoriques à la Lumière des Théories Effectives", *Les Jeudis de l'Histoire et de la Philosophie des Sciences*, ENS Ulm, Paris, France
- Jan. 2024 38. "The Open Systems View in Field Theory" (joint work with Stephan Hartmann), *Open Cosmology workshop II*, Bristol, UK
- Nov. 2023 37. "Why Discretize? Philosophical and Historical Lessons from Lattice Gauge Theories", *Discreteness and Precision in Physics*, IHPST, Paris, France
- Sep. 2023 36. "The Open Systems View in Field Theory" (joint work with Stephan Hartmann), *The 9th biennial meeting of the European Philosophy of Science Association*, Belgrade, Serbia
- Sep. 2023 35. "From the Infinite Universe to the Effective World", *Jahrestagung der Gesellschaft für die Geschichte der Wissenschaften, der Medizin und der Technik*, Ingoldstadt, Germany
- July 2023 34. "Wait, Why Gauge?", *The 21th European Conference on Foundations of Physics*, Bristol, UK
- July 2023 33. "Wait, Why Gauge?", *The British Society for the Philosophy of Science (BSPS) Annual Conference*, Bristol, UK
- May 2023 32. "Open Systems Across Scales", *Congrès de la Société de Philosophie des Sciences (SPS) 2023*, Université Paris Nanterre, France
- April 2023 31. "De l'Univers Infini au Monde Effectif", *XIVe Congrès de la Société Française d'Histoire des Sciences et des Techniques*, Bordeaux, France

- March 2023 30. “Ken Wilson’s Early Concept of Effective Theory”, Séminaire d’Histoire et de Philosophie de la Physique, IHPST & SPHERE, Paris, France
- Nov. 2022 29. “Open Systems Across Scales”, *Open Cosmology workshop*, Munich Center for Mathematical Philosophy, LMU Munich, Germany
- Nov. 2022 28. “Explanations in Physics”, Center for Advanced Studies, LMU Munich, Germany
- Nov. 2022 27. “How Theoretical Terms Effectively Refer”, Departmental Colloquium, Munich Center for Mathematical Philosophy, LMU Munich, Germany
- Aug. 2022 26. “How Theoretical Terms Effectively Refer”, *The Fourth International Conference of the German Society for Philosophy of Science (GWP.2022)*, TU Berlin, Germany
- July 2022 25. “Steve Weinberg and the Rise of Systematic Low-energy Approximations”, *Approximations to Second Order: Historical and Philosophical Perspectives*, MPIWG, Berlin, Germany
- June 2022 24. “Ken Wilson’s Early Concept of Effective Theory”, *The Fourteenth Biennial Congress of the International Society for the History of Philosophy of Science (HOPOS 2022)*, UC Irvine, USA
- June 2022 23. “Bottom-up EFTs and Model Independence: Some Historical Roots”, *Beyond Models*, University of Bonn, Germany
- May 2022 22. “How Theoretical Terms Effectively Refer”, *Canadian Society for the History and Philosophy of Science (CSHPS) Annual Meeting*, Online
- April 2022 21. “How Theoretical Terms Effectively Refer”, Departmental Colloquium, IE University, Madrid, Spain
- March 2022 20. “How to Think about Systems Across Scales”, Munich Center for Mathematical Philosophy, LMU Munich, Online
- Oct. 2021 19. “Ken Wilson’s Early Concept of Effective Theory”, *The 20th European Conference on Foundations of Physics*, ENS Ulm, Paris, France
- Sep. 2021 18. “Playing Physics Against Itself: Kenneth Wilson’s Path to Effective Theories in the 1960s”, *European Society for the History of Science (ESHS) Early Career Scholars Conference*, Online
- Sep. 2021 17. “La Référence des Termes Théoriques à la Lumière des Théories Effectives”, *Congrès de la Société de Philosophie des Sciences (SPS) 2021*, Université de Mons, Belgium
- June 2021 16. “Ken Wilson and the Slicing Method”, *Approximation in Physics: Historical and Philosophical Perspectives*, MPIWG, Berlin, Germany
- Nov. 2019 15. “How Theoretical Terms Effectively Refer”, Department of Philosophy, University of Notre Dame, South Bend, USA
- May 2019 14. “Two Cheers for Effective Theories and Selective Realism”, *LARSIM seminar*, CEA, Paris, France
- May 2019 13. “Two Cheers for Effective Theories and Selective Realism”, *Workshop in Philosophy of Physics*, CCNY, New York, USA

- April 2019 12. “Two Cheers for Effective Theories and Selective Realism”, *Early Career Workshop in the History and Philosophy of Physics*, University of Pittsburgh, USA
- July 2018 11. “Renormalization Scrutinized”, *The 19th European Conference on Foundations of Physics*, Utrecht University, Netherlands
- July 2018 10. “Renormalization Scrutinized”, *The British Society for the Philosophy of Science (BSPS) Annual Conference*, Oxford, UK
- July 2018 9. “Effective Theories and Infinite Idealizations”, *Congrès de la Société de Philosophie Analytique (SOPHA)*, UCL, Louvain-la-Neuve, Belgium
- March 2018 8. “Effective Theories and Infinite Idealizations”, *Models and Simulations 8 (MS8) Annual Conference*, USC, Columbia, USA
- July 2017 7. “Effective Theories and Infinite Idealizations”, *The British Society for the Philosophy of Science (BSPS) Annual Conference*, Edinburgh, UK
- Oct. 2017 6. Commentary on Benjamin Henke’s “Actual Difference Making, Causal Selection, and Ranking Explanations”, *Society for the Metaphysics of Science Conference*, Fordham University, New York, USA
- July 2017 5. Commentary on Patricia Palacios’s “Symmetry-Breaking Phase Transition: A Challenge for Reductionism?”, *Symmetries and Asymmetries in Physics Conference*, Leibniz University Hannover, Germany
- July 2016 4. “Who’s Afraid of Infinities? Reduction and Singularities in Phase Transitions”, *Infinite Idealizations in Science Conference*, Munich Center for Mathematical Philosophy, LMU Munich, Germany
- Nov. 2014 3. “The Origins of Loop-infinities in Quantum Field Theory”, *Philosophy of Physics Talk Series*, Columbia University, New York, USA
- July 2014 2. “The Logic of Perturbative Renormalization”, Center for Mathematical Science, University of Cambridge, UK
- May 2013 1. “Are Virtual Particles Real?”, History and Philosophy of Science Department, University of Cambridge, UK

Teaching Experience

As Instructor at LMU Munich (all graduate)

- Winter 23/24 Scientific Realism and Its Discontents [\[Syllabus\]](#)
- Winter 22/23 Reduction and Emergence [\[Syllabus\]](#)

As Instructor at Columbia University (all undergraduate)

- Spring 2020 Contemporary Civilization, Moral & Political Philosophy [\[Syllabus\]](#)
- Fall 2019 Contemporary Civilization, Moral & Political Philosophy [\[Syllabus\]](#)
- Spring 2019 Contemporary Civilization, Moral & Political Philosophy
- Fall 2018 Contemporary Civilization, Moral & Political Philosophy
- Summer 2018 Early Modern Philosophy [\[Syllabus\]](#)
- Summer 2017 Philosophy of Science [\[Syllabus\]](#)

As Teaching Assistant at Columbia University (all undergraduate)

- Spring 2017 Symbolic Logic (Achille Varzi), Recitation Sections
- Fall 2016 Metaphysics (Achille Varzi), Recitation Sections
- Spring 2016 Physics and Philosophy (David Albert)
- Fall 2015 Introduction to Philosophy (Cheryl Mendelson)
- Spring 2015 History of Philosophy II: Aquinas to Kant (Patricia Kitcher), Recitation Sections
- Fall 2014 Methods and Problems of Philosophical Thought (David Albert)

Experience with supervision

- In progress Eduarda Nova Cruz, “Relational Quantum Mechanics and Realism”, Master thesis, LMU Munich
- 2024 Matthias Albrecht, “Epistemic Relativism and Scientific Objectivity”, Master thesis, LMU Munich
- 2024 Karla Weingarten, “Understanding with Feynman Diagrams”, Master thesis, LMU Munich
- 2020 Nikitas Koutoupes, “Quantum Suicide and Probability in the Many-Worlds Interpretation of Quantum Mechanics”, Master student essay, Columbia University
- 2015 – 2020 Regular supervisions of undergraduate mid-term papers (5-10 pages) and final research essays (10-20 pages), Columbia University

Pedagogical Training

Seminar

- 2018 – 2019 Contemporary Civilization core preceptor pedagogical seminar

Workshops

- Spring 2020 “Inclusive Online Teaching”, Center for Teaching and Learning (CTL)
- Spring 2020 “Teaching Remotely”, CTL
- Spring 2019 “Learning Through Discussion”, CTL
- Spring 2019 “Inclusive Teaching”, CTL
- Fall 2018 “Dealing with Difficult Topics in the Classroom”, Core Curriculum (CC)
- Fall 2018 “Effectively Leading Classroom Discussions”, CC
- Fall 2018 “Grading and Assessment”, CC
- Fall 2018 “Inclusive Teaching”, CC
- Fall 2018 Micro-teaching and peer-observation sessions, CC
- Fall 2017 “Inclusive Teaching: Small Changes to Maximize Equity in the Classroom”, CTL
- Fall 2016 “Syllabus Design”, CTL
- Fall 2014 “Presentation Skills for Educators”, CTL

Physics Research

- Summer 2010 **Laboratory for Theoretical Physics (LPT), Orsay, France**
CP violation study of the channels $B_{s/d} \rightarrow l^+ l^-$ and $B^- \rightarrow l \bar{\nu}_l$ within the Standard Model and the two-Higgs-doublet model

Service

Conference and symposium organization

- Sep. 2023 4. Symposium *Open and closed systems in quantum physics and cosmology*, EPSA, co-organizer
- July 2023 3. Symposium *Open and closed systems in quantum physics and cosmology*, Foundations, co-organizer
- Oct. 2018 2. Workshop on the future of the foundations of physics (17 invited speakers), Department of Physics & Department of Philosophy, Columbia University, co-organizer
- May 2018 1. Rutgers-Columbia workshop on the metaphysics of quantum field theories (8 invited speakers), Department of Philosophy, Rutgers University, co-organizer

Oral history interviews

- Aug. 2024 Interview of Robert Wald (with Erik Curiel), Munich

Professional service and outreach

- 2024 – present General secretary, *Société de Philosophie des Sciences* (SPS)
- 2024 – present Steering committee, *Société de Philosophie des Sciences* (SPS)
- 2024 Interview for the journal *The Reasoner*
- 2024 Co-organizer, workshop *How to apply for a PhD program*, LMU Munich
- 2024 Search committee, postdoctoral position in philosophy of science, LMU Munich
- 2022 – 2024 Organizer, Philosophy of Physics Reading Group, LMU Munich
- 2022 Review committee, American Academy in Berlin fellowship program
- Sep. 2022 Interview for the magazine *New Scientist*
- 2020 – 2022 Co-organizer, Final Theory Group seminar, MPIWG, Berlin
- March 2020 Review committee, James P. Shenton essay prize, Core Curriculum, Columbia University
- 2015 – 2016 Facilitator, philosophy outreach program *Rethink*, New York, USA
- 2015 – 2016 Organizer, graduate student workshop, Columbia University
- 2015 – 2016 Graduate student representative, Columbia University
- 2013 – 2015 Founder and organizer, philosophy of physics reading group, Columbia University
- 2009 – 2010 Group leader, science outreach program *La Main à la Pâte*, Paris, France

Journal referee

Erkenntnis, Foundations of Physics, International Studies in the Philosophy of Science, Philosophical Studies, Philosophy of Science, Studies in History and Philosophy of Modern Physics, Studies in History and Philosophy of Science, Synthese, The British Journal for the Philosophy of Science, The European Physical Journal H

Program committee

21st European Conference on Foundations of Physics (2023), Columbia-NYU graduate conference (2014-2019), Princeton-Penn-Columbia history of philosophy graduate conference (2015)

Participation in research projects

Metascience (2013-2015, [website](#)), Historical Epistemology of the Final Theory Program (2018-present, [website](#)), The Universe as an Open System (2021-present, [website](#))

Affiliations

British Society for Philosophy of Science, European Society for the History of Science, European Philosophy of Science Association, German Society for Philosophy of Science, Philosophy of Physics Society, Philosophy of Science Association, Société de Philosophie des Sciences

Languages

English (fluent), French (native), Spanish (B2), German (A2), Farsi (elementary)

References

Stephan Hartmann

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David Albert

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Jenann Ismael

William H. Miller III Professor
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Emmanuelle Saada (Teaching Reference)

Professor & Chair of Contemporary Civilization (2018 – 2021)
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