

University of Colorado Boulder
College of Arts & Sciences
Department of Philosophy

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Employment

Full time Lecturer in the Department of Philosophy at the **University of Colorado Boulder** – January 2016-May 2018

Visiting Assistant Professor in the Department of Philosophy at the **University of Illinois at Chicago**– January 2015-May 2015.

Postdoctoral Associate at Rutgers University in the *Multi University Templeton Project in Philosophy of Cosmology* (co-directors: David Albert and Barry Loewer) – January 2013- January 2015.

Education

PhD in Philosophy at the **University of Illinois at Chicago**, January 2013. Thesis: “**Emergent Spacetime in String Theory**”.

Master in Physics at the **University of Illinois at Chicago**, August 2012.

“**Laurea**” (i.e. BS+MS) in **Mathematics** at the **University of Rome “Roma Tre”**. Master’s thesis: “**Moduli Space of Curves**”, 2004.

“**Laurea**” (i.e. BA+MA) in **Philosophy** at the **University of Rome “La Sapienza”**. Master’s thesis: “**Wittgenstein on Normativity and Rules**”.

Research interests

Area of Specialization: Philosophy of Physics, Philosophy of Science, Metaphysics.

Area of Competence: Philosophy of mind, Philosophy of cognitive science, Philosophy of Biology, Epistemology, Logic, Philosophy of Mathematics.

Publications

- **Books**:

“**The Emergence of Spacetime in String Theory**”, forthcoming for the new series of the *Philosophy of Mathematics and Physics*, **Routledge**, 2017.

- **Papers**:

“**Holographic space and time: Emergent in what sense?**” in **Studies in History and Philosophy of Modern Physics**, Special number on **Dualities in Physics**, 13 September, 2016.

“**Deriving General Relativity from String Theory**”, **Philosophy of Science**, 82, December 2015. Co-author with Nick Huggett.

“Out of space – Out of time. Spazio e Tempo nella Teoria delle Stringhe”, in **“La Guerra dei Mondi? Scienza e Senso Comune”** [The War of the Worlds? Science and Common Sense]. Edited by A. Lavazza and M. Marraffa, **Codice**, Turin, 2016.

“Review of ‘String Theory and the Scientific Method’” (book by Richard Dawid) **International Studies in the Philosophy of Science** 28,108-111, 2014

“Time in Quantum Gravity” for Adrian Bardon and Heather Dyke (eds), **The Blackwell Companion to the Philosophy of Time**, 2011. Co-author with Christian Wüthrich and Nick Huggett.

“Entanglement exchange and Bohmian Mechanics”, **Manuscrito, Issues in the Philosophy of Physics**, Edited by Décio Krause and Otávio Bueno, Vol 33, Jan-Jun 2010. Co-author with Nick Huggett.

- **Papers work in progress:**

“Modality after String Theory”, invited contribution for the miscellaneous volume **Beyond Spacetime: The Philosophical Foundations of Quantum Gravity**, **Cambridge University Press**.

PhD Dissertation in Philosophy

Title: Emergent Spacetime in String Theory.

Committee: Nick Huggett (UIC, thesis supervisor), Kevin Davey (University of Chicago), David Hilbert (UIC), Jon Jarrett (UIC), , Arthur Licht (UIC, Department of Physics).

Abstract: My dissertation lays the basis for one of my present research topics in metaphysics and in physics about the disappearance of space and time from the fundamental laws of quantum gravity. My PhD thesis is focused on spacetime emergence in string theory. During the last thirty years the notion of spacetime introduced by general relativity has been object of a critical review in light of the new emerging theories of quantum gravity. String theory is one of them. By trying to combine the principles of both general relativity and quantum theory, string theory elaborates a revolutionary description of physical dynamics at the smallest length scale. One of its novelties is that *there is a distance in spacetime, the smallest physicists believe exists, at which point the notions of space and time lose meaning*. Strings do not move along spacetime, rather, spacetime re-appears as an emergent macroscopic entity “produced” by underlying string dynamics “happening” at the smallest scale. My dissertation analyzes this notion of emergence especially from the perspective of deep symmetries of the theory’s laws, known as “dualities”. Moreover, the thesis presents a mathematical and philosophical exploration of the use of string theory’s moduli space. The moduli space of a theory is a kind of navigation system through the physical content of its laws. It allows an indirect exploration of those parts of the physical content not directly accessible.

This exploration *via* moduli space recently evolved in two advanced results. The first, presented in chapter five of my Routledge book, delivers a strong argument for background independence of string theory. The argument relies on some formal properties of the theory’s moduli space which are vehicles of some fundamental physics revealing the genuine metaphysical commitment of the theory on the nature of space and time. The second result, using the first one as starting point, proposes a way of revising modal realism without any posit of spatiotemporal fundamentality. This result is a forthcoming paper (still work in progress) in a CUP miscellaneous volume on the philosophical foundation of quantum gravity.

Fellowships and Awards

Outstanding Thesis Award, University of Illinois at Chicago, Graduate College, Fall 2013.

Chancellor’s Graduate research fellowship for multidisciplinary research at the University of Illinois at Chicago, Summer 2012.

Post graduate visitor at Oxford University, Oriel College, Summer 2012.

Research Assistant of Prof. Nick Huggett for **ACLS Collaborative Research Fellowship on emergent spacetimes in quantum gravity**, Summer 2010, Summer 2011, Summer 2012.

Provost's Award won during Spring 2009 to support attendance at the Summer School in Philosophy of Physics, "**Geneva Summer School 2009**", (Switzerland).

Talks

Invited Speaker at the International Workshop **Quantum Gravity: Physics and Philosophy**, ERC Project Philosophy of Canonical Quantum Gravity, Paris, France, **October 24/27, 2017**,
<https://indico.math.cnrs.fr/event/2429/>

Invited Speaker at the **XX International Summer School of Philosophy of Physics, Space and Time in Quantum Physics**, Urbino, Italy, **10th- 13th July, 2017**.

Speaker at the **3rd International Conference on the Philosophy of Quantum Gravity**, Geneva, **27-30 June 2017** (Switzerland)

Discussant at the **Seven Pines Symposium**, May 17-21, 2017, "**Black Holes in the Spotlight**", Stillwater MN.

Invited speaker for the **2017 Speaker Series** of **Beyond Space: The Philosophical Foundations of Quantum Gravity**, March 29, 2017, **University of Illinois at Chicago** and **University of Geneva**.

Invited speaker for the **Colloquium Series** at the **University of Colorado at Boulder**, Philosophy Department, "**No time for Strings. Being a Mechanistic Philosopher at the Planck Scale**", October 21, 2016.

Invited Speaker at the **International Association for the Philosophy of Time 3rd Annual Meeting**, Winston-Salem, North Caroline, 9-11 June, 2016.

Speaker at the conference on the **Philosophical foundations of quantum gravity**, *Beyond Spacetime II*, **University of California, San Diego**, "**Time in String Theory: dS/CFT conjecture**", 13-14 March, 2015.

Speaker at the 2014 **Philosophy of Science Association** conference, "**Deriving General Relativity from String Theory**", co-authored with Nick Huggett, Chicago, November 2014.

Speaker at the conference on the **Philosophical foundations of quantum gravity**, *Beyond Spacetime*, **University of Illinois at Chicago**, Sept 27-Sept 29, 2013.

Invited speaker at the *University of California at Santa Cruz, Institute for the Philosophy of Cosmology*, June 23- July 14, Summer School 2013.

Conferences/Talks Organizational activities:

Co-Organizer of the Annual Boulder Conference (along with Prof Allan Franklin), "**Gravity: Its History and Philosophy**", October 28-30, 2016, University of Colorado at Boulder, Physics Department.

Editorial Activities:

Referee for **Studies in History and Philosophy of Modern Physics**, for **Foundations of Physics**, for **Synthese**, for **Journal of the American Philosophical Association**, for **The British Journal for the Philosophy of Science**

Teaching experience:

Full-Time Lecturer at the University of Colorado at Boulder, Department of Philosophy:

PHIL 3430 (History of Science from Newton to Einstein) in Fall 2017.

Full-Time Lecturer at the University of Colorado at Boulder, Department of Philosophy):

PHIL 1440-001 and PHIL 1440-002 (Introduction to Logic) in Fall 2017.

Full-Time Lecturer at the University of Colorado at Boulder, Department of Philosophy:

PHIL 1400 (Philosophy and Sciences-Honor) in Spring 2017.

Full-Time Lecturer at the University of Colorado at Boulder, Department of Philosophy):

PHIL 1440-001 and PHIL 1440-002 (Introduction to Logic) in Spring 2017.

Full-Time Lecturer at the University of Colorado at Boulder, Department of Philosophy:

PHIL 3430 (History of Science from Newton to Einstein) in Fall 2016.

Full-Time Lecturer at the University of Colorado at Boulder, Department of Philosophy, Cross-listed course (Philosophy and Physics Departments):

PHYS 5450/PHYS 4450/PHIL5450/PHIL4450 – graduate and undergraduate seminar (History and Philosophy of Physics. “Re-thinking Metaphysics in light of Quantum Mechanics”) in Fall 2016.

Full-Time Lecturer at the University of Colorado at Boulder, Department of Philosophy:

PHIL 3410 (History of Science from Ancient to Newton) in Spring 2016.

Full-Time Lecturer at the University of Colorado at Boulder, Department of Philosophy, Cross-listed course (Philosophy and Physics Departments):

PHYS 5450/PHYS 4450/PHIL5450/PHIL4450 – graduate and undergraduate seminar (History and Philosophy of Physics. “Foundational issues in Quantum Mechanics”) in Spring 2016.

Visiting Assistant Professor at the University of Illinois at Chicago, Department of Philosophy:

PHIL 203 (Metaphysics), Spring 2015.

Post Doc at Rutgers University, Department of Philosophy:

PHIL 109 (Introduction to formal reasoning. Deductive and Inductive Logic), Spring 2014.

Primary Instructor (graduate student) at the University of Illinois at Chicago, Department of Philosophy:

PHIL 102 (Introductory Logic) in Fall 2011.

Teaching assistant (graduate student) at the University of Illinois at Chicago, Department of Philosophy:

PHIL 102 (Introductory Logic) in Fall 2007, Fall 2008, Spring 2009, Spring 2010, Fall 2012

PHIL 105 (Philosophy and Science) in Spring 2008.

PHIL 100 (Introduction to Philosophy) in Fall 2009, Spring 2011.

Teaching assistant at the University of Rome "Roma tre", Department of Mathematics:

LINEAR ALGEBRA, TOPOLOGY, AFFINE AND PROJECTIVE GEOMETRY, 2002-2004.

Languages

Italian native speaker, English speaker, reading knowledge of ancient and early-modern Latin.

Referees (please contact Valerie Brown, valbrown@uic.edu, UIC department's secretary taking care of uploading and/or emailing all my reference letters.)

- 1) **Barry Loewer**, Chairperson of the Rutgers University Department of Philosophy, Director of the Rutgers Center for Philosophy and the Sciences, Co-director of the Rutgers Templeton Project in Philosophy of Cosmology.
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- 2) **Nick Huggett**, Professor and Director of Graduate Studies of the Philosophy Department at the University of Illinois at Chicago.
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 Department of Philosophy,
 1423 University Hall, 14th Floor
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- 3) **David Hilbert**, Professor of Philosophy at the University of Illinois at Chicago.
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- 4) **Allan Franklin**, Professor Emeritus of the Physics Department at the University of Colorado at Boulder.
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- 5) **Massimo Marraffa**
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