

Feraz Azhar

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<https://philosophy.nd.edu/people/faculty/feraz-azhar/>

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|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| ACADEMIC APPOINTMENTS | University of Notre Dame , Notre Dame, IN, U.S.A. Assistant Professor of Philosophy Department of Philosophy <i>On leave at the Black Hole Initiative, Harvard University: Spring 2020 & 2021</i> | 8/2019–Present |
| | Harvard University , Cambridge, MA, U.S.A. Postdoctoral Research Fellow Black Hole Initiative | 9/2017–8/2019 |
| EDUCATION | PHILOSOPHY | |
| | University of Cambridge , Trinity College, Cambridge, U.K. Department of History and Philosophy of Science Ph.D. 7/2017. Thesis: <i>Probabilistic reasoning in the inflationary universe</i> | 10/2014–7/2017 |
| | Massachusetts Institute of Technology , Cambridge, MA, U.S.A. Visiting Student: Program in Science, Technology, and Society | 1/2016–8/2016 |
| | University of Sydney , Sydney, NSW, Australia School of History and Philosophy of Science M.Sc. 8/2014. Thesis: <i>Vehicles of informational content in neural networks</i> | 2/2013–8/2014 |
| | SCIENCE | |
| | Johns Hopkins University , Baltimore, MD, U.S.A. Postdoctoral Research Fellow Department of Neurosurgery, Johns Hopkins University School of Medicine | 1/2011–4/2012 |
| | Harvard University , Cambridge, MA, U.S.A. Postdoctoral Research Fellow, Harvard Medical School Department of Neurosurgery, Brigham and Women's Hospital (5/10–12/10) Department of Ophthalmology, Boston Children's Hospital (3/09–4/10) | 3/2009–12/2010 |
| | University of California, Santa Barbara , CA, U.S.A. Department of Physics Ph.D. 12/2008, M.A. 3/2007. Thesis: <i>An information theoretic study of neural populations</i> | 9/2002–12/2008 |
| | Princeton University , Princeton, NJ, U.S.A. Joseph Henry Laboratories of Physics & Lewis-Sigler Institute for Integrative Genomics Visiting Student Research Collaborator | 10/2005–8/2006 |
| | University of Cambridge , St. John's College, Cambridge, U.K. Department of Applied Mathematics and Theoretical Physics M.A.St. (Part III of the Mathematical Tripos) | 10/2001–6/2002 |
| | University of Sydney , Sydney, NSW, Australia B.Sc. (Advanced) Honours in Applied Mathematics Thesis: <i>Ashtekar variables in canonical gravity</i> | 2/1997–12/2000 |

* Denotes author list is alphabetical

JOURNAL ARTICLES AND BOOK CHAPTERS

A Bayesian view on the Dr. Evil scenario

F. Azhar, A. H. Guth & M. H. Namjoo*

Erkenntnis (Forthcoming)

Preprint: <http://philsci-archive.pitt.edu/18845/>

Finely tuned models sacrifice explanatory depth

F. Azhar & A. Loeb

Foundations of Physics **51**, 91, (2021)

Preprint: <http://philsci-archive.pitt.edu/18526/>

Effective field theories as a novel probe of fine-tuning of cosmic inflation

F. Azhar

Studies in History and Philosophy of Modern Physics **71**, 87–100, (2020)

Preprint: <http://philsci-archive.pitt.edu/16636/>

Gauging fine-tuning

F. Azhar & A. Loeb

Physical Review D **98**, 103018, (2018)

Preprint: <http://philsci-archive.pitt.edu/15036/>

Flows into inflation: An effective field theory approach

F. Azhar & D. I. Kaiser

Physical Review D **98**, 063515, (2018)

Preprint: <http://philsci-archive.pitt.edu/15158/>

Scientific realism and primordial cosmology

F. Azhar & J. Butterfield

In *The Routledge Handbook on Scientific Realism*, ed. J. Saatsi. London: Routledge, pp. 304–320, (2018)

Extended preprint: <http://philsci-archive.pitt.edu/12192/>

Spectra of conditionalization and typicality in the multiverse

F. Azhar

Physical Review D, **93**(04), 043506, (2016)

Preprint: http://philsci-archive.pitt.edu/11996

Polytopes as vehicles of informational content in feedforward neural networks

F. Azhar

Philosophical Psychology, **29**(5), 697–716, (2016)

Preprint: http://philsci-archive.pitt.edu/11992

Testing typicality in multiverse cosmology

F. Azhar

Physical Review D, **91**(10), 103534, (2015)

Preprint: http://philsci-archive.pitt.edu/11995

Prediction and typicality in multiverse cosmology

F. Azhar

Classical and Quantum Gravity, **31**(3), 035005, (2014)

Preprint: http://philsci-archive.pitt.edu/11994

Predicting single-neuron activity in locally connected networks

F. Azhar & W. S. Anderson

Neural Computation, **24**(10), 2655–2677, (2012)

Preprint: <http://arxiv.org/abs/1506.04301>

Epileptic seizures from abnormal networks: Why some seizures defy predictability
W. S. Anderson, **F. Azhar**, P. Kudela, G. K. Bergey & P. J. Franaszczuk
Epilepsy Research, **99**(3), 202–213, (2012)

CONFERENCE PROCEEDINGS

Automating interictal spike detection: Revisiting a simple threshold rule
A. Palepu, S. Premanathan, **F. Azhar**, M. Vendrame, T. Loddenkemper, C. Reinsberger, G. Kreiman, K. A. Parkerson, S. Sarma & W. S. Anderson
In: *40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC 2018*, pp. 299–302, (2018)

Three aspects of typicality in multiverse cosmology

F. Azhar

In: *EPSA15 Selected Papers*, eds. M. Massimi, J.-W. Romeijn & G. Schurz. *European Studies in Philosophy of Science*, vol. 5, Cham: Springer, pp. 125–136, (2017)

Preprint: <http://philsci-archive.pitt.edu/12422/>

PAPERS ONLINE

When are correlations strong?

F. Azhar & W. Bialek

Preprint: <http://arxiv.org/abs/1012.5987>

THESES

Probabilistic reasoning in the inflationary universe

F. Azhar: Doctoral Dissertation (Philosophy of Physics)

University of Cambridge, U.K. (2017)

Vehicles of informational content in neural networks

F. Azhar: Master's Thesis (Philosophy of Neuroscience)

University of Sydney, Australia (2014)

An information theoretic study of neural populations

F. Azhar: Doctoral Dissertation (Theoretical Physics)

University of California, Santa Barbara, U.S.A. (2008)

Ashtekar variables in canonical gravity

F. Azhar: Undergraduate Honours Thesis (Applied Mathematics)

University of Sydney, Australia (2000)

BOOK REVIEW

Interdisciplinarity and Modern Cosmology

F. Azhar

Review of *The Oxford Handbook of the History of Modern Cosmology*. Edited by H. Kragh & M. S. Longair, Oxford: Oxford University Press (2019).

In: *Journal for the History of Astronomy*, **51**(4), 485–486, (2020)

IN THE NEWS

The Simple Truth about Physics, *Scientific American*, January 1, 2020

GRANTS

Faculty Research Support Program FY2019

2020–2023

University of Notre Dame (Co-PI with Prof. Nicholas Teh)

Establishing the Effective Theory Paradigm for Basic Science

SELECTED
HONORS AND
AWARDS

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Wittgenstein Studentship in Philosophy Trinity College, University of Cambridge | 2014–2017 |
| Postgraduate Research Prize Faculty of Science, University of Sydney <i>For philosophy of physics publication, titled: “Prediction and typicality in multiverse cosmology”</i> | 2014 |
| Outstanding Teaching Associate Department of Physics, University of California, Santa Barbara | 2006/2007 |
| Eleanor Sophia Wood Postgraduate Research Traveling Scholarship University of Sydney, for study at U.C. Santa Barbara and Princeton University | 2003–2006 |
| Benefactor’s Scholarship St. John’s College, University of Cambridge | 2001–2002 |
| University Medal Applied Mathematics, University of Sydney | 2000 |

SELECTED TALKS

† Invited talk

* Refereed and accepted conference submission

§ Rescheduled or cancelled due to COVID-19

02/2022 *Spacetime singularities and a novel formulation of indeterminism*[†]
HPS Colloquium, University of Notre Dame, U.S.A.

12/2021 *Effective field theories as a novel probe of fine-tuning of cosmic inflation*[†]
Department of Philosophy, University of Illinois, Chicago, U.S.A.

07/2020 *(Some) philosophical aspects of cosmic inflation*[†]
(Virtual) Midwest Summer School in Philosophy of Physics (U.S.A.)

07/2020 *Finely tuned models sacrifice explanatory depth*^{*§}
British Society for the Philosophy of Science Annual Conference, Kent, U.K.

05/2020 *Finely tuned models sacrifice explanatory depth*[†]
Black Hole Initiative Foundations Seminar, Harvard University, U.S.A. (Via Zoom)

05/2019 *Assessing fine-tuning of cosmic inflation*[†]
HPS Colloquium, Stanford University, U.S.A.

01/2019 *Assessing fine-tuning of cosmic inflation*[†]
Department of Philosophy, University of Notre Dame, U.S.A.

05/2018 *Quantifying fine-tuning in the early universe: Primordial black holes as dark matter*[†]
High Energy Phenomena Seminar, Harvard-Smithsonian Center for Astrophysics, Harvard University, U.S.A.

05/2018 *Quantifying fine-tuning in the early universe: Primordial black holes and habitable halos*[†]
Black Hole Initiative Annual Conference, Harvard University, U.S.A.

04/2018 *Inflationary trajectories: An effective field theory approach*[†]
MIT/Tufts Cosmology Seminar (at MIT), U.S.A.

04/2018 *Inflationary trajectories: An effective field theory approach*[†]
Institute for Theory and Computation (luncheon talk), Harvard University, U.S.A.

11/2017 *Inflationary trajectories: An effective field theory approach*[†]
Black Hole Initiative Colloquium, Harvard University, U.S.A.

02/2017 *Three aspects of typicality in multiverse cosmology*[†]
Workshop in methodological and epistemological issues in cosmology, UC Irvine, U.S.A.

11/2016 *Three aspects of typicality in multiverse cosmology*[†]

LSE Sigma Club, London, U.K.

09/2015 *Testing typicality in multiverse cosmology**

European Philosophy of Science Association 2015. Düsseldorf, Germany.

08/2015 *Testing typicality in multiverse cosmology**

15th Congress of Logic, Methodology and Philosophy of Science. Helsinki, Finland.

04/2015 *Testing typicality in multiverse cosmology**

1st Munich Graduate Workshop in Mathematical Philosophy: Philosophy of Physics. LMU, Munich, Germany.

03/2014 *Prediction and typicality in multiverse cosmology*[†]

Sydney Foundations of Physics Seminar. University of Sydney, Australia

TEACHING
EXPERIENCE

PHILOSOPHY

University of Notre Dame

As lecturer

- Introduction to Philosophy: Philosophy and Science Spring 2022
- Interpretations and Applications of Probability in the Physical Sciences (co-taught with Prof. Harvey Brown) Fall 2021
- Introduction to Philosophy: Philosophy and Science Fall 2021
- Philosophy of Cosmology Fall 2020
- Introduction to Philosophy: Philosophy and Science Fall 2020
- Introduction to Philosophy: Philosophy and Science (×2) Fall 2019

As guest lecturer

- Led a graduate seminar at the Department of Philosophy, University of Illinois, Chicago, on “Spacetime singularities and a novel formulation of indeterminism” Fall 2021

University of Cambridge

As lecturer

- Part II Philosophy: Paper 6, Philosophy of Science (co-taught with Dr. Jeremy Butterfield) Lent 2017

As supervisor

- Part IB History and Philosophy of Science (HPS) AY 2016/2017
- Part II Philosophy: Paper 6, Philosophy of Science Michaelmas 2015
- Part IB Philosophy Michaelmas 2015

SCIENCE/MATH

University of Sydney

As tutor

- Differential Calculus (Advanced) (MATH1901) Semester 1, 2013

University of California, Santa Barbara

As lecturer

- Mathematical Methods of Theoretical Physics (100A) Summer 2008
- Introductory Physics (6B) Spring 2008
- Introductory Physics (6A) Winter 2008

- Introductory Physics (6B) Spring 2007
- Introductory Physics (6A) Winter 2007
- As teaching assistant*
- General Physics (21) Winter 2005
- Introductory Physics (6A, 6B, 6C, 10): Various quarters during 9/02–8/05, 9/06–12/08

SELECTED
SERVICE

UNIVERSITY OF NOTRE DAME

- Graduate Admissions Committee (Philosophy) 2021–2022
- Oral exam, 2nd-year exam, & QP review committee (5 total) (HPS/Philosophy) 2020, 2021
- First-year advising (Philosophy) 2020, 2021
- Cushing Prize Committee (HPS/Philosophy) 2020
- Mock interview committee (1) (Philosophy) 2019

HARVARD UNIVERSITY

- Organizer for the Black Hole Initiative (BHI) Philosophy Working Group (weekly meetings) (10/2017–5/2019)
- Organizer for the BHI Philosophy Mini-Workshop Series, titled “The Philosophy of Extreme Spacetimes” (11/2017–5/2019)
- BHI Colloquium Committee member (9/2017–8/2019)

SERVICE TO PROFESSION

- Reviewed papers for: *Oxford University Press, Philosophical Psychology, 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*