

SISKA DE BAERDEMAEKER

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AREAS OF SPECIALIZATION: Philosophy of Science, History and Philosophy of Physics
(Cosmology)

AREAS OF COMPETENCE: Biomedical Ethics, History of Science, Logic and Critical Reasoning

EDUCATION

- 2020 **PhD** – University of Pittsburgh, History & Philosophy of Science
(expected) Dissertation: “Cosmology: The Impossible Integration?”
 Committee: John Norton (chair), Arthur Kosowsky, Sandra Mitchell,
 James Woodward
- 2019 **Visiting Graduate Student** – University of Edinburgh, School of Philosophy,
 Psychology & Language Sciences, under supervision of Michela Massimi
 (February 10 – March 13)
- 2013 **M.A.** – University of Leuven, Philosophy
- 2014 **B.Sc.** – University of Leuven, Physics
- 2012 **B.A.** – University of Leuven, Philosophy

PUBLICATIONS

Under Review

Method-Driven Experiments and the Search for Dark Matter

PRESENTATIONS & CONFERENCE PARTICIPATION

Invited Presentations

- 2019 “Method-driven Experiments in Astroparticle Physics”
 • Workshop on Evidence in Astrophysics, Madrid, Spain (June 21)
 • Symposium Series of the CLPS, University of Leuven, Leuven, Belgium
 (March 15)
- 2018 “Evidential Integration in Cosmology”, 2nd Leuven – Buenos Aires Workshop in
 Philosophy of Physics, Leuven, Belgium (July 22 – 23)

Peer-Reviewed Presentations

- 2019 “Jump Ship, Shift Gears, or Just Keep on Chugging: Assessing the Responses to
 Tensions between Theory and Evidence in Contemporary Cosmology”, with

- Nora Boyd, Dark Matter and Modified Gravity Conference, Aachen, Germany (February 6 – 8)
- 2018 “Integrating in the Face of Contradiction: Lessons from Cosmology”, 26th Biennial Meeting of the Philosophy of Science Association, Seattle, WA (November 1 – 4)
- 2018 “Evidential Integration in Cosmology”, &HPS: International Conference on Integrated History and Philosophy of Science, Hannover, Germany (July 5 – 7)
- 2018 “Integrating evidence in cosmology: the search for dark matter”, 7th Society for the Philosophy of Science in Practice Biennial Conference, Ghent, Belgium (June 29 – July 1)
- 2016 “Georges Lemaître and the Role of Observations in Early Twentieth Century Relativistic Cosmology”
- 32nd Boulder Conference on the History and Philosophy of Science: “Gravity: Its History and Philosophy”, University of Boulder, Boulder, CO (October 30)
 - History of Science Society Annual Meeting, Atlanta, GA (November 2)

Invited discussant or commentator

- 2019 Comments on “Models in Cosmology: Knowing What to Believe” (John Peacock), Cross-disciplinary Perspectives on Model-Independent Searches, Edinburgh, UK (February 11 – 12)
- 2018 Chair and discussant for “Norton for Everyone? The Material Theory of Induction and Beyond”, Center for Philosophy of Science, Pittsburgh, PA (October 27 – 28)
- 2018 Invited discussant at 22nd Seven Pines Symposium, “What Counts as Evidence?”, Stillwater, MN (May 16 – 20)
- 2017 Invited discussant at 21st Seven Pines Symposium, “Black Holes in the Spotlight”, Stillwater, MN (May 17 – 21)
- 2017 Reading group leader at Philosophy of Cosmology Workshop, CUNY Graduate Center, New York City, NY (May 5)
- 2017 Discussant at “Methodology and Epistemology in Cosmology”, UC Irvine, Irvine, CA (February 10 – 12)
- 2016 Invited discussant at 20th Seven Pines Symposium, “Big Questions. Some Fundamental Problems in Physics”, Stillwater, MN (May 11 – 15)

Summer school

- 2018 Rotman Summer Institute in Philosophy of Cosmology, Ontario, Canada (June 11 – 20)
- 2015 3rd International Summer School in Philosophy of Physics, “The Ontology of Physics”, Saig, Germany (July 20 – 25)

TEACHING EXPERIENCE

Primary Instructor (University of Pittsburgh)

- 2019 Morality & Medicine (Fall)

- 2018 Space, Time, and Matter: History of Cosmology and Astronomy (Spring)
 2017 Principles of Scientific Reasoning (Fall)

Teaching Assistant (University of Pittsburgh)

- 2016 Mind & Medicine (Spring)
 2015 Introduction to Philosophy of Science (Fall)

Teaching Training

- 2016 – 2018 Achievement in Pedagogy Badge, offered by the Graduate Student Teaching Initiative at the Center for Teaching and Learning, University of Pittsburgh
 2016 AAPT Workshop on Teaching and Learning in Philosophy with a Special Emphasis on Inclusive Pedagogy, University of Pittsburgh (February 4)

SERVICE

Conference organization

- 2017 Co-organizer of “Super-PAC: Early Career Workshop in Philosophy of Astrophysics and Cosmology”, Center for Philosophy of Science, Pittsburgh, PA (October 27 – 29)
 2015, 2017 Reviewer for the Pitt-CMU Graduate Student Conference

Service to the department

- 2018 – 2019 Co-organizer of a philosophy of cosmology discussion group with participants from the HPS department and the Physics department
 2018 – 2019 Graduate student representative on the ALS Speaker Nomination Committee
 2018 HPS Graduate Student Representative
 2016 – 2017 HPS Representative to the Pitt Arts and Sciences Graduate Student Organization
 2015 HPS Work In Progress Talks Organizer

Public outreach

- 2019 Public Lecture at the Amateur Astronomers Association of Pittsburgh (September 13)
 2019 Guest on “Let’s Go to the Archives, Episode 2: Harmonia Macrocosmica”, available here: <https://www.youtube.com/watch?v=8bf7z0ME2A>
 2018 Astro on Tap talk: “You say you want a revolution (in your cosmological theories)?”, Pittsburgh, PA (April 26)
 2018 Public Lecture at Allegheny Observatory: “Space Oddities”, Pittsburgh, PA (April 20). With Nora Boyd.
 2017 Co-creator of an Instant HPS video on the discovery of Brownian motion, “The Botanist and the Sphynx”, available here : https://www.youtube.com/watch?v=qukJ_gpN_VSY. With William Penn and John Norton.

Reviewer

Philosophy of Science (2017, 2019), Studies in History and Philosophy of Science (2019), Synthese (2018)

AWARDS, PRIZES & RECOGNITION

2019, 2018, Wesley C. Salmon Fund, Research grant
2016, 2015
2018, 2017 Outstanding Presenter Award at Pitt Graduate Student Expo
2014 – 2015 Honorary Fellow of the Belgian American Education Fund

SELECTED GRADUATE COURSEWORK

History and Philosophy of Science

- History of Science I: History of the Physical Sciences (Paolo Palmieri)
- Philosophy of Science Core Seminar (John Norton)
- History of Science II: History of the Life Sciences (James Lennox)
- Experiment & Scientific Practice (Mazviita Chirimuuta)
- Recent Topics in Philosophy of Science (Adam Caulton)
- Recent Topics in Philosophy of Physics – Climate Science (Giovanni Valente)
- Einstein 1905 (John Norton)
- Models & Modeling (Sandra Mitchell & James Woodward)
- Galileo (Paolo Palmieri)
- Realism (Mazviita Chirimuuta)
- Theories of Confirmation (John Norton)
- Science and Metaphysics (Porter Williams) – *audit*
- Modern Cosmology (John Norton) – *audit*
- Recent Topics in Philosophy of Physics (Harvey Brown) – *audit*

Philosophy and History of Philosophy

- Topics in Logic (Michael Caie)
- Locke & Leibniz (Peter Machamer)
- Scholasticism (Paolo Palmieri)

Physics

- Nuclear and Particle Physics (Ayres Freitas)
- General Relativity I (Eric Swanson)
- Particle Astrophysics (Ayres Freitas)
- General Relativity II (Eric Swanson) – *audit*
- Topics in Quantum Physics – Physics at the LHC (Tae Min Hong) – *audit*

DISSERTATION ABSTRACT – “COSMOLOGY: THE IMPOSSIBLE INTEGRATION?”

My dissertation introduces a new account of how empirical methods and evidence from a wide range of disciplines can be integrated to bear on a model of a complex target system that is

informed by a careful study of the recent history of cosmology. The starting point is an explication of a so-called method-driven 'logic'. This logic represents a general structure for justifications of choosing one set of empirical methods over another to probe a given target. Its characterizing features are that (1) an existing method is repurposed to the target, and (2) the description of the target is adapted to the features that the target would need to have in order for the method to be effective.

Elucidating this method-driven logic brings to the forefront various questions about evidence in cosmology. First, interpreting the results of method-driven experiments is non-trivial: while significant positive results are ambivalent in their warrant for conclusions about the target, negative results warrant secure constraints on the space of possibilities. Second, I broaden the discussion to more general conflicts in evidence in an integrative context, and I argue that, under specific circumstances, ignoring a particular subset of the available evidence is warranted. The final chapter tells a cautionary but optimistic tale about the use of cosmological evidence in other subfields of physics, thus coming full-circle on the relation between cosmology and its informing disciplines.