

## **Federico Boem, PhD.**

### **RUHR-UNIVERSITÄT BOCHUM**

Universitätsstraße 150

44801 Bochum

**Faculty of Philosophy and Educational Science**

**Institute for Philosophy I**

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### **AREAS OF SPECIALIZATION**

Philosophy of the Life Sciences and Biomedicine,, Philosophy of Scientific Practice, Metascience

### **AREAS OF COMPETENCE**

Philosophy of Science, Logic, Bioethics, Epistemology, History of Science, STS

### **EMPLOYMENT**

2024 - Current - **Ruhr-Universität Bochum**

Researcher

Institute for Philosophy I

2024 - Current - **Università telematica Unicusano**

Adjunct Lecturer

Dipartimento di Scienze Umanistiche, Motorie e della Formazione

2021 - 2024 - **University of Twente**

Researcher

Philosophy Section

2020 - 2021 - **University of Florence**

Researcher

Department of Literature and Philosophy

2019 - 2020 - **University of Turin**

Postdoc

Department of Philosophy and Education

2018 - 2019 - **Ludwig-Maximilians-Universität München**

Visiting Fellow

MCMP

2018 - **King's College London**

Visiting Lecturer of Ethics and Politics of Science and Technology

Department of Philosophy

2016 - 2020 - **University of Milan**

Adjunct Lecturer

Department of Oncology and Haemato-oncology

2019 - 2021 - **University of Verona**

Adjunct Lecturer  
School of Medicine and Surgery

## EDUCATION

### 2015 - **European School of Molecular Medicine/University of Milan**

PhD in Foundations of the Life Sciences and Their Ethical Consequences

Committee: Federica Russo, Thomas Vaccari

**Dissertation:** “A Matter of Style. How Map-Thinking and Bio-ontologies shape contemporary Molecular Research.”

### 2011 - **University of Exeter**

MA in History and Philosophy of Biology

Thesis chair: Sabina Leonelli

**MA thesis:** “The Relationship between Biological Collections and Experimental Dimension in the Practice and Epistemology of 20th Century Biology.”

### 2010 - **University of Florence**

*Laurea* in Logic and Philosophy of Science

Committee: Marcello Buiatti, Elena Castellani

**Thesis:** “Ascesa e caduta del Dogma Centrale della Biologia Molecolare” (tr. The Rise and Fall of Central Dogma of Molecular Biology).

## OTHER QUALIFICATIONS

### 2023 - **National scientific “habilitation” of the Italian Republic for the functions of Associate Professor in two areas:**

1) Theoretical Philosophy; (11/C1 - 11/PHIL-01)

2) Logic, History and Philosophy of Science. (11/C2 - 11/PHIL-02)

### 2020 - **London School of Hygiene & Tropical Medicine and UK Public Health Rapid Support Team**

Certificate of Achievement

*COVID-19: TACKLING THE NOVEL CORONAVIRUS*

## PEER-REVIEWED JOURNALS

### 2024

- Lamminpää I, **Boem F**, Amedei A. Health-promoting worms? Prospects and pitfalls of helminth therapy. *Bioessays*, 46(11):e2400080, (2024)
- **Boem, F**, Erden YJ. Issues in the production and reproduction of scientific knowledge: a nano case study, *Frontiers in Research Metrics & Analytics* (under review)
- Rost Videla NC, Said M, Gharib M, Lévy R, **Boem F**. Better nanoscience through open, collaborative, and critical discussions. *Materials Horizons*, <https://doi.org/10.1039/D3MH01781H>, (2024)
- **Boem, F.**, & Suárez, J. Epistemic misalignments in microbiome research. *BioEssays*, Article 2300220. <https://doi.org/10.1002/bies.202300220>, (2024)

### 2023

- **Boem, F.**, Greslehner, G. P., Chiu, L., & Konsman, J-P. Minding the gut: extending embodied cognition and perception to the gut complex, *Frontiers of Neuroscience*, Volume 17 - 2023 | doi:10.3389/fnins.2023.1172783, (2023)
- **Boem, F.**, & Pausco, E. A philosophical outing to Dutch Design Week. *Journal of Human-Technology Relations*, 1. <https://doi.org/10.59490/jhtr.2023.1.7029> (2023)
- **Boem, F.**, Bonzio, S., Osimani, B., & Sacco, A. The Cochrane Case: An Epistemic Analysis on Decision-Making and Trust in Science in the Age of Information. *Foundations of science*, 28(1), 143-158. <https://doi.org/10.1007/s10699-020-09668-y>, (2023)

## 2022

- Suárez, J, **Boem, F.**, Technology-driven surrogates and the perils of epistemic misalignment: an analysis in contemporary microbiome science. *Synthese* 200 (6):1-28. (2022)
- **Boem, F.**, Racism After the End of the Race: A Brief Epistemological Viewpoint on Genomic Studies and Racism. *Africa e Mediterraneo*, 96(1/22). (2022)
- **Boem, F.**, Bonzio S., A Logic for a Critical Attitude?, *Logic and Logical Philosophy*. (2022)

## 2021

- **Boem, F.**, Galletti, M., Public Health Policies, Science, and Democracy. Philosophy Moves Beyond the Pandemic., *HUMANA.MENTE Journal of Philosophical Studies*, 14(40), III-V. (2021)
- **Boem, F.**, Ratti, E., Science and Politics in a Time of Pandemic: Some Epistemological and Political Lessons from the Italian Story. *HUMANA.MENTE Journal of Philosophical Studies* 14(40), 89-124. (2021)
- **Boem, F.**, La mente estesa ma individuata: Una prospettiva simbiotica, *Rivista Internazionale di Filosofia e Psicologia*. 12, 3, p. 254-270 17 p. (2022)
- **Boem, F.**, Modelling Pandemic: Proximate and Ultimate Causes, *Argumenta* . 6, 2, p. 57-77, (2021)
- **Boem, F.**, Nannini, G. & Amedei, Multidisciplinary of anti-COVID-19 battle: from immunological weapons to ecological interventions, *Frontiers in Bioscience-Landmark*, 26(11); 1274-1285. (2021)
- **Boem, F.**, Ferretti, G. & Caiani, S., Out of our skull, in our skin: the Microbiota-Gut-Brain axis and the Extended Cognition Thesis, *Biology & Philosophy* 36, 14 (2021).

## 2020

- **Boem, F.**, Scientific Protocols as Recipes: A New Way to Look at Experimental Practice in the Life Sciences and the Hidden Philosophy Within, *HUMANA.MENTE Journal of Philosophical Studies*, 13(38), 281-299, (2020)
- Ronai, I., Greslehner, G. P., **Boem, F.** et al., "Microbiota, symbiosis and individuality summer school meeting report". *Microbiome* 8, 117 (2020).
- **Boem, F.**, Nannini, G. & Amedei, Not just 'immunity': how the microbiota can reshape our approach to cancer immunotherapy, *Immunotherapy*, (2020)
- Niccolai, E., **Boem, F.**, Emmi, G. & Amedei, A., The link "Cancer and autoimmune diseases" in the light of microbiota: evidence of a potential culprit, *Immunology Letters* 222 DOI: 10.1016/j.imlet.2020.03.001 (2020)

## 2019

- **Boem, F.**, Amedei A., Healthy axis: Towards an integrated view of the gut-brain health. *World Journal of Gastroenterology*, 25(29):3838-3841. (2019)

- Niccolai, E., **Boem, F.**, Russo, E. & Amedei, A., The Gut–Brain Axis in the Neuropsychological Disease Model of Obesity: A Classical Movie Revised by the Emerging Director “Microbiome”. *Nutrients* 2019, 11, 156 (2019)

#### 2018

- Amedei, A. & **Boem, F.**, I’ve Gut A Feeling: Microbiota Impacting the Conceptual and Experimental Perspectives of Personalized Medicine. *Int. J. Mol. Sci.* 2018, 19, 3756. (2018)

#### 2017

- Boniolo, G., Andreoletti, M., **Boem, F.**, Ratti, E., The Main Faces of Robustness. *Dialogue and Universalism*, 3, 157-172 (2017)

#### 2016

- **Boem, F.**, Orienteering Tools: Biomedical Research with Ontologies. *HUMANA.MENTE Journal of Philosophical Studies*, 9(30), 37-65., (2016)
- **Boem, F.**, Ratti, E., Andreoletti, M. & Boniolo, G., Why genes are like lemons. *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, (2016)

#### 2015

- DiFrisco, J., Pontarotti, G., **Boem, F.**, Schlaepfer, G., Sokolowska, E. & Fernández-Labandera, E., Ontological Issues in the Life Sciences. *Biological Theory*, (2015)

#### 2014

- Germain, P-L., Ratti, E. & **Boem, F.**, Junk or Functional DNA? ENCODE and the Function Controversy. *Biology & Philosophy* (2014)

#### 2012

- **Boem, F.**, Camara, G., Chuk, E., Quattri, F., Ratti, E., Sanfilippo, E M., Sojic, A., Diverse perspectives on ontology: A joint report on the First IAOA Interdisciplinary Summer School on Ontological Analysis. *Applied ontology* 8 (1):59-71.

### OTHER PEER REVIEW PUBLICATIONS

#### Volume contributions:

#### 2023

- Greslehner, G. P., **Boem, F.**, Chiu, L., & Konsman, J-P., *Philosophical Perspectives on Neuroendocrine-Immune Interactions: The Building Block Model and Complementary Neuro-Endocrine-Immune-Microbiota Systems Approaches*. In J. P. Konsman, & T. M. Reyes (Eds.), *Neuroendocrine-Immune System Interactions* (pp. 31-61). (Masterclass in Neuroendocrinology; Vol. 13). Springer Nature. (2023)

#### 2022

- Russo, E., **Boem, F.**, Curini, L., & Amedei, A., *Gastrointestinal Cancers: What Is the Real Board of Microenvironment and the Role of Microbiota-Immunity Axis?*, Interdisciplinary Cancer Research Springer. (2022)

## 2021

- Russo, E., **Boem, F.** & Amedei, A., *Role of microbiome in cancer immunotherapy. Cancer Immunology and Immunotherapy* 1st Edition Volume 1: Delivery Strategies and Engineering Technologies in Cancer Immunotherapy (edited by Mansoor M. Amiji and Lara Scheherazade Milane) - (2021)

## 2020

- **Boem, F.**, Malagrino, I. & Bertolaso, M., *In Silico Clinical Trials: a Possible Response to Complexity in Pharmacology*, in *Uncertainty in Pharmacology: Epistemology, Methods, and Decisions*. LaCaze, A. & Osimani, B. (eds.). Cham: Springer, p. 135-152 18 p. (Boston Studies in the Philosophy and History of Science; vol. 338). (2020)

## 2016

- **Boem, F.**, Ratti, E., *Towards a Notion of Intervention in Big-Data Biology and Molecular Medicine*, in *Philosophy of Molecular Medicine: Foundational Issues in Research and Practice* (Edited by Giovanni Boniolo and Marco J Nathan), Routledge (2016)

## 2015

- **Boem, F.**, Boniolo, G., Pavelka Z., *Stratification and Biomedicine: How Philosophy Stems from Medicine and Biotechnology in The Future of Scientific Practice* (edited by Marta Bertolaso), Pickering & Chatto, (2015)

## BOOKS:

- **Boem, F.**, *Pensare per mappe. Ontologie per una pratica scientifica*. Mimesis Edizioni (2023)
- **Boem, F.**, *Forme dell'argomentare e del ragionare*. Mondadori Education - Le Monnier Università (2021)

## EDITING:

- *Elementi per una genetica forense*, (co-edited with Luca Marelli), Mondadori, 2012

## SELECTED PRESENTATIONS/INVITATIONS

- “Percezioni viscerali: un'estensione della cognizione incarnata”, Seminario annuale di Filosofia teoretica, Università di Firenze, 2024
- “Publishing as a scientific practice”, Maastricht Technology Seminar, Maastricht University, 2024
- “Improving nanoscience through open, collaborative critical discussions”, IUPAC-Chains, The Hague, 2023
- “Gatekeepers in scientific publishing”, STS Italy, Bologna 2023
- *In July 2022, I was invited by Dr Kristina Ganzinger to participate as a research integrity expert in the workshop 'Reconstituting Biology: Charting the Way to Minimal Cells', organised by the Lorentz Center in Leiden.*
- “Scientific publishing: a new life for the distinction between the context of discovery and the context of justification?”, SPSP Biennial Conference, Ghent 2022

- “Gatekeeping in scientific publishing: a new epistemic gear in the practice of science”, NVWF/Dutch Research School of Philosophy (OZSW) conference, Leusden 2022
- “Toward a Rational Decision-theoretic Model of Vaccine Hesitancy”, SiNE, Milan, 2021
- “Elementi per una epistemologia della comunicazione scientifica”, giornata di studi su “Comunicazione e responsabilità sociale della scienza”, Firenze, 2021
- “An epistemology for scientific communication”, STS Italia conference, Trieste, 2021
- “Microbiota, cognition and individuality”, Workshop. Human Nature: Philosophy and the Natural Sciences. University of Milan, 2019
- “Out of our Skull, within our Skin: The Gut Microbiota and the Extended Mind Thesis”, 4th Silfs Postgraduate Conference on Logic and Philosophy of Science, Urbino, 2019
- “Vaccine hesitancy, epistemological and ethical issues” - at Chi ha paura dei vaccini. Filosofia, etica, comunicazione conference (organized by ASSR Emilia Romagna), Bologna, 2017
- “Molecular Biology vs Bioinformatics: the method and the demarcation” - at SILFS Triennial International Conference, Bologna, 2017
- “Why genes are like lemons” - at SILFS conference, Urbino, 2016
- “Mapping Biological Knowledge. From Particular Data to General Phenomena” – at 5th Biennial Conference of the Society for Philosophy of Science in Practice (SPSP), Aarhus, 2015
- "Bio-ontologies as orienteering tools in biomedical research" – at third meeting of the European Advanced Seminar in the Philosophy of the Life Sciences (EASPLS), 2014 – Konrad Lorenz Institute in Klosterneuburg, Vienna, 2014
- "What is stemness?" - at the international conference of the German Society for Philosophy of Science/Gesellschaft für Wissenschaftsphilosophie (GWP), University of Hannover, 2013
- "The gene after encode: a Wittgensteinian approach" - at the ISHPSSB, University of Montpellier III, 2013
- "Models in bioinformatics - GO a representation of what?" - at EPSA conference, - University of Helsinki, 2013
- "Defining life?" - presentation at the conference "Materia e materia vivente", University of Florence, 2012

## TEACHING EXPERIENCE

### As instructor

- **King's College London**  
“Ethics and Politics of Science and Technology”, Spring 2018
- **University of Milan**  
“Logic and critical thinking in scientific methodology”, Spring 2016, 2017, 2018, 2019, 2020
- **University of Verona**  
Logic in clinical methodology”, Spring 2020, 2021
- **University of Urbino**  
“Philosophy of ecology”, Spring 2020
- **European School of Molecular Medicine graduate programme**  
“Applied ethics”, Fall 2016, 2019

### As teaching assistant

- **University of Twente**  
“Scientific Methodology and Research Integrity”, (within the course *Governing in a Tech-Based Society*, Spring 2022, 2023
- **University of Amsterdam**  
“Data literacy”, Winter 2023
- **University of Milan**  
“Logic”, Spring 2012, 2013, 2014, 2015
- **University of Florence**  
“Public understanding of science and Research integrity” (within the course in *Science communication*), Spring 2022

## COURSES PREPARED TO TEACH

Philosophy of Science  
Philosophy of the Life Sciences  
Philosophy of Biomedicine  
Philosophy of Data  
Ethics and Politics of Science and Technology  
Science and Values  
Research Integrity and Trust  
Science and Democracy  
Introduction to STS  
Critical Thinking  
History of Science  
History of Biology  
History of Medicine

## SUPERVISIONS

Master thesis supervisor:

- Lucrezia Totolo, AA 2016-2017 - **Il fenomeno dell'esitazione vaccinale nelle politiche di sanità pubblica: un'analisi delle ragioni** (tr. *The phenomenon of vaccination hesitation in public health policies: an analysis of the reasons*), Corso di Laurea in SCIENZE COGNITIVE E PROCESSI DECISIONALI, Università di Milano 'Statale'

- Chiara Ballabio, AA 2018-2019 - **Sbagliamo perché esitiamo o esitiamo perché sbagliamo? Analisi dei processi cognitivi implicati nella scelta vaccinale** (tr. *Do we fail because we hesitate or do we hesitate because we fail? Analysis of the cognitive processes involved in vaccination choice*), Corso di Laurea in SCIENZE COGNITIVE E PROCESSI DECISIONALI, Università di Milano 'Statale'
- Margherita Bove, AA 2018-2019 - **Mind your Body: Mental Disorders in the Light of Embodiment**. Corso di Laurea in SCIENZE COGNITIVE E PROCESSI DECISIONALI, Università di Milano 'Statale'
- Francesca Vendola, AA 2018-2019, **Bacterial Human Being: A Redefinition Of Extended Cognition In The Light Of Microbiota's Impact On Brain And Behavior**. Corso di Laurea in SCIENZE COGNITIVE E PROCESSI DECISIONALI, Università di Milano 'Statale'
- Carmen D'Ambrosio AA 2019-2020 - **Comunicare il rischio. La comunicazione nella gestione della pandemia da Covid-19** (tr. *Communicating risk. Communication in the management of the Covid-19 pandemic*), Corso di Laurea in SCIENZE COGNITIVE E PROCESSI DECISIONALI, Università di Milano 'Statale'

## SCHOLARSHIPS

- 2014-2015: Umberto Veronesi's Foundation scholarship (18,500 euro gross per year)
- 2012-2013: European School of Molecular Medicine scholarship (18,500 euro gross per year)

## LABORATORY ROTATIONS AND EXPERIMENTAL TECHNIQUES

- January 2013 – December 2015  
Giacchino Natoli's group - Transcriptional control in inflammation and cancer (IEO) - PCR,  
- Transfection,  
- ChIP-seq,  
- Elements of R programming,  
- Gene Ontology enrichment analysis
- February 2012- December 2012.  
Giuliana Pelicci's group: Biology and signal transduction of normal and cancer neural stem cells. (IEO)  
- Theoretical work on the notion of stemness.  
- Practical experience with the Western blot technique

## MEMBERSHIPS

Member of SILFS (Italian Society of Logic and Philosophy of Science)  
Member of Dutch Research School of Philosophy  
Member of SPSP (Society for Philosophy of Scientific Practice)  
Member STS Italy

## OTHER EXPERIENCES

2012 - Summer School in Ontological Analysis, IAOA, University of Trento  
2010 - Natural History Museum of the University of Florence, curator assistant on Museum collection  
2014/current - I have been a reviewer for the journals *Biology & Philosophy*, *Synthese*, *Studies in History and Philosophy of Science*, *European Journal of Philosophy of Science*, *History and Philosophy of the Life Sciences*, *Philosophy of Science*.



## PROFESSIONAL REFERENCES

### Scholars with whom I work or have worked closely.

**Prof. Dr Ir, Mieke Boon**, full professor of Philosophy of Science in Practice in the Philosophy Department at the University of Twente  
email: [m.boon@utwente.nl](mailto:m.boon@utwente.nl)

**Dr Yj Erden**, associate professor of Philosophy in the Philosophy Department at the University of Twente  
email: [y.j.erden@utwente.nl](mailto:y.j.erden@utwente.nl)

**Prof. Raphaël Lévy**, professor of Physics, at the University of Sorbonne Nord  
email: [raphael.levy@sorbonne-paris-nord.fr](mailto:raphael.levy@sorbonne-paris-nord.fr)

**Dr Federica Russo**, professor of Philosophy and Ethics of Techno-Science & Westerdijk Chair, Freudenthal Institute, Utrecht University  
email: [f.russo@uu.nl](mailto:f.russo@uu.nl)

**Prof. Sabina Leonelli**, professor of Philosophy and History of Science at the University of Exeter  
email: [s.leonelli@exeter.ac.uk](mailto:s.leonelli@exeter.ac.uk)

**Prof. Jan Sprenger**, full professor of Philosophy of Science in the Philosophy and Education Department at the University of Turin  
email: [jan.sprenger@unito.it](mailto:jan.sprenger@unito.it)

**Prof. Amedeo Amedei**, full professor of Medical Technologies for Laboratory in the Experimental and Clinical Medicine Department at the University of Florence  
email: [amedeo.amedei@unifi.it](mailto:amedeo.amedei@unifi.it)

**Prof. Raffaella Campaner**, full professor of Philosophy of Science in the Philosophy and Communication Department at the University of Bologna  
email: [raffaella.campaner@unibo.it](mailto:raffaella.campaner@unibo.it)

**Dr Matteo Mameli**, reader of Philosophy in the Philosophy Department at the King's College London  
email: [matteo.mameli@kcl.ac.uk](mailto:matteo.mameli@kcl.ac.uk)

### Other scholars with whom I work or have worked

**Prof. Cyrus Mody**, full professor of History of Science, Technology and Innovation in the History Department at the University of Maastricht  
email: [c.mody@maastrichtuniversity.nl](mailto:c.mody@maastrichtuniversity.nl)

**Prof. Willem Halffman**, associate professor in Science and Technology Studies at the Radboud University  
email: [w.halffman@science.ru.nl](mailto:w.halffman@science.ru.nl)

**Prof. Guillaume Cabanac**, full professor in Computer Science in the Computer Science Department at the University of Toulouse 3  
email: [guillaume.cabanac@univ-tlse3.fr](mailto:guillaume.cabanac@univ-tlse3.fr)

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