

UNIVERSITÀ DEGLI STUDI DI MILANO

Procedura di selezione per la chiamata a professore di II fascia da ricoprire ai sensi dell'art. 18, comma 1 e 4, della Legge n. 240/2010 per il settore concorsuale \_11/C2 -Logica, Storia e Filosofia della Scienza , (settore scientifico-disciplinare M-FIL/02-LOGICA E FILOSOFIA DELLA SCIENZA, ora gruppo scientifico-disciplinare 11/PHIL-02)

presso il Dipartimento di Filosofia Piero Martinetti

(avviso bando pubblicato sulla G.U. n. 52 del 28/06/2024) - Codice concorso 5611

## **Patricia Palacios**

### **CURRICULUM VITAE**

**(N.B. IL CURRICULUM NON DEVE ECCEDERE LE 30 PAGINE E DEVE CONTENERE GLI ELEMENTI CHE IL CANDIDATO RITIENE UTILI AI FINI DELLA VALUTAZIONE.**

**LE VOCI INSERITE NEL FACSIMILE SONO A TITOLO PURAMENTE ESEMPLIFICATIVO E POSSONO ESSERE INTEGRATE)**

#### **INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)**

COGNOME	PALACIOS
NOME	PATRICIA

#### **TITOLI**

##### **TITOLO DI STUDIO**

*(indicare la Laurea conseguita inserendo tipologia e relativo punteggio, Ateneo, titolo della tesi, data di conseguimento, ecc.)*

- **MSc, in Philosophy of Science**, London School of Economics and Political Science, UK, 14 November 2014, dissertation with distinction.

- **Master in Philosophy**, University of Santiago, Chile, 10 October 2013, approved with distinction.

- **Bachelor in Philosophy**, University of Chile, Chile, 8 June 2010, approved with highest distinction.

##### **TITOLO DI DOTTORE DI RICERCA O EQUIVALENTI, OVVERO, PER I SETTORI INTERESSATI, DEL DIPLOMA DI SPECIALIZZAZIONE MEDICA O EQUIVALENTE, CONSEGUITO IN ITALIA O ALL'ESTERO**

*(inserire tipologia del titolo e relativo punteggio, Ateneo, titolo della tesi, data di conseguimento, ecc.)*

- **Doctoral Degree in Philosophy**, Ludwig-Maximilian-University Munich, Munich Center for Mathematical Philosophy (MCMP), Germany, 10 July 2018, approved with “summa cum laude”. Title of the dissertation: “Phase Transitions in Science: Selected Philosophical Topics”, supervisor: Prof. Stephan Hartmann.

## ALTRI TITOLI CONSEGUITI

(inserire titolo, ente, data di conseguimento, ecc.)

- **Austrian National Habilitation** for a Professorship position at any Austrian University (28 November 2022).
- **Abilitazione scientifica nazionale (italiana)** per la qualifica di professore di II fascia (12 December 2023).

## POSIZIONI ACCADEMICHE

- **Associate Professor (deut. Universitätsdozentin)**, in the Philosophy Department at University of Salzburg (since December 2022)
- **Assistant Professor (deut. Universitätsassistent)** (tenure-track), in the Department of Philosophy at University of Salzburg (from October 2018 to November 2022)
- **Visiting fellowship at the University of California**, Department of Logic and Philosophy of Science at the University of California, Irvine, sponsored by the National Science Foundation Grant No. 1328172 to work on the project “Comprehending and Regulating Financial Crises”, University of California, Irvine, January 2016-April 2016.
- **Visiting fellowship** at the Minnesota Center for Philosophy of Science, University of Minnesota, US, April-May 2017.

## PERIODI DI CONGEDO

- Maternity leave: June 2023-October 2024
- Maternity leave: June 2021-September 2022

## ATTIVITÀ DIDATTICA

### INSEGNAMENTI E MODULI

(inserire nome dell'insegnamento / modulo / corso, periodo [gg/mm/aa inizio e fine], anno accademico, corso laurea, Ateneo, numero di ore frontali, CFU)

### Courses taught at the University of Salzburg:

- (1) **Why Trust Science?** Advanced Seminar for graduate students of the program “Master in Philosophy”, 30 hours per semester. Summer Semester 2023 (in English)
- (2) **Philosophy of Economics and Social Sciences**, Advanced Seminar for undergraduate students of the program: “Philosophy, Politics and Economics”. 30 hours. Summer Semester 2020, Summer Semester 2021 (in German).
- (3) **Emergence and Reduction in Science**, Advanced Seminar for graduate students of the program “Master in Philosophy”. 30 hours. Summer Semester 2019, Summer Semester 2021, Summer Semester 2023 (in English).
- (4) **Philosophy of Science**, Introductory Course for undergraduate students of the programs: “Bachelor in Philosophy” and “Bachelor in Philosophy, Politics and Economics”. 60 hours. Winter

Semester 2018/2019, Winter Semester 2019/2020, Winter Semester 2020/2021, Winter Semester 2022/2023 (in German).

(5) **Methodology of Science**, Advanced Course for undergraduate and graduate students of the programs: “Bachelor in Philosophy”, “Bachelor in Philosophy, Politics and Economics”, and “Master in Data Science”. 60 hours per semester. Winter Semester 2018/2019, Winter Semester 2019/2020, Winter Semester 2022/2023 (in German).

Courses taught at the Munich Center for Mathematical Philosophy (MCMP), LMU Munich:

(6) **Emergence and Reduction in Science**, Advanced Seminar for graduate students of the program “Master in Logic and Philosophy of Science”. 30 hours per semester. Winter Semester 2017/2018 (in English).

Courses taught at other institutions:

(7) **Philosophical Problems in Thermodynamics and Statistical Mechanics**, Course for graduate students of the program “Diploma en Filosofía de las Ciencias” (e-learning), Instituto de Filosofía y Ciencias de la Complejidad, Santiago, Chile, 30 hours. Summer Semester 2016, IFICC. (in Spanish)

(8) **Philosophy of Language**, Undergraduate Course for students of the program “Bachelor in Philosophy”, 30 hours. Summer Semester 2013, Universidad Alberto Hurtado, Santiago, Chile (in Spanish).

(9) **Philosophy, Relativity and Quantum Mechanics**, Advanced Course for students of the program “Diploma en Filosofía de las Ciencias”, 30 hours per semester. Winter Semester 2012, Universidad Alberto Hurtado, Santiago, Chile (in Spanish).

(10) **Philosophy of Science**, Advanced Course for students of the program “Diploma en Filosofía de las Ciencias”, 30 hours per semester. Summer Semester 2012, Summer Semester 2013, Universidad Alberto Hurtado, Santiago, Chile (in Spanish).

(11) **Logical Reasoning**, Undergraduate Course for students of the program “Bachelor in Economics”, 30 hours per semester. Winter Semester 2011, Summer Semester 2012, Winter Semester 2012, Universidad Adolfo Ibanez, Santiago, Chile (in Spanish).

(12) **Introduction to Logic**, Undergraduate Course for students of the program “Bachelor in Music”, 30 hours. Summer Semester 2011, Winter Semester 2011, Summer Semester 2012, Winter Semester 2012, Universidad Andrés Bello, Santiago, Chile (in Spanish).

(13) **Introduction to Logic and Philosophy of Science** (teaching assistant), Introductory course for undergraduate students, University of Leipzig, Summer Semester 2009 (in English).

## **ATTIVITÀ DI DIDATTICA INTEGRATIVA E DI SERVIZIO AGLI STUDENTI**

### **ATTIVITÀ DI RELATORE DI ELABORATI DI LAUREA, DI TESI DI LAUREA MAGISTRALE, DI TESI DI DOTTORATO E DI TESI DI SPECIALIZZAZIONE**

*(inserire numero e tipologia di elaborati seguiti, suddivisi per anno accademico, ateneo, corso laurea, ecc.)*

#### **2023**

(1) **External member of PhD Dissertation Committee** for Saakshi Dulani, University of Geneva, Swaziland, December 2023, title of the thesis “Black Hole Paradoxes A Unified Framework for Information Loss”.

(2) **Internal member PhD Dissertation Committee** for Gregorie Dupuis-McDonald, University of Salzburg, December 2023, title of the thesis “Three problems in migration science: A complex-systems approach to the problems of evidence, prediction and causality”

(3) **Main examiner Bachelor Thesis**, Kerstin Raab, Title of the thesis: “Symmetry Breaking in Physics: A Case of Emergence?”, September 2023, University of Salzburg.

#### **2022**

(4) **Main examiner Master Thesis** Mason Kreidler, University of Salzburg, December 2022, Title of the thesis “Emerging sustainability implications : how complex interactions with cascading dams (probably) produce undesirable ontological emergence in fish ecosystems.”

#### **2021**

(5) **Main examiner Master Thesis** Johnathan Parnell, University of Salzburg, June 2021, title of the thesis: “Addressing The Measurement Problem as a Wave Function Realist.”

(6) **Main examiner Bachelor Thesis**, Laura Christina Gehmayr, title of the thesis: “Are Random Control Trials the new Gold-standard in development economics”?, completed Summer Semester 2021.

#### **2019**

(7) **Main examiner Bachelor Thesis**, Michael Haiden, title of the thesis: "Reduction in International Relations Theory: Applications and Difficulties“, completed in the Summer Semester 2019.

(8) **Main examiner Bachelor Thesis**, Korbinian Kiendl (Bachelor Student), title of the thesis: “Emergence in psychology: decision framing”, completed in the Summer Semester 2019.

### **ATTIVITÀ DI TUTORATO DEGLI STUDENTI DI CORSI DI LAUREA E DI LAUREA MAGISTRALE E DI TUTORATO DI DOTTORANDI DI RICERCA**

*(inserire numero e tipologia delle attività, suddivise per anno accademico, ateneo, corso laurea, ecc.)*

(1) **Co-supervisor PhD student** Hamid Mirhosseini (PhD Student), working title of the thesis “Faithfulness in Scientific Representation” (in progress)

(2) **Co-supervisor PhD student**, Gregorie Dupuis-McDonald, title of the thesis “Three problems in migration science: A complex-systems approach to the problems of evidence, prediction and causality”, University of Salzburg, completed December 2023.

(3) **Grant supervisor for PhD candidate** Núria Munoz (on the project “Philip

Anderson and the development of emergence in physics”, March 2021 - May 2021 from the Oestereichische Akademische Austauschdienst (OeAD), Salzburg, Austria

(4) **Grant supervisor for Postdoc** Valeriya Chasova on the project “Ontology of symmetries reconsidered: rethinking past studies, new empirical statuses, and their links”, March 2021 - February 2022 from the Oestereichische Akademische Austauschdienst (OeAD), Salzburg, Austria

(5) **Main supervisor Master student** Mason Kreidler, University of Salzburg, December 2022, Title of the thesis “Emerging sustainability implications : how complex interactions with cascading dams (probably) produce undesirable ontological emergence in fish ecosystems.”

(6) **Main supervisor Master student** Johnathan Parnell, University of Salzburg, June 2021, title of the thesis: “Addressing The Measurement Problem as a Wave Function Realist.”

(7) **Main supervisor Bachelor Student** Kerstin Raab, Title of the thesis: “Symmetry Breaking in Physics: A Case of Emergence?”, September 2023, University of Salzburg.

(8) **Main supervisor Bachelor Student** Laura Christina Gehmayr (Bachelor Student), title of the thesis: “Are Random Control Trials the new Gold-standard in development economics”?, completed in the Summer Semester 2021.

(9) **Main supervisor Bachelor Student** Michael Haiden (Bachelor Student), title of the thesis: “Reduction in International Relations Theory: Applications and Difficulties“, completed in the Summer Semester 2019.

(10) **Main supervisor Bachelor Student** Korbinian Kiendl (Bachelor Student), title of the thesis: “Emergence in psychology: decision framing”, completed in the Summer Semester 2019.

## **SEMINARI**

*(inserire titolo del seminario, luogo, data, durata in giorni/ore, ente organizzatore, ecc.)*

### **Summer School seminars for graduate students:**

(1) **Emergence and Reduction in Science**, Lecture Stream at the Summer School on Mathematical Philosophy for Female Students 2021, Munich Center for Mathematical Philosophy, Munich, Germany, 19-23 July 2021.

(2) **On the Use of Universality Arguments in Black Hole Physics**, Lecture at the XXIV Urbino Summer School in Philosophy of Physics for graduate students and postdoc researchers, 8 June 2021.

(3) **Can Physics Explain Economics?**, Lecture at the Summer School on Mathematical Philosophy for Female Students, Munich Center for Mathematical Philosophy, Munich, Germany, July, 2018.

(4) **Philosophical Problems Raised by Phase Transitions**, Lecture at the Summer School on Mathematical Philosophy for Female Students, Munich Center for Mathematical Philosophy, Munich, Germany, Germany, July 31, 2017.

(5) **Emergence and Reduction in Physics**, Lecture at the Summer School on Mathematical Philosophy for Female Students, Munich Center for Mathematical Philosophy, Munich, Germany, July 29, 2016.

(6) **Infinite Idealizations in Physics**, Lecture at the Summer School on Mathematical Philosophy for Female Students, Munich Center for Mathematical Philosophy, Munich, Germany, July 31, 2015

## **ATTIVITÀ DI RICERCA SCIENTIFICA**

### **PUBBLICAZIONI SCIENTIFICHE**

*(per ciascuna pubblicazione indicare: nomi degli autori, titolo completo, casa editrice, data e luogo di pubblicazione, codice ISBN, ISSN, DOI o altro equivalente)*

#### **Book**

(1) **Palacios, P. (2022)**. *Emergence and Reduction in Physics*. Cambridge University Press. ISBN: 978-1108814065.

#### **Peer-reviewed articles and contributions**

(2) **Palacios, P.**, and Jhun J. "Statistical Mechanical Models of Finance" In the Handbook of the Philosophy of Scientific Modeling DOI: 10.4324/9781003205647-37

(3) **Palacios, P. (2024)**. Intertheory Relations in Physics. Entry for the Stanford Encyclopedia of Philosophy (SEP). <https://plato.stanford.edu/archives/spr2024/entries/physics-interrelate/>

(4) El Skaf, R., Feline, L., **Palacios P.**, and Valente G. (2024) "Surrogate reasoning in the sciences." *Synthese* 203, no. 4 (2024): 105. DOI: 10.1007/s11229-024-04518-x

(5) **Palacios, P.**, "Intertheoretic Reduction in Physics Beyond the Nagelian Model" (2023), in C. Soto (Ed), *Current Debates in Philosophy of Science: In Honor of Roberto Torretti*, *Synthese Library Series*, Springer. DOI: 10.1007/978-3-031-32375-1\_8

(6) El Skaf, R., and **Palacios P. (2022)**, "What can we learn (and not learn) from thought experiments in black hole thermodynamics?." *Synthese* 200, no. 6 (2022): 434. *Synthese*. DOI: 10.1007/s11229-022-03927-0

(7) **Palacios, P.** "From a free energy principle to a free energy model?. Comment on" The Markov blanket trick: On the scope of the free energy principle and active inference" by Vicente Raja et al." *Physics of Life Reviews* 43 (2022): 96-97. DOI: 10.1016/j.pprev.2022.09.002

(8) Gryb, S., **Palacios, P.**, & Thébault, K. P. (2021). "On the universality of Hawking radiation." *The British Journal for the Philosophy of Science*, 72(3): 809-837. DOI:10.1093/bjps/axz025

(9) Colombo, M., & **Palacios, P. (2021)** "Non-equilibrium thermodynamics and the free energy principle in biology." *Biology & Philosophy*, 36(5), 41. DOI: 10.1007/s10539-021-09818-x

(10) **Palacios P.** & Valente, G. (2021). The paradox of infinite limits : a realist response. In Timothy D. Lyons & Peter Vickers (eds.), *Contemporary Scientific Realism: The Challenge From the History of Science*. New York, NY: Oxford University Press. ISBN: 9780190946814

(11) **Palacios, P.** "Ehrenfest and ehrenfest-Afanassjewa on the ergodic hypothesis." *The Legacy of Tatjana Afanassjewa: Philosophical Insights from the Work of an Original Physicist and Mathematician* (2021): 101-120. DOI: 10.1007/978-3-030-47971-8\_5

(12) **Palacios, P.**, and David G.. "¿ Qué pueden enseñarnos las ciencias de la complejidad sobre política y democracia?." (2021). *Estudios Públicos*. Centro de Estudios Públicos. 2021, **162**, pp. 7-29. ISSN 0716-1115. eISSN 0718-3089. Available under: doi: 10.38178/07183089/1717201115

(13) Eliassi-Rad, T., Farrell, H., Garcia, D,..., **Palacios P. et al.** What science can do for democracy: a complexity science approach. *Humanit Soc Sci Commun* **7**, 30 (2020). <https://doi.org/10.1057/s41599-020-0518-0>

(14) **Palacios, P.** (2019). "Phase transitions: A challenge for intertheoretic reduction? *Philosophy of Science*", **86**(4), 612-640. DOI: 10.1086/704974

(15) Fletcher, S. C., **Palacios, P.**, Ruetsche, L., & Shech, E. (2019). "Infinite idealizations in science: An introduction". *Synthese* **196**, 1657-1669. DOI: 10.1007/s11229-018-02069-6

(16) Jhun, J., **Palacios, P.**, & Weatherall, J. O. (2018). "Market crashes as critical phenomena? Explanation, idealization, and universality in econophysics." *Synthese*, **195**, 4477-4505. DOI: 10.1007/s11229-017-1415-y

(17) Wiesner, K., Birdi, A., Eliassi-Rad, T., Farrell, H., Garcia, D., Lewandowsky, S., **Palacios, P.**, Ross, D., Sornette, D. & Thebault, K. (2018). Stability of democracies: a complex systems perspective. *European Journal of Physics*, **40**(1), 014002. DOI: 10.1088/1361-6404/aaeb4d.

(18) **Palacios, P.** (2018). Had we but world enough, and time... but we don't!: Justifying the thermodynamic and infinite-time limits in statistical mechanics. *Foundations of Physics*, **48**, 526-541. DOI: 10.1007/s10701-018-0165-0

### Book reviews:

(19) **Palacios P.**, (2023) "A Middle Way: A Non-Fundamental Approach to Many-Body Physics by Robert Batterman: Reductionism and the Autonomy of Scales" DOI: <https://doi.org/10.1016/j.shpsa.2022.08.016>

(20) **Palacios, P.** (2016). Chance and Temporal Asymmetry. *International Studies in the Philosophy of Science*, **30**(2), 185-187. <https://doi.org/10.1080/02698595.2016.1265865>

### Edited Special Issues:

(1) El Skaf, R., Felling, L., **Palacios P.**, and Valente G. (2024) "Surrogate reasoning in the sciences." *Topical Collection Synthese* **203**, no. 4 (2024): 105. DOI: 10.1007/s11229-024-04518-x

(2) Fletcher, S. C., **Palacios, P.**, Ruetsche, L., & Shech, E. (2019). "Infinite idealizations in science". *Special Issue Synthese* **196**. DOI: 10.1007/s11229-018-02069-6

### ORGANIZZAZIONE, DIREZIONE E COORDINAMENTO DI CENTRI O GRUPPI DI RICERCA NAZIONALI E INTERNAZIONALI O PARTECIPAZIONE AGLI STESSI

(per ciascuna voce inserire tipologia di progetto, titolo del progetto, anno, durata, eventuale ente finanziatore e importo del finanziamento, ruolo, gruppo di ricerca, ecc.)

## **Research Grants**

- (1) **Key Researcher in the project “Knowledge in Crisis”**, which has been recently selected for major funding (9.000.000 Euros) under the Clusters of Excellence initiative (FWF). In charge of the subproject “From Mice to Zebrafish to Humans: On the validity of analogue animal experiments in biomedical research”, in which I will direct a postdoctoral researcher.
- (2) **FQXi mini-grant for the project “Causation and Complexity”** (3.500 Euros).
- (3) **Collaborator of the research project “Limits, asymptotic expansions, and perturbation theory in physics”** (PI: Vincent Ardourel), [French National Research Agency](#), March 2023-February 2026.
- (4) **Assistant researcher for the project “Comprehending and Regulating Financial Crises”**, National Science Foundation Grant No. 1328172 (Co-Principal investigator: Prof. James O. Weatherall), January 2016-April 2016. University of California, Irvine, USA. (5.000 Dollars)
- (5) **Ernst Mach Grant supervisor** for the project “Ontology of symmetries reconsidered: rethinking past studies, new empirical statuses, and their links” carried out by the postdoc Valeriya Chasova, March 2021-Dec. 2021. (10.350 Euros).
- (6) **Ernst Mach Grant supervisor** for the project “Philip Anderson and the development of emergence in modern physics” the PhD Student Nuria Munoz, March 2021-June 2021. (4.400 Euros).
- (7) **Ernst Mach Grant recipient** for the project “Phase Transition in Finite Systems” at the University of Salzburg, September 2017-June 2018, supervisor Prof. Charlotte Werndl (9.400 Euros).



## **Research Networks:**

- (1) **Co-founder and elected Equity, Diversity and Inclusion Officer** of the Philosophy of Physics Society, which is in charge of the new international journal: Philosophy of Physics. <https://philosophyofphysics.org/>
- (2) **Local coordinator** “Irvine-London-Munich-Polimi-Salzburg Network in Philosophy and Foundations of Physics”. From September 2018 onwards. <https://ilmpsnetwork.wordpress.com/imps/>
- (3) **Elected member of the advisory board** Chilean Philosophy of Science Society. From July 2024. <https://www.sochific.cl/>
- (4) **Ordinary member of research network** “Category Theory in Philosophy of Science” (DFG Scientific Networks Grant). Research member, July 2018- September 2021. <https://www.cattheoryphilsci.philosophie.uni-muenchen.de/index.html>
- (5) **Ordinary member of research network** “Physics meets Philosophy in Vienna”. Research member, from November 2019 onwards. <https://wienerkreis.univie.ac.at/kooperationsnetzwerk/physics-meets-philosophy-in-vienna/>

**ATTIVITÀ QUALI LA DIREZIONE O LA PARTECIPAZIONE A COMITATI EDITORIALI DI RIVISTE SCIENTIFICHE**  
(per ciascuna voce inserire anno, durata, ruolo, rivista scientifica, ecc.)

- (1) **Associate Editor**, Journal *Foundations of Physics*, Springer, from November 2019 onwards.
- (2) **Guest editor**, Topical Collection “Surrogate reasoning in the sciences.” Topical Collection *Synthese* 203, no. 4, 2024 (with El Skaf, R., Felling, L and Valente G.)
- (3) **Guest editor**, Special Issue ““Infinite idealizations in science”. Special Issue *Synthese* 196, 2019,. DOI: 10.1007/s11229-018-02069-6 (with Fletcher, S. C., Ruetsche, L., & Shech, E.)

## **TITOLARITÀ DI BREVETTI**

(per ciascun brevetto, inserire autori, titolo, tipologia [nazionale o internazionale], anno, numero brevetto, ecc.)

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## **PREMI E RICONOSCIMENTI NAZIONALI E INTERNAZIONALI PER ATTIVITÀ DI RICERCA**

(inserire nome e motivazione del premio, data, ente erogatore, ecc.)

-**Keynote speaker** at the “21st UK and European Meeting on the Foundations of Physics”, July 9. 2023, Bristol, UK.

-**Keynote speaker** at the “4th Lisbon International Conference on Philosophy of Science”, July 12. 2023, Lisbon, Portugal.

-**Principal keynote speaker at the public interdisciplinary panel discussion** “Emergence 2.0: Philosophy, Quantum Materials, and Artificial Intelligence” (outreach event), Stuttgart, Germany, June 21, 2022.

-“Female Physicist of the Month” of the Austrian Physical Society (ÖPG)- (Forthcoming in September 2024).

- FQXi mini-grant for the project “Causation and Complexity”.

- DAAD Scholarship to undertake Ph.D in Philosophy, 2016-2018 (30,000 Euros)

- Beca Chile Scholarship to undertake Ph.D in Philosophy, 2014 (18,000 each year)

- Beca Chile Scholarship to undertake MSc. in Philosophy of Science at the London School of Economics, 2013 (35,000 Euros)

- Best Student Award, University of Santiago, Chile, 2012

- Exchange Program scholarship at the University of Leipzig (5000 Euros)

- Master Merit award, University of Santiago, Chile, 2010 (1000 Euros)

- Goethe-Institut/DAAD Scholarship, Mannheim, Germany, 2008. (1000 Euros)

**PARTECIPAZIONE IN QUALITÀ DI RELATORE A CONGRESSI E CONVEGNI DI INTERESSE INTERNAZIONALE**  
(*inserire titolo congresso/convegno, data, durata in giorni/ore, ente organizzatore, ecc.*)

### **Keynote lectures:**

(1) “Reduction and the autonomy of scales”, Keynote talk at the “21st UK and European Meeting on the Foundations of Physics”, July 9. 2023, Bristol, UK. This is considered as the biggest conference in philosophy and foundations of physics, with more than one hundred contributed talks.

(2) “Reduction and the Autonomy of the Special Sciences” Keynote speaker at the “4th Lisbon International Conference on Philosophy of Science”, July 12. 2023, Lisbon, Portugal. This is a major international conference directed to a wide audience with interests in the philosophy of science broadly conceived (more than one hundred contributed talks).

(3) **Emergence 2.0: Philosophy, Quantum Materials, and Artificial Intelligence” (outreach event)**, Principal keynote speaker at the public interdisciplinary panel discussion, Stuttgart, Germany, June 21, 2022. I was the principal keynote speaker at this interdisciplinary public discussion on emergence organized by the Max Planck Institute for Solid State Research.

(4) “Reduction, Emergence and Phase Transitions”, Workshop “From Models to Decisions,” Castelveccana, Italy, 14 July 2022.

### **Invited talks:**

- (5) "From Spins to flocks to traders? Philosophical insights on model transfer," invited talk at the SILFS session, XXV World Congress of Philosophy, Rome, 3 August 2024 (scheduled).
- (6) "Redefining equilibrium for long range interacting systems", Philosophy of Physics Workshop: Foundations of Thermodynamics, Western University, 18 June, 2024,
- (7) "On the use of thought experiments in black hole physics," invited talk at Investigating Reality, Santa Fe Institute, March 26-28, 2024.
- (8) "What can we learn (and not learn) from thought experiments in black hole physics", Colloquium Talk, Black Hole Initiative, University of Harvard, March 25, 2024.
- (9) "From Spins to Flocks: Model Adaptation in the Study of Criticality," Foundations of Biophysics, September 2023, Bristol, UK.
- (10) "Reduction, Emergence, and Phase Transitions", invited talk at the "Physics meets philosophy" group, IQOQI January 20th, 2023, Vienna.
- (11) "Reduction, Emergence, and Phase Transitions", New Directions in the Foundations of Physics, Viterbo, Italy, June, 2022.
- (12) "Reduction, Emergence, and Phase Transitions" Seven Pines 2022, Foundations of Thermodynamics and Statistical Mechanics, May 2022, Minneapolis.
- (13) "Non-equilibrium Thermodynamics and the Free Energy Principle in Biology", Active Inference Livestream. [activeinference.org/](https://activeinference.org/), October 19, 2021.
- (14) "Re-defining equilibrium for long-range interacting systems", New Directions in the Foundations of Physics, Viterbo, Italy, 2020/2021, June 26, 2021.
- (15) "Approximation methods and the autonomy of effective (field) theories", workshop 'Approximation Methods', Berlin, Germany, 10 June, 2021.
- (16) "Re-defining equilibrium for long-range interacting systems", Foundations of Physics 2020/2021, May 2021.
- (17) "The Paradox of Infinite Limits: a Realist Response", Bristol Center for Science and Philosophy, Bristol, UK, May 11, 2021.
- (18) "The Paradox of Infinite Limits: a Realist Response", LSE Sigma Club, London, UK, May 10, 2021
- (19) "The Paradox of Infinite Limits: a Realist Response", Mini-Workshop on Infinities and Idealizations in Physics, Harvard Foundations Of Physics series, USA, April 27, 2021.
- (20) "Can physics tell us something about democracy?", Complexity Science Hub Vienna, September 25, 2020.
- (21) "¿Qué pueden enseñarnos las ciencias de la complejidad sobre física y democracia", Sociedad Platónica, Santiago, Chile, July 2020
- (22) "Re-defining equilibrium for long-range interacting systems", Colloquium Philosophy of Physics, Oxford, UK, October 2019.

- (23) "Intertheoretic Reduction beyond the Nagelian model", Bergen Seminar Philosophy of Science, Bergen, Norway, August 2019.
- (24) "On the universality of Hawking radiation", Black Hole Initiative, Harvard University, Boston, USA, May 2019.
- (25) "Re-defining equilibrium for long-range interacting systems", FraMEPhys, Birmingham, UK, May 2019.
- (26) "On the universality of Hawking radiation", Geneva Symmetry Group, Geneva, Switzerland, May 2019.
- (27) "Re-defining equilibrium for long-range interacting systems", Geneva Symmetry Group, Geneva, Switzerland, May 2019.
- (28) "Emergent symmetry breaking in finite systems: philosophical aspects", Conference "Symmetrybreaking vs symmetry-preserving many-body schemes" at Saclay, France, May 2019
- (29) "Re-defining equilibrium for long-range interacting systems", PhilSci Colloquium, Stockholm, Sweden, April 2019.
- (30) - "Topics in Philosophy of Physics: Emergence and Reduction in Condensed Matter Physics", Kolloquium zur Chemie und Physik der Materialien, Salzburg, Austria, April 2019.
- (31) "Can Physics Tell Us Why (and When) Stable Democratic Systems May be Undesirable?", Workshop Philosophy at Work, Munich, Germany, March 2019.
- (32) "Can Physics Tell Us Why (and When) Stable Democratic Systems May be Undesirable?", at the Institute for Quantum Optics and Quantum Information Vienna (IQOQI) Vienna, Austria, November 2018.
- (33) "Emergence and Reduction in Condensed Matter Physics", Talk in the Seminar Research Group "HEFTP", Max Planck Institute, Berlin, Germany, September 2018.
- (34) "Re-defining Equilibrium for Long-range Interacting Systems", Time In Physics Workshop, Salzburg, Austria, September 2018
- (35) "Can Physics Tell Us Why (and When) Stable Democratic Systems May be Undesirable?", Munich- Hannover Workshop in Philosophy of Science, Munich, Germany, May 2018.
- (36) "Do Scale Invariant Models Explain?: From Traffic Jams to Democratic Systems", Workshop: How stable are democracies? Complex systems Perspectives on Modern Society, Bristol, UK, January 12-13, 2018
- (37) "On the Aims of Limiting Reduction", Workshop: New Perspectives on Inter-theory reduction, University of Salzburg, Austria, November 26, 2017
- (38) "Phase Transitions: A Challenge for Reductionism?", WIP seminar, University of Salzburg, Austria, November 6, 2017
- (39) "Market Crashes as Critical Phenomena? Explanation, Idealization, and Universality in Econophysics", University of Bristol, UK, October 18, 2017
- (40) "Market Crashes as Critical Phenomena? Explanation, Idealization, and Universality in Econophysics", University of Florence, Italy, October 10, 2017

- (41) “Philosophical Problems Raised by Phase Transitions”, Seminario Permanente de Filosofía de las Ciencias, University of Chile, Santiago, Chile, August 16, 2017
- (42) “Symmetry-Breaking Phase Transition: A challenge for Reductionism?”, Workshop: Symmetry and Asymmetry in Physics, Hannover, Germany, July 2017
- (43) “Phase Transition: A challenge for Reductionism?”, Workshop: The infinite limit and phase transitions, Louvain-la-Neuve, Belgium, June 23, 2017
- (44) “Had We But World Enough, and Time: Justifying the Thermodynamic and Infinite-Time Limits in Statistical Mechanics”, Workshop: Tatjana Afanassjewa and her legacy: new perspectives on irreversibility, Salzburg, Austria, June 17, 2017
- (45) “Had We But World Enough, and Time: Justifying the Thermodynamic and Infinite-Time Limits in Statistical Mechanics”, Workshop: Explanation, Idealization and Causation, Munich, Germany, May 27, 2017
- (46) “Market Crashes as Critical Phenomena?”, University of St. Thomas, Minneapolis, USA, April 13, 2017
- (47) “Phase Transition: A challenge for Reductionism?”, Philosophy Colloquium University of Queensland, Brisbane, Australia, March 17, 2017
- (48) “Symmetry-breaking phase transition: A challenge for reductionism?”, Workshop: Symmetry and Symmetry-breaking in Physics, University Paris-6, Paris, France, Dic 2, 2016
- (49) “Emergence and Reduction in Physics”, Philosophy Colloquium, Universidad de Buenos Aires, Buenos Aires, Argentina, Oct 7, 2016.
- (50) “The Role of Approximation in a Reductive Explanation for Phase Transitions”, University of California, San Diego, USA, March 9, 2016
- (51) “The Role of Approximation in a Reductive Explanation for Phase Transitions”, Southern California Philosophy of Physics Seminar, University of California, Irvine, USA, January 16, 2016
- (52) “The Role of Approximation in a Reductive Explanation for Phase Transitions”, Workshop: Reduction in Physics and Biology, Santiago, Chile, January 5, 2016
- (53) “The Role of Approximation in a Reductive Explanation for Phase Transitions”, University of Oxford, Oxford, UK, October 22, 2015

#### **Contributed talks:**

- (54) “From Spins to Flocks: Model Adaptation in the Study of Critical Phenomena”. Symposium “Physics Beyond Physics: On the Empirical Success and Explanatory Role of Biophysical Models Physics beyond physics”. Accepted for presentation at the Philosophy in Practice Session, PSA, New Orleans, November 14. 2024 (scheduled).
- (55) “Analogical Reasoning in Econophysics”, PSA Conference 2020/2021, Baltimore, USA, 11-14 Nov. 2021 [scheduled].
- (56) “Thought experiments vs. Analogue experiments: The case of black holes”, Foundations of Physics 2020/2021 Conference, Paris, France, 28-30 November 2021

- (57) “On the Universality of Hawking Radiation”, EPSA Conference, Geneva, September 2019.
- (58) “Market Crashes as Critical Phenomena? Explanation, Idealization, and Universality in Econophysics“, XXIV. Kongress der deutschen Gesellschaft für Philosophie, September 25, 2017
- (59) “Had We But World Enough, and Time: Justifying the Thermodynamic and Infinite-Time Limits in Statistical Mechanics“, Jornadas Rolando Chuaqui, Valparaíso, Chile, August 23, 2017
- (60) “Market Crashes as Critical Phenomena? Explanation, Idealization, and Universality in Econophysics“, MUST 10 Causation and Complexity Conference, Sydney, Australia, March 2017
- (61) “Phase Transitions: A challenge for reductionism or for ,Nagelianism’?” Foundations of Physics Conference, LSE, UK, July 16, 2016
- (62) “Giving Econophysics a Chance: On the Plausibility of Modeling Stock Market Crashes as Critical Phase Transitions“, Workshop Infinite Idealizations in Physics, Munich, Germany, June 9, 2016
- (63) “The Role of Approximation in a Reductive Explanation for Phase Transitions“, Irvine-Princeton- Pittsburgh Conference, Pittsburgh, USA, April 1, 2016
- (64) “The Role of Approximation in a Reductive Explanation for Phase Transitions“, Workshop Effective Theories, Mixed Scale Modeling, and Emergence, Pittsburgh, USA, October 2, 2015
- (65) “Do RG methods provide a reductive explanation for phase transitions?“, 15th Congress of Logic, Methodology and Philosophy of Science, CLMPS 2015, Helsinki, Finland, August 6, 2015
- (66) “Do RG methods explain continuous phase transitions?” 1° Munich Graduate Workshop in Mathematical Philosophy: Philosophy of Physics, MCMP, Munich, Germany, April 10, 2015
- (67) “On the role of infinite idealizations in QFT“, Workshop Re-thinking foundations of physics, Dorfgastein, Austria, April 3, 2015

### **ATTIVITÀ GESTIONALI, ORGANIZZATIVE, DI SERVIZIO E DI TERZA MISSIONE**

**INCARICHI DI GESTIONE ED IMPEGNI ASSUNTI IN ORGANI COLLEGIALI E COMMISSIONI, PRESSO RILEVANTI ENTI PUBBLICI E PRIVATI E ORGANIZZAZIONI SCIENTIFICHE E CULTURALI, OVVERO PRESSO L'ATENEO O ALTRI ATENEI**

*(inserire tipologia di incarico/impegno, ente, data, durata, ecc.)*

### **Organization of workshops and conferences:**

- (1) Permanent Member of the organizing committee of the series of workshops “New Directions in the Foundations of Physics”, May 2023; June 2024.
- (2) Co-organizer Workshop “Irvine-London-Munich-Polimi-Salzburg Conference in Philosophy and Foundations of Physics”, London, UK, June 10-12, 2024.
- (3) Main Organizer Workshop “Causation and Complexity”, University of Salzburg, Austria, September 29-30, 2022.
- (4) Co- Organizer Symposium in Epistemology and Philosophy of Science at the VII Chilean Conference in Philosophy, Concepción, Chile, October 3-4 2021.

- (5) Co-organizer Workshop “Irvine-London-Munich-Polimi-Salzburg Conference in Philosophy and Foundations of Physics”, University of Salzburg, Austria, September 2-3, 2019.
- (6) Co-organizer Workshop “Irvine-Munich-Polimi-Salzburg Conference in Philosophy and Foundations of Physics”, University of Salzburg, Austria, September 3-4, 2018.
- (7) Co-organizer Workshop “Explanation, Multiscale Models and Multiple Realizability”, Valparaiso, Chile, March 5-8 2018.
- (8) Co-organizer Workshop “With and without measure: symmetry and symmetry breaking” Workshop, Munich, Germany, June, 2017.
- (9) Co-organizer Workshop “Explanation, Idealization and Causation” Workshop, Munich, Germany, May 27, 2017.
- (10) Co-organizer Workshop “Infinite Idealizations in Science”, MCMP, Munich, Germany, June 8-9, 2016.
- (11) Co-organizer Workshop “Reduction in Physics and Biology”, Santiago, Chile, January 4-6, 2016.
- (12) Co-organizer Workshop “Ontology of Fundamental Physics”, Santiago, Chile, December 9, 2015.
- (13) Co-organizer 1° Munich Graduate Workshop in Mathematical Philosophy: Philosophy of Physics, MCMP, Munich, Germany, April 9-11, 2015.

### **Program Committees:**

- (1) Organizing committee of the series of workshops “New Directions in the Foundations of Physics”, May 2023; June 2024.
- (2) The BSPS 2024 Annual Conference, British Society for the Philosophy of Science, July 2024
- (3) The BSPS 2023 Annual Conference, British Society for the Philosophy of Science, July 2023
- (4) The BSPS 2022 Annual Conference, British Society for the Philosophy of Science, July 2022
- (5) East European Network for Philosophy of Science.
- (6) The BSPS 2021 Annual Conference, British Society for the Philosophy of Science, July 2021
- (7) BSPS 2020, Kent, UK, British Society for the Philosophy of Science, July 2020
- (8) Foundations of Physics 2020/2021, Paris, France
- (9) PSA 2020/2021 (Poster Committee), Baltimore, Maryland, USA.
- (10) Foundations of Physics 2018, Utrecht, the Netherlands
- (11) The Second Law, MCMP, Munich, Germany, September 2017

### **Referee for:**

- 1. British Journal for the Philosophy of Science
- 2. Philosophy of Science

3. Synthese
4. Studies in History and Philosophy of Modern Physics
5. Australasian Journal of Philosophy
6. Foundations of Physics
7. European Journal for Philosophy of Science
8. Social Epistemology
9. Conicyt (Research National Funds, Chile)

### **Other administrative activities at the University of Salzburg:**

- Erasmus exchange Programm coordinator, September 2021 onwards.
- Work in Progress coordinator, October 2018-June 2021
- Elected “Mittelbau” representative, October 2019-June 2023

### **ATTIVITÀ DI TERZA MISSIONE**

*(inserire tipologia di incarico/impegno, ente, data, durata, ecc.)*

- (1) Principal keynote speaker at the public interdisciplinary panel discussion “Emergence 2.0: Philosophy, Quantum Materials, and Artificial Intelligence” (outreach event), Stuttgart, Germany, June 21, 2022.
- (2) “The Reality Issue: Black Holes and Fiction”, Commissioned article in science communication for the Magazine Nautilus (to be published in August 2024).
- (3) “Salzburger Forscher wollen die Krise der Demokratie mithilfe der Physik erklären” (Scientist from Salzburg want to explain the democracy crisis with the help of physics), article based on my research at the newspaper *Salzburger Nachrichten*. <https://www.sn.at/salzburg/chronik/salzbuerger-forscher-wollen-die-krise-der-demokratie-mithilfe-der-physik-erklaren-64408675>
- (4) Democracy under threat, a mathematician’s perspective, article based on my research at *Physics World*, February 2019. <https://physicsworld.com/a/democracy-under-threat-a-mathematicians-perspective/>
- (5) Lässt sich die Stabilität von Demokratien berechnen? (Could one explain the stability of democracies), article based on my research at *Spektrum*, December 2018. [https://scilogs.spektrum.de/gedankenwerkstatt/laesst-sich-die-stabilitaet-von-demokratien-berechnen/?alm\\_mvr=0](https://scilogs.spektrum.de/gedankenwerkstatt/laesst-sich-die-stabilitaet-von-demokratien-berechnen/?alm_mvr=0)

### **ATTIVITÀ CLINICO ASSISTENZIALI**

*(indicare, data, durata, ruolo, ente presso il quale si è prestata attività assistenziale, ecc.)*

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Data

26.07.2024

Luogo

Salzburg, Austria