

Nicola Angius

Curriculum Vitae

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Education

- 2017 **Associate Professor Qualification**, *Area 11/C2, Logic, History, and Philosophy of Science*, Italian National Scientific Qualification.
- 2007–2010 **PhD in Philosophy**, *University of Cagliari*, Italy, Grade: Excellent (A+).
- 2000–2005 **MA in Philosophy**, *Catholic University of Milan*, Italy, Grade: 110/110.
- 1994–1999 **High School Liceo Scientifico "G. Spano"**, *Sassari*, Italy, Grade: 100/100.

PhD thesis

- Title *MODEL VERIFICATION IN COMPUTER SCIENCE: SCIENTIFIC METHODOLOGY, ABSTRACTION, AND IDEALIZATION*
- Supervisor Professor Guglielmo Tamburrini (University of Naples, Italy).
- Abstract This work provides an epistemological and methodological analysis of model checking to advance the thesis that the conjectural knowledge of computer programs and hardware systems which formal methods in Computer Science enable one to attain involves the deployment of methodologies which, in their essential traits, are on a par with traditional methodologies one utilizes in physics and other natural sciences for predictive and explanatory purposes. This examination will draw upon reflective work carried out in the philosophy of science and it chiefly concerns the philosophy of models on one hand and distortive idealizations in scientific practice on the other. This work is divided into two parts, the first one dealing with the notion of theoretical models in empirical sciences and model checking, the second part examining the practice of idealization within empirical models and drawing some relative reflections on the issue of abstraction in model checking.

Research Interests

Philosophy of Computer Science; Philosophy of Cognitive Science; Philosophy of AI; Philosophy of Computer Simulations; Computational Logic.

Career

- 2024- **Associate Professor of Logic and Philosophy of Science**, *Department of Cognitive Science*, University of Messina, Italy.
- 2021-2024 **Assistant Professor (RTDb) of Logic and Philosophy of Science**, *Department of Cognitive Science*, University of Messina, Italy.
- 2022-2023 **Teaching Fellow**, *Ethics for Engineering*, Human Centred Artificial Intelligence Masters, University of Naples Federico II, Italy.

- 2018–2021 **Teaching Fellow**, *Philosophy of Computer Science*, Department of History, Human Science, and Education, University of Sassari, Italy.
- 2017–2018 **Teaching Fellow**, *Philosophy of Mind and of Cognitive Sciences*, Department of biomedical sciences, University of Sassari, Italy.
- 2016–2017 **Research Fellow**, *Department of History, Human Sciences, and Education*, University of Sassari, Italy.
- Dicembre 2015 **Teaching Erasmus**, *Department of Mathematics, School of Applied Mathematics and Physical Sciences, National Technical University of Athens, Atene, Grecia.*
- 2008–2017 **Teaching Assistant**, *Logic and Philosophy of Science*, Department of History, Human Sciences, and Education, University of Sassari, Italy.
- 2011 **Visiting Scholar**, *School of Computer Science and Electronic Engineering*, University of Essex, UK.
- 2010–2012 **Research Fellow**, *Department of Theories and Researches of Cultural Systems*, University of Sassari, Italy.

Teaching

Philosophy of Computing; Philosophy of Science; Epistemology of Psychology, *Department of Cognitive Science*, University of Messina.

Member of the faculty board of the PhD program in Cognitive Science, *Department of Cognitive Science*, University of Messina.

Accademic activities

Refereeing *Analysis; Biology and Philosophy; Synthese; Minds & Machines; Journal of Logic and Computation; Philosophy & Technology; AI & Society; Philosophical Studies; Foundations of Science; International Studies in the Philosophy of Science; Oxford Bibliographies; Techné: Research in Philosophy and Technology; Axiomathes; Humana.Mente; APhEx.*

Awards -PRIN 2022 (Relevant National Interest Project) SMARTTEST (Simulation of Probabilistic Systems for the Age of Digital Twin) - awarded by the Italian Ministry of Research and University

- Research Groups - Local unit PI for the *SMARTEST* PRIN project: Simulation of Probabilistic Systems for the Age of Digital Twin, granted by the Italian Ministry of Research and University.
- Member of *PROGRAMme*, ANR project: What is a (computer) program? Historical and philosophical perspectives.
 - External member of the Logic and Formal Methods Research Group ($\lambda - ForM$). Department of Mathematics, School of Applied Mathematical and Physical Sciences, National Technical University of Athens.
 - Progetto Fondazione Sardegna "Verità e discorso valutativo" (2021-2023).
 - Principal Investigator of the research project "Formal Methods in Computer Science and Computational Model Development in Robotics and Natural Computing: Methodological, Epistemological and Applied Ethics Issues" funded by *Regione Autonoma della Sardegna* (2010-2012)
- Invited talks
- *From coding to Curing*, seminar at HLRS, University of Stuttgart, 3 November 2023, Stuttgart, Germany.
 - *PROGRAMme workshop*, University of Lille, 14-15 June 2022, Lille, France. Talk: Computational theories – Representing the world through programs.
 - *Summer School On Computer Simulation Methods*, at HLRS, University of Stuttgart, September 25-29, 2017, Stuttgart, Germany. Talk: Qualitative Models in Computational Systems Biology. Representation, confirmation, experimentation.
 - *3th Séminaire Histoire et philosophie de l'informatique*, February 23 2017, at IH-PST, Paris. Talk: From Simulative Programs as Theories to Theories of Simulative Programs.
 - Workshop on *Algebraic Modelling of Topological and Computational Structures*. National Technical University of Athens; July 3, 2015, Athens, Greece. Talk: Syntactic and Semantic Presentations of Scientific Theories in Abstract Model Theory.
 - *HaPoC 2015 : 3rd International CONFERENCE on the HISTORY and PHILOSOPHY of COMPUTING*, October 8-11, 2015, Pisa, Italy. Talk: Explaining computing systems behaviours Functions, Abstractions, Idealization.
 - Workshop on *Induction, abduction, belief revision, and realism*. National Technical University of Athens; December 15-16, 2014, Athens, Greece. Talk: The Logical Structure of Modular Semantic Theories of Software Systems.

- Congresses and Symposia - Co-organizer of the symposium *Epistemological Perspectives on Neural Language Models* at *SFILS 2023*, Triennial International Conference of the Italian Society of Logic and Philosophy of Sciences, Urbino, Italy, 4-7 September 2023.
- Steering Committee member of Truth in Evaluation - Mid-Term Conference of the Italian Society for Analytic Philosophy – 30 Years of SIFA (1992-2022) - 26-28 September 2022, Alghero (University of Sassari), Italy.
 - Program Committee member of HaPoC 2021, 6th International Conference on the History and Philosophy of Computing, 27-29 Oct 2021 Zürich (Switzerland).
 - Co-organizer of the symposium 'Identity in Computational Formal and Applied Systems', at *CLMPST 2019, 16th International Congress on Logic, Methodology and Philosophy of Science and Technology*, August 5-10 2019, Prague.
 - Program Committee member of HaPoC 2019, 5th International Conference on the History and Philosophy of Computing, October 28-30 2019, University of Bergamo, Bergamo, Italy
 - Program Committee member of HaPoP 2018, Fourth Symposium on the History and Philosophy of Programming, March 23 2018, Mathematical Institute, University of Oxford, United Kingdom.
 - Co-organizer of the symposium 'Methodological issues in the Philosophy of Computer Science' at IACAP 2016: International Association for Computing and Philosophy, Annual Meeting, June 14-17 2016, Ferrara, Italy.
 - Co-organizer of the Workshop on the Philosophy of Computer Science at 5th UNILOG, June 20-30 2015, Istanbul, Turkey
 - Program Committee member of PHILOWEB GR, May 31 2014, Thessaloniki, Greece.

- Submitted talks - “Co-Simulations of Brain Language Processing using Neural Language Models”, at COGSCI (Cognitive Science Society) 2024, July 24-27 2024, Rotterdam, the Netherlands (with Perconti P., Plebe A., Acciai A.).
- “ Undesigned Cognitive Architecture”, at ACS (Advances in Cognitive Science) 2024, June 17-19 2024, Italian National Research Council (CNR), Palermo (with Acciai A., Perocnti P, Plebe A.)"
 - “Co-Simulations of Brain Language Processing using Neural Language Models”, at IACAP (International Association for Computing and Philosophy) 2024, July 8-10 2024, Eugene (OR), University of Oregon (with Perconti P., Plebe A., Acciai A.)
 - “How Can Neural Language Model Work?” (with Pietro Perconti, Alessio Plebe, and Alessandro Acciai), *SFILS 2023*, Triennial International Conference of the Italian Society of Logic and Philosophy of Sciences, Urbino, Italy, 4-7 September 2023.
 - “From Thinking to How to Think” (with Alessio Plebe and Alessandro Acciai) *IACAP 2023* - Congress of the International Association of Computing and Philosophy 3-5 July 2023, Prague, Czech Republic.
 - “Deep Learning in Simulative Sciences’ (with Alessio Plebe) *IACAP 2023* - Congress of the International Association of Computing and Philosophy 3-5 July 2023, Prague, Czech Republic.
 - “From Coding to Curing” (with Alessio Plebe e Arianna Pavone) *IACAP 2022* - Biennial Congress of the International Association of Computing and Philosophy July 22-24 2022, Santa Clara University, Santa Clara, CA, USA.
 - “Second Order Properties of Copied Computational Artefacts” (with Giuseppe Primiero). CLMPST 2019, 16th International Congress on Logic, Methodology and Philosophy of Science and Technology, August 5-10 2019, Prague, Czech Republic.
 - “From Simulative Programs as Theories to Theories of Simulative Programs” (with Guglielmo Tamburrini). *IACAP 2016: International Association for Computing and Philosophy, Annual Meeting*, June 14-17, 2016, Ferrara, Italy.
 - “Defending the Semantic View of Theories. A Computer Science Perspective” (with Petros Stefanias). 15th Congress on Logic, Methodology and Philosophy of Science (CLMPS), August 3-8, 2015, Helsinki, Finland.
 - “The Logical Structure of Modular Semantic Theories of Software Systems” (with Petros Stefanias). *IACAP 2014, The Annual Meeting of the International Association for Computing and Philosophy*, July 2-4 , Thessaloniki, Greece.
 - “Falsification and confirmation of hypotheses about computational systems in software testing”, 14th congress of logic, methodology and philosophy of science (CLMPS11), July 19-26, 2011, University of Nancy, France.
 - “Model Based Abductive Reasoning in Software Verification”. MBR012 Model-Based Reasoning in Science and Technology. Theoretical and Cognitive Issues, June 21-23, 2012, Sestri Levante, Italy.
 - “Model Checking and scientific methodology: models, regularities, and idealizations.” International Conference of the Italian Society for Logic and Philosophy of Science (SILFS 2010), December, 15 - 17 2010, Bergamo, Italy
 - “Model Checking and Models in Science. Models, Regularities, Prediction” (with Guglielmo Tamburrini). 7th European Conference on Philosophy and Computing (ECAP09), July 2-4, 2009, Barcelona, Spain.

Publications

- Angius, N. (2025). Meaning and Reference in Programming Languages. *Philosophies*, 10(2), 40.
- Angius, N., Perconti, P., Plebe, A., & Acciai, A. (2025) Making sense of transformer success. *Frontiers in Artificial Intelligence*, 8, 1509338.
- Angius, N. & Primiero G. & Turner, R. (2025) The Philosophy of Computer Science. *Stanford Encyclopedia of Philosophy* (Spring 2025 Edition), Edward N. Zalta (ed.)
- Angius, N., Perconti, P., Plebe, A., & Acciai, A. (2024). The Simulative Role of Neural Language Models in Brain Language Processing. *Philosophies*, 9(5), 137.
- Angius, N., & Stefaneas, P. (2024). The Logical Structure of Modular Semantic Theories of Software Systems. *Metaphilosophy*, 55(3), 440-456. <https://doi.org/10.1111/meta.12701>.
- Angius, N. (2024). The Epistemology of DT simulations. *The Reasoner*, 18(4)
- Angius, N., (2024). What is (the Philosophy of) Computer Science? *Metascience*, 33 (1), 123-126. <https://doi.org/10.1007/s11016-023-00928-8>
- Angius, N., Perconti, P., Plebe, A., & Acciai, A. (2024). Co-Simulations of Brain Language Processing using Neural Language Models. In *Proceedings of the Annual Meeting of the Cognitive Science Society* (Vol. 46).
- Angius, N., & Symons, J. (2023). Central Themes and Open Questions in the Philosophy of Computer Science. *Axiomathes: Global Philosophy*, 33(6), 51. <https://doi.org/10.1007/s10516-023-09704-z>
- Angius, N., & Plebe, A. (2023). From Coding To Curing. Functions, Implementations, and Correctness in Deep Learning. *Philosophy & Technology*, 36(3), 47.
- Angius, N. (2023) Can Computer Programs be Formally Verified? *APhEx*, 28, 322-338.
- Angius, N. (2022) On the Experimental Foundation of Computing. *Axiomathes*, 32(3), 1221-1236 <https://doi.org/10.1007/s10516-022-09645-z>
- Angius, N. & Primiero G. (2022) Copying Safety and Liveness Properties of Computational Artefacts. *Journal of Logic and Computation*, 33 (5), 1089-1117. <https://doi.org/10.1093/logcom/exac053>
- Angius, N. & Primiero G. & Turner, R. (2021) The Philosophy of Computer Science. *Stanford Encyclopedia of Philosophy* (Spring 2021 Edition), Edward N. Zalta (ed.)
- Angius, N. & Primiero, G. (2020) Infringing Software Property Rights. Ontological, Methodological, and Ethical Questions. *Philosophy & Technology*, 33(2), 283-308
- Angius, N. (2020). On the Mutual Dependence between Formal Methods and Empirical Testing in Program Verification. *Philosophy & Technology*, 33(2), 349-355
- Angius, N. (2019). Qualitative Models in Computational Simulative Sciences. Representation, Confirmation, Experimentation. *Minds & Machines*, 29(3), 397-416

- Angius, N. & Primiero, G. (2018). The logic of identity and copy for computational artefacts. *Journal of Logic and Computation*, 28(6), 1293-322
- Angius, N., Dimarogkona M., & Stefaneas, P. (2017). Building and Integrating Semantic Theories over Institutions. In S. Lambropoulou, D. Theodorou, P. Stefaneas & L. H. Kauffman (Eds), *Algebraic Modeling of Topological and Computational Structures and Applications*, Springer, PROMS series
- Turner, R., & Angius, N. (2017) The Philosophy of Computer Science. *Stanford Encyclopedia of Philosophy* (Spring 2017 Edition), Edward N. Zalta (ed.)
- Angius, N. & Tamburrini, G. (2017). Explaining Engineered Computing Systems' Behaviour: the Role of Abstraction and Idealization. *Philosophy & Technology*, 30(2), 239-258.
- Angius, N. & Tamburrini, G. (2016). Dai Programmi Simulativi come Teorie alle Teorie dei Programmi Simulativi. *Sistemi Intelligenti.*, XXVIII(1), 153-168
- Angius, N., & Stefaneas, P. (2016). Discovering Empirical Theories of Modular Software Systems. An Algebraic Approach. In Muller, V. (ed.), *Computing and Philosophy: Selected Papers from IACAP 2014. (Synthese Library)* Berlin: Springer.
- Angius, N. (2015). Computer Simulations Without Simulative Programs in Executable Cell Biology. Hypothesis Discovery and Justification. *Paradigmi*, XXXIII(3), 67-82
- Angius, N. (2014). Computational Idealizations in Software Intensive Science: a Comment on Symons' and Horner's paper. *Philosophy and Technology*, 27(3), 479-484.
- Angius, N. (2014). The Problem of Justification of Empirical Hypotheses in Software Testing. *Philosophy and Technology*, 27(3), 423-439
- Angius, N. (2013). Model-based Abductive Reasoning in Automated Software Testing. *Logic Journal of the IGPL*, 21(6), 931-942.
- Angius, N. (2013). Abstraction and Idealization in the Formal Verification of Software Systems. *Minds and Machines*, 23(2), 211-226.
- Angius, N. (2011). Software Verification and Scientific Methodology: Models, Regularities, Idealizations. *L&PS - Logic & Philosophy of Science*, 9, 569-577.
- Angius, N., & Tamburrini, G. (2011). Scientific Theories of Computational Systems in Model Checking. *Minds and Machines*, 21(2), pp. 323-336.
- Angius, N., & Tamburrini, G. (2010). Epistemologia dell'Artificiale e Informatica Teorica. In P. Greco, S. Termini (a cura di), *Memoria e Progetto. Un Modello per il Mezzogiorno che Serva a Tutto il Paese*, Edizioni GEM.

Languages

- Italian **Mother-tongue**
- English **Conversationally fluent**