

Curriculum Vitae

Olivia Levrini

Born: March 20, 1970

Citizenship: Italy

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• Education and academic titles

- 1995 Graduate in Physics, Alma Mater Studiorum - University of Bologna (magna cum laude).
- 1999-2000 Grant of the University of Bologna ("Young Researchers Project") for developing the project "Proposals of conceptual paths for an innovative teaching of the key-ideas of contemporary physics", 1999-2000.
- 2000 PhD in Physics, Alma Mater Studiorum - University of Bologna. Dissertation title: Analysing the possible interpretations of the formalism of General Relativity. Implications for teaching. Advisors: S. Bergia, N. Grimellini Tomasini.
- 2001 National certificate for the teaching of Physics in secondary high school.
- 2000-2002 "Assegno di ricerca" (Post-doc grant) on the project "Which physics for initial teacher education?" University of Bologna, 2000-2002 (Supervisor: N. Grimellini Tomasini).
- 2005 Grant of the University of Bologna (Marco Polo Project) for spending a period of three months as visiting scholar at the Graduate School of Education, University of California at Berkeley (June-September 2005), within the research group led by Prof. A. A. diSessa.

• Employment

- 2002 – 2014 (September 14th): Assistant Professor in Physics Education and History of Physics, Department of Physics and Astronomy, Alma Mater Studiorum - University of Bologna.
- 2014 (September 15th) - 2023 (November 1st): Associate Professor in Physics Education and History of Physics, Department of Physics and Astronomy "A. Righi", Alma Mater Studiorum - University of Bologna.
- 2023 (November 2nd): Full Professor in Physics Education and History of Physics, Department of Physics and Astronomy "A. Righi", Alma Mater Studiorum - University of Bologna.
- 2025 (May): Honorary Research Fellow of the University of Oxford, UK

• Research service and acknowledgments

- Organization of conferences and other research events at international and national level
 - *Conference President* of the 2019 ESERA conference, Bologna, August 26-30, 2019.
 - *Co-chair* (with Tamer Amin, American University of Beirut) *and coordinator of the Local Organizing Committee* of the 9th meeting of the Special Interest Group on Conceptual Change of the European Association for Research on Learning and Instruction (EARLI), Bologna, Italy, August 26-29, 2014.
 - *President*, with Elisa Ercolessi, of SECTION 7 - Didactics and history of physics, Conference of the Italian Physical Society, L'Aquila, Italy, September 23-27 2019 .
 - *President of the Scientific e Local Committee (LOC e SOC)* of the following international research events:
 - Workshop on Design, Methodology, and Theory, Department of Physics and Astronomy, University of Bologna, Italy, October 24-25, 2012 (together with P. Guidoni)
 - Final event of I SEE project, August, 26, 2019, Bologna.
 - Final event for policymakers of FEDORA project "Proactive anticipatory policies on science education and sustainability", November 3, 2022, Bologna
 - *Conference On Interdisciplinarity In STEM Education*, Event organized by the IDENTITIES project, in collaboration with the projects FEDORA, OARS, SEAS, November 4, 2022, Bologna
- Leadership of research groups or decision-making roles in research associations
 - Co-coordinator of the ESERA Special Interest Group 8 FUTURES-oriented Science Education (with Mauricio Pietrocola).
 - Member of the Executive Board of ESERA (European Science Education Research Association) as Conference President of the 2019 congress (from 2017 to 2019).
 - Coordinator of the research groups formalized in the European projects I SEE, IDENTITIES and FEDORA.
 - Coordinator of the research group in Teaching and History of Physics of the Department of Physics and Astronomy "A. Righi". The group currently includes, in addition to OL, two RTDb (one in Physics Education and one in History of Physics), two post-docs, 4 PhD students, and manages over 10 graduate students per year.
- Editorial experience:
 - Section Editor of the journal *Science Education* (since January 2025)
 - Associate Editor of the journal *Science & Education* (since January 2020 to December 2024)
 - Member of the Editorial Board of the *Giornale di Fisica* (since 2021)
 - Member of the Editorial Board of *Springer Book Series "Contributions from Science Education Research"* (since 2021)
 - Member of the Editorial Board of *Physical Review - Physics Education Research* (2017-2019).
 - Co-editor of the *special issue*: Laherto A, Levrini O and Erduran S (2023) Editorial: Future-oriented science education for agency and sustainable development. *Front. Educ.* 8:1155507. doi: 10.3389/educ.2023.1155507.

- Co-editor, with S. Kapon of *Section II - Cognitive, Epistemic, And Affective Theoretical Underpinnings Of Research On Physics Learning*, in M. F. Taşar and P. R. L. Heron, (Eds), 2023. The International Handbook of Physics Education Research: Learning Physics. AIP Publishing, Melville, New York (frontmatter available at: <https://doi.org/10.1063/9780735425477>)
- Co-editor of the volumes:
 - Levrini, O., Tasquier, G., Amin, T. G., Branchetti, L. Levin, M. (Eds.) (2021). *Engaging with Contemporary Challenges through Science Education Research: Selected papers from the ESERA 2019 Conference* (1st ed. 2021), ISBN: 978-3-030-74490-8, Springer, pp.329.
 - Levrini, O., Tasquier, G., eBook Proceedings of the ESERA 2019 Conference (ISBN 978-88-945874-0-1).
 - Amin, T. G. & Levrini O. (Eds) (2018). *Converging Perspectives on Conceptual Change. Mapping an Emerging Paradigm in the Learning Sciences*, London and New York: Routledge, pp.351.
 - Guidoni P., Levrini O. (eds.) (2008). *Approcci e proposte per l'insegnamento-apprendimento della fisica a livello preuniversitario, dal progetto PRIN F 21 (Approaches and proposals for the teaching and learning of physics at pre-university level, from the Italian project F 21)*, Forum Editrice, Udine
- Other research activities, assignments and/or acknowledgments
 - EU project reviewers within the Green Deal programme (projects reviewer for ECF4CLIM and GREENSCENT) (2023)
 - Member of the Executive Board of ESERA (European Science Education Research Association), since 2017 to 2019, as Conference President of the 2019 conference.
 - Assignment of the MIUR (Ministry of Instruction, University and Research) for the elaboration of a reference framework for the second written test of physics of the Scientific High Schools from 23-10-2015 to 15-12-2015.
 - Member of the Scientific Council of the Foundation of the Cassa di Risparmio di Pistoia and Pescia, since February 2018.
 - Member of examining commissions for RTDa (researcher) positions (University of Padua, 2020; University of Trento, 2022).
 - Reviewer for Journal of the Learning Sciences, Science Education, Science & Education, International Journal of Science and Mathematics Education, Progress in Science Education.
 - Referee for the conferences GIREP, ESERA, NARST, ICLS, EARLI-SIG on Conceptual Change.
- AWARDS AND HONORS
 - Honorary Research Fellow of the University of Oxford, UK (since May 2025)
 - Award for Physics Education and History Physics of the Italian Physical Society (2024)
 - Ambassador of the City of Bologna 2018 for the organization of the 2019 ESERA conference.
 - Finalist (short list: 3 people) in the selection for a position for Associate Professor, at the Graduate School of Education, University of California at Berkeley, January 2015.
 - Award for the best talk of Section 6, LXXXV National Conference of the Italian Physical Society (S.I.F.), Pavia, September 20-24, 1999.
 - Grant of the University of Bologna (Marco Polo Project) for spending a period of three months as visiting scholar at the Graduate School of Education, University of California at Berkeley (June-September 2005), within the research group led by Prof. A. A. diSessa.
 - Grant of the University of Bologna ("Young Researchers Project") for developing the

project “Proposals of conceptual paths for an innovative teaching of the key-ideas of contemporary physics”, 1999-2000.

- **Research grants and projects coordination and participation**

- Coordination of European projects

Principal Investigator (coordinator)

- **FEDORAS Academy:** Future-oriented steam education FOR A Sustainable world. Erasmus+ Teacher Academies (ERASMUS-EDU-2024-PEX-TEACH-ACA, GA 101196137, 01/02/2025-31/01/2028)
- **FEDORA:** Future-oriented Science EDucation to enhance Responsibility and engagement in the society of Acceleration and uncertainty (Horizon 2020, *Science With And For Society*, GA 872841, 1/09/2020-31/8/2023) (www.fedora-project.eu)
- **IDENTITIES:** Integrate Disciplines to Elaborate Novel Teaching approaches to InTerdisciplinarity and Innovate pre-service teacher Education for STEM challenges (ERASMUS +, KA2, 2019-1-IT02-KA203-063184, 01/09/2019 - 31/12/2022) (www.identitiesproject.eu)
- **I SEE:** Inclusive STEM Education to Enhance the capacity to aspire and imagine future careers (ERASMUS +, KA2, 2016-1-IT02-KA201-024373, 01/09/2016 - 31/08/2019) (www.iseeproject.eu)

Local Coordinator

- **CLIMADEMY:** CLIMAtE Change Teacher AcaDEMT (ERASMUS-EDU-2021-PEX-TEACH-ACA, Project ID: 101056066, 01/06/2022-31/05/2025 - Coordinator: Maria Kanakidou, University of Crete)
- **SEAS:** Science Education for Action and Sustainability (Horizon 2020, SwafS-01-2018-2019-2020, Project No. 824522, 01/09/2019 – 31/08/2022 - Coordinator: Erik Knain, University of Oslo) (www.seas.uio.no)
- **RAISE:** Raw mATerials Students intErnship. A Wider Society Learning activity of the EIT RawMaterials BP2019 (2019-2021), coordinator: Paolo Dambruoso, CNR-Bologna).
- **HOPE-Network:** Horizons in Physics Education (EU-LLP, 2013-3710_540130-LLP-1-2013-1-FR-ERASMUS-ENW, October 2013 – September 2016). Coordinator: Nadine Witkowski, Université Pierre et Marie Curie – UPMC, Paris, France. My role: Contact person of UNIBO and coordinator of the discussion group WG1-B (<http://www.hope-network.eu/>).

- Local coordination in national projects

- **PIANO LAUREE SCIENTIFICHE** (National project aimed to improve the links between schools and scientific departments). My Role Local responsible for the Physics Area since 2016

- Participation in European projects

- **STAGE:** Scientists and Public Engagement (ERASMUS, AGREEMENT NUMBER - 2021-2-NL01-KA220-HED-000048944, 01/06/2022-30/04/2024 - Coordinator: Lucy Avraamidou,

University of Groningen)

- **IRRESISTIBLE** - Including Responsible Research and Innovation in Cutting-Edge Science and Inquiry-Based Science Education to Improve Teacher's Ability of Bridging Learning Environments (EU-LLP, GA number 612367, 1/11/2013 – 31/10/2016). Project Coordinator: Jan Apotheker, University of Groningen, Netherlands. My role: member of the UNIBO team, which is partner of the Project and WP6 coordinator (<http://www.irresistible-project.eu/>).
- **STENCIL** - Science Teaching European Network for Creativity and Innovation in Learning (EU-LLP, January 2011 - December 2013). Project Coordinator: Amitié s.r.l. My role: contact person for the Department of Physics Astronomy (Associate partner) and co-author of Guidelines and Manifesto (deliverables WP7) (<http://www.stencil-science.eu>).
- **TRACES** - Transformative Research Activities. Cultural diversities and Education in Science (EU-7FP, Project no. 244898, July 2010 – June 2012). Project Coordinator: Emilio Balzano, Department of Physics, University of Naples "Federico II". My role: member of the Naples team (<http://www.traces-project.eu/>).

○ Participation in international research groups

- Participation in the activities of the "KiP (Knowledge in Pieces) Community", including the participation in three workshops (San Diego 2009; Chicago 2010; Toronto 2019) (<https://sites.google.com/site/kipcommunity/Home>).
- Invited participation in the *Study Group "Modeling Conceptual Knowledge and Conceptual Change"* del Hanse-Wissenschaftskolleg (HWK) (Istitute of Advanced Studies). Conveners: Tamer Amin, Department of Education, American University of Beirut; Benedek Lang, Department of Philosophy and History of Science, Budapest University of Technology and Economics; Clayton Lewis, Department of Computer Science & Institute of Cognitive Science, University of Colorado, Boulder. 2 meetings (6-7 february 2018 e 28-20 november 2018) Delmenhorst, Germany
- Member of international research associations: GIREP (International Research Group on Physics Teaching, <https://www.girep.org/>), AERA (American Educational Research Association, <https://www.aera.net/>), EARLI (European Association for Research on Learning and Instruction, <https://www.earli.org/>), NARST (A global organization for improving science education through research, <https://narst.org/>), ESERA (European Science Education Research Association, <https://www.esera.org/>).

○ Participation in national research groups

- F21 - Percorsi di Formazione in Fisica per il 21° Secolo (Paths of physics education for 21st Century) — PRIN 2004-2007). Project Coordinator: Paolo Guidoni, Department of Physics, University of Naples "Federico II". My role: member of the Bologna Unit and co-editor of the final book of the project: "Guidoni P., Levrini O. (eds.) (2008). Approcci e proposte per l'insegnamento-apprendimento della fisica a livello preuniversitario, dal progetto PRIN F 21, Forum Editrice, Udine."

● Research activity and production

The research has concerned and mainly concerns the following research topics:

- Role of the history and epistemology of physics in teaching/learning;

- Education reconstruction of topics of modern and contemporary physics (relativity, thermodynamics, quantum physics);
- Learning models and models of conceptual change;
- Epistemic identity and appropriation;
- Models for pre-service and in-service teacher education;
- Methods of qualitative analysis of classroom data;
- Analysis of complex learning environments and orchestration dynamics;
- Design of materials on STEM topics (climate change, quantum computers, simulations of complex systems, artificial intelligence, etc.);
- Interdisciplinarity in STEM education;
- Scientific citizenship and formation of future-scaffolding skills.

○ Publications

Journal Articles

1. Miani, L., De Zuani Cassina, F. & **Levrini, O.** (2025). Raising Awareness on the Complexity of Decision-making through Climate Change Education. *Res Sci Educ* .
<https://doi.org/10.1007/s11165-025-10266-w>
2. Branchetti, L., & **Levrini, O.** (2025). Critical Encounters with Interdisciplinarity in Mathematics Pre-Service Teacher Education, *Recherche en Didactique des Mathématiques*
3. Satanassi, S., **Levrini, O.** (2025). Second quantum revolution: The progressive design of an approach to value its cultural and conceptual scope, *Phys. Rev. Phys. Educ. Res* 21, 010112. DOI: 10.1103/PhysRevPhysEducRes.21.010112
4. **Levrini, O.**, Erduran, S. & Pietrocola, M. Sustainability as Living Architecture. *Sci & Educ* **33**, 1093–1095 (2024). <https://doi.org/10.1007/s11191-024-00557-5>
5. Levrini, O., Pietrocola, M. & Erduran, S. (2024). Breaking Free from Laplace’s Chains. *Science & Education* 33, 489–494
6. Erduran, S., **Levrini, O.** (2024). The Impact of Artificial Intelligence on Scientific Practices: An Emergent Area of Research for Science Education. *International Journal of Science Education*
7. Barelli, E. Lodi, M., Fantini, P., Branchetti, L., **Levrini, O.** (2024). Epistemic Insights as design principles for a teaching-learning module on Artificial Intelligence. *Science & Education*
8. Zanellati, A., Mitri, D. D., Gabbrielli, M., **Levrini, O.** (2024). Hybrid Models for Knowledge Tracing: a Systematic Literature Review, *IEEE Transactions on Learning Technologies*, doi: 10.1109/TLT.2023.3348690.
9. De Zuani Cassina, F., D'orto, E., Fantini, P., Tasquier, G., & **Levrini, O.** (2023). Enhancing relevance and authenticity in school science: design of two prototypical activities within the FEDORA project. In *Frontiers in Education* (Vol. 8, p. 1085526). Frontiers.
10. Laherto, A., **Levrini, O.**, Erduran, S. (2023). Editorial: Future-oriented science education for agency and sustainable development. *Front. Educ.* 8:1155507. doi: 10.3389/educ.2023.1155507
11. **Levrini, O.**, Fantini, P., Tasquier, G., Branchetti, L. (2023). An epistemological approach to align physics teaching with the society of acceleration and uncertainty. *IL NUOVO CIMENTO* 46 C (2023) 203, DOI 10.1393/ncc/i2023-23203-x
12. Satanassi, S., Branchetti, L., Fantini, P., Casarotto, R., Caramaschi, M., Barelli, E., **Levrini, O.** (2023). Exploring the boundaries in an interdisciplinary context through the Family Resemblance Approach: the dialogue between physics and mathematics. *Science & Education*, <https://doi.org/10.1007/s11191-023-00439-2>.
13. Barelli, E., & Levrini, O. (2022). Computational simulations at the interface of physics and society: a teaching learning module for high school students. *Il Nuovo Cimento C*, 45(6). doi:10.1393/ncc/i2022-22213-6
14. Barelli, E., Tasquier, G., Caramaschi, M., Satanassi, S., Fantini, P., Branchetti, L., **Levrini, O.** (2022). Making sense of youth futures narratives: Recognition of emerging tensions in students’ imagination of the future. *Front. Educ.*, 06 Sept. 2022. Sec. STEM Education. doi.org/10.3389/educ.2022.911052

15. Caramaschi, M., Cullinane, A., **Levrini, O.** & Erduran, S. (2022). Mapping the nature of science in the Italian physics curriculum: from missing links to opportunities for reform, *International Journal of Science Education*, 44:1, 115-135, doi: 10.1080/09500693.2021.2017061
16. Satanassi, S., Ercolessi, E., **Levrini, O.** (2022). Designing and implementing materials on quantum computing for secondary school students: The case of teleportation. *Phys. Rev. Phys. Educ. Res.* 18, 010122 doi:0.1103/PhysRevPhysEducRes.18.010122.
17. Bagaglini, V., Branchetti, L., Gombi, A., **Levrini, O.**, Satanassi, S., & Viale, M. (2021). Il ruolo del testo nell'interdisciplinarietà tra matematica, fisica ed educazione linguistica: il tema del moto parabolico tra testi storici e manuali di fisica per la scuola secondaria di secondo grado. *Italiano a Scuola*, 3(1), 133–184. <https://doi.org/10.6092/issn.2704-8128/13083>
18. Satanassi, S., Fantini, P., Spada, R., **Levrini, O.** (2021). Quantum Computing for high school: an approach to interdisciplinary in STEM for teaching. *J. Phys.: Conf. Ser.* 1929 012053.
19. **Levrini, O.**, Tasquier, G., Barelli, E., Laherto, A., Palmgren, E.K., Branchetti, L., Wilson, C. (2021). Recognition and operationalization of Future-Scaffolding Skills: Results from an empirical study of a teaching-learning module on climate change and futures thinking. *Science Education*, doi: 10.1002/sce.21612
20. **Levrini, O.**, Fantini, P., Barelli, E., Branchetti, L., Satanassi, S., Tasquier, G. (2021). The Present Shock and Time Re-appropriation in the Pandemic Era. *Sci & Educ.* 30, 1–31, doi: 10.1007/s11191-020-00159-x
21. **Levrini, O.**, Levin, M., Fantini, P. (2020). Fostering Appropriation Through Designing for Multiple Access Points to a Multi-Dimensional Understanding of Physics. In B. W. Harrer, E. C. Sayre, L. Atkins Elliott (eds.), Focus Collection on Curriculum Development: Theory into Design. *Phys. Rev. Phys. Educ. Res.* 16, 020154
22. **Levrini, O.**, Tasquier, G., Branchetti, L. & Barelli, E. (2019). Developing future-scaffolding skills through science education, *International Journal of Science Education*, doi: 10.1080/09500693.2019.1693080.
23. Branchetti, L., Cattabriga, A. & **Levrini, O.** (2019). Interplay between mathematics and physics to catch the nature of a scientific breakthrough: The case of the blackbody. *Physical Review - Physics Education Research* 15, 020130.
24. **Levrini, O.**, Levin, M., Fantini, P., & Tasquier, G. (2019). Orchestrating classroom discussions that foster appropriation, *Science Education*, doi: 10.1002/sce.21475.
25. Kapon, S., Laherto, A., **Levrini, O.** (2018). Disciplinary authenticity and personal relevance in school science. *Science Education*, doi: 10.1002/sce.21458
26. Branchetti, L., Cutler, M., Laherto, A., **Levrini, O.** Palmgren, E.K., Tasquier, G., Wilson, C. (2018). The I SEE project: An approach to futurize STEM education. *Visions for Sustainability*, 9: 00-00. doi: 10.13135/2384-8677/2770, ISSN 2384-8677.
27. Barelli, E., Branchetti, L., Tasquier, G., Albertazzi, L., **Levrini, O.** (2018). Science of Complex Systems and Citizenship Skills: A Pilot Study with Adult Citizens. *EURASIA J Math Sci and Tech Ed*, 14(4), 1533-1545, doi: 10.29333/ejmste/84841.
28. **Levrini, O.**, De Ambrosis, A., Hemmer, S., Laherto, A., Malgieri, M., Pantano, O. & Tasquier, G. (2017). Understanding first-year students' curiosity and interest about physics—lessons learned from the HOPE project, *European Journal of Physics*, 38, 025701, doi:10.1088/1361-6404/38/2/025701
29. Tasquier, G., **Levrini, O.**, & Dillon, J. (2016). Exploring Students' Epistemological Knowledge of Models and Modelling in Science: Results From a Teaching/Learning Experience on Climate Change, *International Journal of Science Education* doi:10.1080/09500693.2016.1148828.
30. Bertozzi, E., **Levrini, O.** (2015). Recasting particle physics by entangling physics, history and philosophy. *Il Nuovo Cimento*, 38 C, 88, doi: 10.1393/ncc/i2015-15088-y
31. **Levrini O.**, Fantini P., Pecori B., Tasquier G., Levin, M. (2015). Defining and Operationalizing 'Appropriation' for Science Learning, *Journal of the Learning Sciences*, 24(1), 93-136, doi: 10.1080/10508406.2014.928215
32. Bertozzi, E., **Levrini, O.** (2014). Symmetry as conceptual core of the standard model of physics: Actions for science education, *Symmetry: Culture and Science*, 25(3), 279-287.

33. Bertozzi E., **Levrini O.**, Rodriguez M. (2014). Symmetry as core-idea for introducing secondary school students to contemporary particle physics, *Procedia - Social and Behavioral Sciences*, 116, 679-685.
34. **Levrini, O.** (2014). Results in physics education research as lenses for analyzing textbooks, recognizing critical details and fostering thinking. The case of teaching/learning special relativity, (Spanish Version: Resultados de la investigación en educación en física como lentes para analizar libros de texto, reconocer detalles críticos y promover el pensamiento. El caso especial de la enseñanza y el aprendizaje de la relatividad especial), *Revista de Enseñanza de la Física*. 26(1), Dic.2014, 7-21 (www.revistas.unc.edu.ar/index.php/revistaEF/)
35. **Levrini O.**, Bertozzi E., Gagliardi M., Grimellini-Tomasini N., Pecori B., Tasquier G., Galili I. (2014). Meeting the discipline-culture framework of physics knowledge: a teaching experience in Italian secondary school, *Science & Education*, 23, 1701–1731, doi: 10.1007/s11191-014-9692-z.
36. **Levrini O.**, Fantini P., Pecori B., Tasquier G. (2014). Forms of productive complexity as criteria for educational reconstruction: the design of a teaching proposal on thermodynamics, *Procedia - Social and Behavioral Sciences*, 116, 1483-1490.
37. Tasquier G., Pongiglione F., **Levrini O.** (2014). Climate change: an educational proposal integrating the physical and social sciences, *Procedia - Social and Behavioral Sciences*, 116, 820-825.
38. Bertozzi E., Ercolessi E., **Levrini O.** (2013). Words and Formulas in Quantum Field Theory: Disentangling and Reassembling The Basic Concepts for Teaching. *Physics Essays*, 26(3), 371-379.
39. **Levrini O.**, Fantini P. (2013). Encountering Productive Forms of Complexity in Learning Modern Physics. *Science & Education*, 22 (8), 1895–1910, doi:10.1007/s11191-013-9587-4
40. De Ambrosis A., **Levrini O.** (2010), How physics teachers approach innovation: An empirical study for reconstructing the appropriation path in the case of special relativity, *Physical Review Special Topics - Physics Education Research*, doi: 10.1103/PhysRevSTPER.6.020107.
41. **Levrini O.**, diSessa A.A. (2008). How Students Learn from Multiple Contexts and Definitions: Proper Time as a Coordination Class. *Physical Review Special Topics - Physics Education Research* 4, 010107.
42. De Ambrosis A., **Levrini O.** (2007). Insegnare relatività ristretta a scuola: esigenze degli insegnanti e proposte innovative (*teaching special relativity in school: teachers' needs and innovative proposals*). *Giornale di Fisica*, Vol. XLVIII, N. 4, 255-276.
43. Fantini P., Grimellini Tomasini N., **Levrini O.**, Scorza F. (2005). L'Elettrodinamica dei corpi in movimento in classe: studenti di Liceo a confronto con fisica, epistemologia e storia del pensiero scientifico (*"On the Electrodynamics of moving bodies" in class: Lyceum students confronting with physics, epistemology and history of scientific thought*). *La Fisica nella Scuola*, XXXVIII, 1, 118-136.
44. Grimellini Tomasini N., **Levrini O.** (2005). L'Elettrodinamica dei corpi in movimento e i libri di testo: riflessioni sul significato culturale della relatività ristretta (*"On the Electrodynamics of moving bodies" and textbooks: reflections on the cultural meaning of Special Relativity*). *La Fisica nella Scuola*, XXXVIII, 1, 108-117.
45. **Levrini O.** (2004). Osservazione e formalizzazione: Il ruolo dei problemi reali per entrare nel gioco della conoscenza in fisica (*Observation and formalization: the role of real-world problems for entering the game of physics content knowledge*). *La Fisica nella Scuola*, XXXVII, 3 suppl., 61-70.
46. Grimellini Tomasini N., **Levrini O.** (2002). Quale fisica per la formazione iniziale degli insegnanti della scuola secondaria (*What physics for pre-service secondary school teachers*). *Rassegna*, 19, X, Dicembre 2002, 74-82.
47. **Levrini O.** (2002). The substantialist view of spacetime proposed by Minkowski and its educational implications. *Science & Education*, 11(6), 601-617.
48. **Levrini O.** (2002). Reconstructing the basic-concepts of General Relativity from an educational and cultural point of view. *Science & Education*, 11(3), 263-278.
49. Grimellini Tomasini N., **Levrini O.**, Casadio C., Clementi M., Medri Senni S. (1999). Insegnare fisica per nuclei fondanti: un esempio riferito al concetto di spazio (*Teaching physics through core ideas: an example referred to the concept of space*). *La Fisica nella Scuola*, XXXII, 4, 202-213.
50. **Levrini O.** (1999). Relatività ristretta e concezioni di spazio (*Special relativity and conceptions of space*). *Giornale di fisica*, XL, 4, 205-220.

51. Grimellini Tomasini N., **Levrini O.**, Casadio C. (1998). Un estudio sobre el papel de las actividades de laboratorio en los procesos de aprendizaje de la física. In E. Banet, A. de Pro (eds.), *Investigacion e Innovacion en la Enseñanza de las Ciencias*, Vol. II, 131-139.
52. **Levrini O.** (1997). La formula come sintesi di idee, di significati e di fatti di esperienza (*Formula as synthesis of ideas, meanings and facts from experience*). *La Didattica* (Ed. Laterza), 3, III, 66-71.
53. **Levrini O.** (1996). Un problema "reale" per capire la fisica (*A "real-world" problem to understand physics*). *La Fisica nella Scuola*, XXIX, 2, 59-63.

Books and book chapters

1. Caramaschi, M., Zanellati, A., & **Levrini, O.** (2025). Comparing Textual Data Analysis Methods in Science Education Research. In *Connecting Science Education with Cultural Heritage* (pp. 67-82). Springer, Cham.
2. Laherto, A., Rasa, T., Miani, L., **Levrini, O.**, Erduran, S. (2023). Future-Oriented Science Education Building Sustainability Competences: An Approach to the European GreenComp Framework. In: Fazio, X. (eds) *Science Curriculum for the Anthropocene*, Volume 2. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-37391-6_5
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 10. **Levrini, O.** (2015). How Can the Learning of Physics Support the Construction of Students' Personal Identities? (General talk paper). In C. Fazio & R.M. Sperandeo (Eds.), *Teaching/Learning Physics: Integrating Research into Practice*, Proceedings of the GIREP-MPTL 2014 International Conference. Università degli Studi di Palermo, pp. 19-28. ISBN: 978-88-907460-7-9
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31. **Levrini O.** (1999). Teaching modern physics on the basis of a content knowledge reconstruction, in Komorek et al (eds), *Research in Science Education: Past, Present, and Future, Proceedings Second International Conference of the European Science Education Research Association E.S.E.R.A.*, Kiel (Germania), 247-249.
32. Grimellini Tomasini N., **Levrini O.** (1997). Uno studio sul ruolo dei problemi aperti e reali nella costruzione di conoscenza fisica: il "botafumeiro" di Santiago di Compostela (*A study on the role of open-ended and real world problems in the construction of physics knowledge: The "botafumeiro" of Santiago de Compostela*). In Investigación e Innovación en la Didáctica de las Ciencias, *Proceedings V Congreso Internacional sobre investigación en la didáctica de las ciencias*, Murcia (Spagna), 341-342.
33. **Levrini O.** (1997). The Role of Formalization in Scientific Knowledge Construction. In R. Pintò (ed.), *Ph.D Summerschool 3rd European "Theory and Methodology of Research in Science Education"*, European Science Education Research Association (E.S.E.R.A.), Universitat Autònoma de Barcelona, 285-288.

○ Participation as invited speaker at international conferences:

1. Invited contribution to the ESERA sponsored symposium in NARST 2024 "Re-imagining Science Education in Post-Pandemic Worlds & Uncertain Futures", organized by G. Tasquier, L. Avraamidou, Denver (Colorado), March 17th, 2024
2. Invited contribution to the Panel "Post pandemic context and the role of science education", ESERA 2023 conference, August 28- September 2, 2023 Cappadocia, Turkey.
3. Plenary lecture at XV Conferência Internacional de Ensino de Física (XV CIAEF) III Encontro Nacional do Mestrado Nacional Profissional em Ensino de Física (III EnMNPEF) Universidade de Brasília, Brasil. Title of the talk: *Formação em Física para a incerteza* (17 a 21 de julho de 2023)
4. Opening plenary lecture at the 12th ARDIST scientific meeting, November 15-18, 2022, Toulouse, France. Title of the talk: *Regenerating disciplinary content knowledge to equip the young for the 21st Century challenges* (November 15, 2022)
5. Opening plenary lecture at EARLI SIG 5 - Conceptual change, Zwolle (The Netherlands), August 24-27th, 2022. Title of the talk: *Unpacking change for teacher education in the era of uncertainty and acceleration* (August 24, 2022)
6. Invited lecture at the 2022 ECSITE conference, Heilbronn, June 2-4, 2022. Title of the talk: *Reimagining educational systems for the 21st century* (June 2, 2022)
7. Invited talk at the symposium "Science Education during the COVID-19 Pandemic" (NARST 2022 conference, Vancouver, March 27- 30, 2022. Title of the talk: *Unpacking science education rituals in the pandemic era: insights from the sociology of time*
8. Invited talk at the ESERA-sponsored symposium "Crossing Boundaries: Examining and Problematising Interdisciplinarity in Science Education", at NARST 2021 (online), April 7, 2021 - April 10, 2021 (Chairs: Erduran, Martin). Title of the talk: *Disciplines and*

interdisciplinarity in stem education to foster scientific authenticity and develop epistemic skills (authors: Laura Branchetti and Olivia Levrini)

9. Invited talk at the Research seminar: Co-visioning Future-oriented Science Education, University of Oslo, Oslo, Norway, December 10, 2021. Title of the talk: *Future-oriented Science Education and open schooling in the society of acceleration and uncertainty*
 10. Invited seminar at the Homi Bhabha Centre for Science Education, Mumbai, India, April 1, 2021. Title of the lecture: *Students' perception of time (future and present) in the society of acceleration and uncertainty*
 11. Plenary lecture at the 15^o Simposio de Investigación en Educación en Física, Cordoba, Argentina (conference turned to be completely online for the Covid-19 crisis), October 5-9, 2020. Title of the lecture: *Re-thinking physics education for the society of acceleration and uncertainty*
 12. Plenary lecture at the conference epiSTEME 8: Eighth International Conference to Review Research in Science, Technology, and Mathematics Education. Homi Bhabha Centre for Science Education, Mumbai, India, January 3 – 6, 2020. Title of the lecture: *Perspectives on conceptual change and its nexus with identity*
 13. Invited speaker at the HOPE Constanța Forum: Round Table 2, SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis of Higher Education in Physics within a European context in the light of the activities and results of HOPE. Constanta, Romania, 10 September 2016
 14. Invited lecture at the Graduate School of Education, University of California at Berkeley, as a finalist of the selection procedure for a position as Associate Professor, January 29, 2015.
 15. Plenary lecture at the GIREP-MPTL International Conference on Teaching/Learning Physics: Integrating Research into Practice, July 7-12, 2014, Palermo, Italy. Title of the lecture: *How Can the Learning of Physics Support the Construction of Students' Personal Identities?*
 16. Plenary lecture at the conference: "Foundations and Frontiers of Physics Education Research", June 15-19, 2009, Bar Harbor, Maine, USA (organized by P. Heron, R. Sherr, M. Wittman). Title of the lecture: *Learning environments as properly complex territories: examples on teaching/learning modern physics at the secondary school level*
 17. Invited participation in the Round Table at the International School of Physics "Enrico Fermi", Course CLVI, "Research on Physics Education", 25 July 2003.
 18. Invited seminars at the Institut für Didaktik der Physik, Universität Bremen (Germany): "Thinking Physics for Teaching: 'Educational Reconstruction' of Spacetime Physics" (February, 2001); "The 'scientific debate' as a teaching tool for understanding Physics: The case of the concept of time in Special Relativity" (the seminar was organized as an activity of "Kolloquium zur Didaktik der Naturwissenschaften", WiSe 2002/2003, Insitut für Didaktik der Physik, Universität Bremen, Jenuary, 2003).
- Participation as invited speaker at national conferences:
1. Levrini O. (2023). L'insegnamento della fisica e educazione al futuro. Relazione su invito al LXI Congresso Nazionale della Associazione per l'Insegnamento della Fisica (AIF), Catania, 18-21 ottobre, 2023 (*forthcoming*)
 2. Levrini O. (2023). Insegnare fisica nella «società dell'accelerazione e dell'incertezza». Relazione su invito per il convegno sui 50 anni dell'Associazione per l'Insegnamento della Fisica (AIF) a Mantova, 6 maggio, 2023 (*forthcoming*).
 3. Levrini O. (2022). Intervento su invito alla tavola rotonda su "Tecnologia Quantistica: una nuova rivoluzione?", a NEXT Trieste, 24 settembre, 2022.

4. Levrini O. (2019). Einstein, la centralità della velocità della luce. Relazione su invito alla Scuola di Storia della Fisica dell'Associazione per l'Insegnamento della Fisica (AIF), Ferrara, 26.2.2019
5. Levrini O. (2019). Studiare le scienze oggi a scuola, nella società dell'accelerazione e dell'incertezza. Relazione su invito al Workshop "L'alfabeto della natura. Chimica per la formazione primaria", Università degli Studi Roma Tre, 15-16 Novembre 2019
6. Levrini O. (2019). Le discipline (scientifiche) nell'epoca della frammentazione della conoscenza. Terzo Seminario Nazionale sui Licei Matematici, 18-20 Settembre 2019 Università di Salerno (Fisciano).
7. Levrini O. (2018). Parole, cose e strutture matematiche: la relatività per educare a immaginare e costruire mondi. Relazione su invito al 57° Congresso Nazionale della Associazione per l'Insegnamento della Fisica (AIF), Giardini Naxos, 24-27 ottobre 2018.
8. Levrini O. (2018). La Didattica della fisica nella "società dell'accelerazione". Contributo alla Tavola Rotonda "Didattica delle materie scientifica" (Coordina R. Tortora), XXXV Congresso UMI-CIIM, Cagliari, 4-6 ottobre, 2018.
9. Levrini O. (2017). Suggestimenti di didattica della Relatività Ristretta; Suggestimenti di didattica della Meccanica Quantistica, Due relazioni su invito alla Scuola di Storia della Fisica dell'Associazione per l'Insegnamento della Fisica (AIF), Relatività e fisica quantistica: un matrimonio lungo un secolo, CAGLIARI, 20-24 febbraio 2017
10. Levrini, O., Branchetti, L., Cattabriga, A. (2017). L'interdisciplinarietà tra fisica e matematica nella formazione degli insegnanti, Relazione su Invito alla Tavola Rotonda Formazione Iniziale degli insegnanti, 103° Congresso Nazionale della Società Italiana di Fisica, Trento, 14.9.2017.
11. Levrini O. (2016). L'insegnamento/apprendimento della fisica nella "società dell'accelerazione". CCII Congresso Nazionale della Società Italiana di Fisica, Padova, Settembre 26 - 30, 2016.
12. Balzano E., De Ambrosis A., Levrini O., Michelini M., Oss S., Sperandio RM (2012). Formazione degli insegnanti in fisica: stato dell'arte, indicazioni europee, aspetti d'innovazione, problemi aperti e linee di ricerca future. Tavola Rotonda, XCVIII Congresso Nazionale della Società Italiana di Fisica, Napoli, Settembre 17 - 21, 2012
13. Levrini O. (2011). La fisica moderna e il suo valore culturale: problemi e sfide per la ricerca in didattica della fisica. Relazione su Invito al XCVII Congresso Nazionale della Società Italiana di Fisica, L'Aquila, Settembre 26 - 30, 2011.
14. Levrini O. (2010). Ambienti di apprendimento come "territori propriamente complessi": esempi sull'insegnamento/apprendimento della fisica moderna Relazione su Invito al XCVI Congresso Nazionale della Società Italiana di Fisica, Bologna, Settembre 20 - 24, 2010.
15. Lulli G., Levrini O., Bisi F., Desalvo A., Bergia S., Gagliardi M. (2009). L'esperimento più bello della fisica on-line - Relazione su Invito al XCV Congresso Nazionale della Società Italiana di Fisica, Bari, Settembre 28 - Ottobre 3, 2009.
16. Besson U., Giordano E., Guidoni P., Levrini O., Michelini M., Pilo M., Rinaudo G., Sperandio R.M., Tarsitani C. (2008). La Ricerca in Didattica della Fisica in Italia. Tavola Rotonda (moderatore Riccardo Govoni), XLVII Congresso Nazionale dell'Associazione per l'Insegnamento della Fisica (AIF), Roma, 22-25.10.2008.
17. Levrini O. (2003). L'"Elettrodinamica dei corpi in movimento" in classe: studenti di Liceo a confronto con fisica, epistemologia e storia del pensiero scientifico. Relazione su Invito al LXXXIX Congresso Nazionale della Società Italiana di Fisica, Parma, Settembre 17-22 2003.

18. Levrini O., (2002). Osservazione e formalizzazione: Il ruolo dei problemi reali per entrare nel gioco della conoscenza in fisica Relazione su Invito al XLI Congresso Nazionale dell'Associazione per l'Insegnamento della Fisica (AIF), Casarano (Lecce), Ottobre 23-26, 2002.

○ Participation as a speaker in congresses and conferences of international interest:

over 50 participations as speaker or co-speaker at international summer schools, conferences or congresses including ESERA, GIREP, AERA, NARST, EARLI, EARLI-SIG3, EARLI-SIG16, ICLS, HPS-ST, ICPE, EpiSTEME, ECSITE, ASE, FFPER, ESU, ARDIST. 33 communications are subject to publication in International Congress Proceedings with referee (see specific item in the scientific production).

• Professional service for the University

- Member of the University Observatory for teaching assessment ("Osservatorio per la Valutazione della Didattica di Ateneo"), 2018-2023 (July)
- Member of the Center for teaching Innovation, UNIBO (Centro di Ateneo per l'Innovazione didattica") (2020-2023);
- Member, as the representative of the assistant professors, of the elective Department Council ("Giunta") of the Department of Physics and Astronomy, University of Bologna (from 2012 to 2014 - September)
- Member of the Science School Council, University of Bologna (from 2012 to 2014 - September).
- Representative of the Scientific Area in the University Steering Committee for the secondary school teacher education programme (D.R. n. 399/2017 del 09/11/2017, Prot. n.138420).
- Member of the University Steering Committee for in-service teacher education programme (D.R. n.338/2017 del 23/03/2017, Prot. n. 33163).
- Responsible for the Department activities of the programme "Alternanza scuola-lavoro" (<http://www.fisica-astronomia.unibo.it/it/iniziative-di-terza-missione/alternanza-scuola-lavoro>).
- Member of "Commissione Terza Missione"(dissemination board) of the Department of Physics and Astronomy "A. Righi", since 2019.
- Member of the "Equity and inclusion" Working Group of the Department of Physics and Astronomy "A. Righi", from 2021.
- Referent for the Curriculum in Teaching and History of Physics, in the Master's Degree Course in Physics, UNIBO (active from the 2018-2019 academic year).
- Member of the Doctoral Board in Data Science and Computation, University of Bologna (since 2020).
- Member of the Board of Responsible of the University Museum Service (SMA) as Scientific Responsible of the Physics Museum, University Museum System, UNIBO from 2017 to 2019.
- Member elected as researcher representative of the Department Board, from July 2012 to September 2014.
- Member of the Council of the School of Sciences, University of Bologna, from September 2012 to September 2014.

• Teaching

○ Bachelor and Master level

- 2001 – 2009 *Physics Education* at the Post-graduate school for secondary school teaching (SSIS) (pre-service teacher education) at University of Bologna and at the Free University of Bolzano.
- 2004 – present *Physics Education - Advanced topics, Second level graduation (masters course)* in Physics at the University of Bologna.
- 2005 – 2017 *Module of Relativity*, in collaboration with A. De Ambrosis (University of Pavia), within the University MASTER IDIFO (Directed by M. Michelini). 2011 – 2019 *History of Physics*, Second level graduation (masters course) in Physics at the University of Bologna.
- 2012 – present *Physics Education and History of Physics*, “Tirocinio Formativo Attivo” (TFA) and “Percorsi Abilitanti Speciali (PAS), post-graduate schools for secondary school teaching (pre-service teacher education) at the University of Bologna. History of Physics,
- 2014 – present *Course Physics Teaching: theoretical and experimental aspects*, First cycle degree/Bachelor in Physics at the University of Bologna.
- 2022-2023 *Module in the course Introduction to quantum science and technology*, First cycle degree/Bachelor in Physics at the University of Bologna.

○ Supervision activity

- Supervision of more than 15 bachelor's degree theses in Physics
- Supervision of more than 25 master's degree theses in Physics
- Supervision of 9 PhD theses of which:
 - 4 PhD theses in Physics, University of Bologna, completed (Bertozzi E. 2010, Vernazza N. 2019, Ravaioli G. 2020, Satanassi S. 2023);
 - 3 PhD theses in Physics, University of Bologna, in progress (De Zuani Cassina F., Miani L., D'Orto E.);
 - 1 PhD thesis in Data Science and Computation, University of Bologna, completed (Barelli E. 2022);
 - 1 PhD thesis in Data Science and Computation, University of Bologna, in progress (Caramaschi M.).
 - Co-supervision of 2 PhD theses of which:
 - 1 PhD thesis in Anthropology and Epistemology of Complexity. University of Bergamo (Fantini P., 2014);
 - 1 PhD thesis in Didactics, History and Epistemology of Chemistry, Physics and Mathematics, University of Palermo (Tasquier G. 2015),
- Supervisor of over 60 specialization theses at the School of Specialization in Secondary Education (SSIS), or Active Training Internship (TFA) of the University of Bologna.
- Member of the organizing committee of the 4 Summer Schools “Physical sensing and processing”, organized annually by the Department of Physics and Astronomy “A. Righi”, starting from 2019 (OPH summer school from 2020); speaker in the 2022 edition and coordinator or co-coordinator of the "cooperative work" activities in the 2019-2020-2022 editions.
- Responsible and teacher of the Winter school of the IDENTITIES project for students of UNIBO Master's Degree Courses on "Quantum technologies: a new challenge for teaching" (February 10-11-12 and February 17-18-19, 2021).

○ In-Service Teacher Education

- 2000 – present Over 20 seminars of cycles of seminars for in-service teacher education about the teaching of modern physics (relativity and quantum physics);
- 2005 – 2012 Design and realization of the *Module of Relativity*, in collaboration with A. De Ambrosis (University of Pavia), within the on-line University MASTER IDIFO (Didactical Innovation in Physics Education and Orienteering) for in-service teacher education (Directed by M. Michelini, Department of Physics, University of Udine);
- 2013 – 2014 Design and realization of 4 courses for teachers about quantum physics, within the Italian Project “Piano Lauree Scientifiche” (15 hours each);
- 2014 – present Two modules about “Mathematical modeling in physics and in physics education” within a MASTER for expert teachers in “The profession of trainer in Math Education” (Directed by G. Bolondi, Department of Mathematics, University of Bologna (15 hours each).
- 2017-2018 Director of the Professional Development Course (CFP) in “Tools and methods for analysing scientific texts: implications for physics teaching” (Strumenti e metodi di analisi del testo scientifico: implicazioni per l’insegnamento della fisica) (4 CFU).

○ Faculty development

- 2020 - Lab for teaching innovation in online teaching - Area of Science (with A. Cattabriga, B. Bacci, S. Moruzzi), University of Bologna
- 2021 - Lab on "Teaching tools to analyze student engagement in 'service' teaching in the STEM field" (with A. Cattabriga) (6 hours, Italian language), “Strumenti di didattica disciplinare per analizzare il coinvolgimento degli studenti in insegnamenti di servizio in ambito STEM” (con A. Cattabriga) (6 ore, lingua italiana), Università di Bologna

● Dissemination, Communication and Outreach

- Member of the scientific committee and speaker in the two editions 2021 and 2022 of the Summer School "Officina di Narrazione della Scienza" (ONSCI) of the Department of Physics and Astronomy "A. Righi" in Bologna.
- Responsible for the physics area of the Scientific Graduation Plan (PLS) of Bologna and member of the PLS committee which, every year, organizes a conference in October for upper secondary school classes (about 400 students per year) and the review "Science at the cinema".
- Coordinator of PLS Workshops for students. At least 6 workshops are held every year for about 250 students.
- More than 40 seminars in in-service teacher training contexts on modern physics teaching (relativity, quantum physics) or on the role of physics teaching in the society of acceleration and uncertainty.
- Over 20 public conferences aimed at disseminating scientific culture.
- Responsible and coordinator of the design and set-up of a stand for the Researchers' Night on the European projects I SEE and FEDORA, respectively in the 2017 and 2022 editions.

- Construction, in collaboration with the IMM-CNR of Bologna, of the website dedicated to the dissemination of the experiment on the interference of single electrons (<http://l-perimento-piu-bello-della-fisica.bo.imm.cnr.it/index.html>). The site was officially presented on 11.28.2009 with an event organized by the Physics Department of the University of Bologna, the CNR-IMM Institute of Bologna and Unibo Cultura -more-beautiful.html).
- Realization of an original documentary: Gonzalez D.L., Levrini O., Lulli G., Zanasi D. (2011). Electron interference: The most beautiful experiment (DVD), selected by the "Vedere la Scienza" Science Film Festival in Milan in the 2012 edition (<http://l-perimento-piu-bello-della-fisica.bo.imm.cnr.it/promodvd.html>).
- Participation as organizing member of the exhibition Percorsi di ricerca. Physics crosses Bologna (Bologna, Museo Civico Archeologico, 7 October – 13 November, 2005).
- Contribution to the planning and realization of the exhibits of the Exhibition concerning the section on Research in Physics Education (in particular, the video "Einstein's clocks").

Bologna, June 11th, 2025

