Paola Lecca

Curriculum Vitae

Last update on May 4, 2026

Personal information

First name	Paola
Last name	Lecca
Work addsress	Faculty of Engineering, Free University of Bozen-Bolzano, NOI Techpark - via A. Volta 13/A, 39100 Bolzano, Italy
Work e-mail address	Paola.Lecca@unibz.it
Work phone number	+39 0471 016162
Google Scholar	`https://scholar.google.com/citations?user=MH6tZcUAAAAJ&hl=en`
Scopus	`https://www.scopus.com/authid/detail.uri?authorId=55929331600`
Web of Science	`https://www.webofscience.com/wos/author/record/AAJ-2457-2021`
ORCID	`https://orcid.org/0000-0002-7224-136X`

Education since leaving school

12/2006 **PhD In Computer Science and Telecommunications, IECS (former ICT) Doctoral School, University of Trento, Italy**

Thesis: Modelling and simulating system biology with stochasticity (Advisor: Prof. C. Priami, currently at the Department of Computer Science of University of Pisa, Italy and The Microsoft Research - University of Trento, Centre for Computational and Systems Biology (COSBI), Italy.)

06/1997 **M. Sc. Theoretical Physics, Italy**

Thesis: Thermodynamical properties of black holes Contribution of the electromagnetic field to the entropy of a Schwarzschild black hole. (Supervisor Dr. G. Cognola – University of Trento, Italy)

Habilitation

Abilitazione Scientifica Nazionale **Fisica Applicata, Didattica e Storia della Fisica**

02/D1 - FIS/07: Fisica applicata (a beni culturali, ambientali, biologia e medicina)
Valid from 10/07/2020 to 10/07/2032.

Languages

Italian	Mother tongue
English	C1 level of the CEFR, in oral, and written production and in reading and listening. Open badge from University of Bozen-Bolzano available at `https://bestr.it/verify/0NQNTQ5KZK`
German	B1 level of the CEFR, in oral, and written production and in reading and listening. Open badge from University of Bozen-Bolzano available at `https://bestr.it/verify/1HCEOA2GA0`
Spanish	A2 on test of Sprachtest.de of Provinz Bozen

Present appointment

From July 2019 to present

Assistant Professor at the Faculty of Engineering of the Free University of Bozen-Bolzano, Italy

I conduct theoretical and applied research on graph theory, modelling and analysis of dynamic networks, control theory and causal inference. My studies lie at the intersection of three disciplines:

1. statistics (traditional and high-dimensional inferential statistics)
2. computer science (graph theory, physics-informed and graph neural networks)
3. applied physics (applications of theoretical physics principles to solve engineering, industrial, environmental, biological and medical problems),

and find application in areas such as systems biology, medicine, biochemistry, pharmacology, population dynamics in ecology and climate physics. I develop theories and mathematical models to infer from experimental data and then to describe the static and dynamic properties of systems that are complex in terms of size, non-linearity, and stiffness.

The inference techniques I develop often require the use of high-dimensional statistical tools recommended in the cases where the number of variables is comparable to, or even larger than, the number of observations. This often occurs in modern fields like genomics, medicine and environmental sciences.

I also develop algorithms to simulate the evolution of stiff and non-linear systems over time and their reactions to perturbations from the external environment or induced by the observer. Much of my research on simulation methodologies recently focuses on differential-equation based models solution and Physics-Informed Artificial Neural Networks.

In parallel with pure and applied research activities, from 2019 to 2025, I carried out technology transfer activities at the Smart Data Factory (SDF) laboratory of the Faculty of Engineering, University of Bozen/Bolzano. I worked to promote technology transfer of the research products of the Faculty to the industrial world in the regional and national territory. As SDF member I have been also engaged in teaching courses for companies and promoting the activities of the Bozen Engineering Faculty also to schools visiting the SDF laboratory.

I have more than twenty years of university teaching experience. Since 2012, I have been teaching statistics, first at the University of Trento in the Department of Cellular, Computational, and Integrative Biology (from 2012 to 2018) to students in the Bachelor's program in Biomolecular Sciences and Technology, and then at the Faculty of Engineering of the Free University of Bozen-Bolzano to students in the Master's program in Computing for Data Science.

Professional Experience

July 2019 - present

Assistant Professor

Faculty of Engineering (ex Faculty of Computer Science), Free University of Bozen-Bolzano, Italy.

Feb 2019 - Dec 2019

Teaching assistant (see "Teaching section")

University of Trento, Italy.

Feb 2018 - Feb 2019 **Research fellow**
Department of Mathematics of University of Trento, Italy, and Scholarship holder at the Dept. of Medicine of University of Verona.

Dec 2017 – Feb 2018 **Research fellow**
eCrime, ITC, Law and Criminology of the Law Faculty of University of Trento, Italy, and Scholarship holder at the Dept. of Medicine of University of Verona, Italy.

Dec 2016 – 2017 **Research fellow**
Department of Mathematics of University of Trento, Italy, and Scholarship holder at the Dept. of Medicine of University of Verona.

Dec 2015 – 2016 **Research fellow**
Research Group OptHySys at the Department of Mathematics, University of Trento, Italy

Nov 2012 – Sept 2015 **Research fellow**
Centre for Integrative Biology (CIBIO), University of Trento

Jan 2011 - Oct 2012 **Researcher / Principal Investigator**
Leader of the "Network Identification" group, The Microsoft Research - University of Trento, Centre for Computational and Systems Biology (COSBI).

2007 **Visiting scientist**
Institute for Systems Biology, Seattle, USA.

2006 - 2010 **Researcher**
Researcher, The Microsoft Research - University of Trento, Centre for Computational and Systems Biology (COSBI).

Oct 2003 - 2006 **PhD Student**
Ph. D. Student in Bioinformatics, Department of Information Engineering and Computer Science, University of Trento (Italy).

2003 **Research assistant**
Bioinformatics research unit, Department of In-formation Engineering and Computer Science, University of Trento (Italy).

2001 - 2002 **Research assistant**
Nuclear and sub-nuclear physics research unit, Department of Physics of University of Trento, Italy.

1998 - 2000 **Researcher**
Predictive Models for Biomedicine and Environment research unit, Fondazione Bruno Kessler - Scientific and Technological Research (Trento, Italy),

Visiting affiliation and affiliate membership

2007 **Visiting scientist**
Institute for Systems Biology, Seattle, USA.

From 2019 to the present **Affiliate Member**
Member of the National Group for Mathematical Analysis, Probabilityand their Applications, Francesco Severi National Institute of High Mathematics, Città Universitaria - P.le Aldo Moro 5, 00185 Rome, Italy - Research Unit of University of Trento, Italy (`https://www.maths.unitn.it/111/indam-a-trento`.)

From 2019 to the present **Affiliate Member**
Member of the IoT Digital Innovation Hub, of AIR Instittute , Salamanca, Spain. Web page: `https://innovationhub.es/team`, `https://air-institute.com/`.

Teaching

The average duration of each course listed here is 45 hours. Courses of Teaching assigned by Free University of Bozen-Bolzano have a duration of 60 hours.

2002/2003 **Teaching assistant**
Computer Science Methods, for Masters students in Physics, University of Trento, Italy

2004/2005 **Lecturer**
Computational Biology, for Masters students in Bioinformatics, University of Trento, Italy

2005/2006 **Lecturer**
Computational Biology, for Masters students in Bioinformatics, University of Trento, Italy

2006/2007 **Lecturer**
Simulation of Biological Systems, for Masters students in Bioinformatics, University of Trento, Italy

2007/2008 **Lecturer**
Simulation of Biological Systems, for Masters students in Bioinformatics, University of Trento, Italy

2007 **Lecturer**
Stochastic chemical kinetics, for Masters students in Bioinformatics at COSBI, Trento, Italy

2008/2009 **Lecturer**
Simulation of Biological Systems, for Masters students in Bioinformatics, University of Trento, Italy

2012/2013 **Teaching assistant**
Mathematical Analysis and Statistics II, for Bachelors students in Biomolecular Sciences and Technology, University of Trento, Italy

2013/2014 **Teaching assistant**
Mathematical Analysis and Statistics II, for Bachelors students in Biomolecular Sciences and Technology, University of Trento, Italy

2014/2015 **Teaching assistant**
Mathematical Analysis and Statistics II, for Bachelors students in Biomolecular Sciences and Technology, University of Trento, Italy

2015/2016 **Teaching assistant**
Mathematical Analysis and Statistics II, for Bachelors students in Biomolecular Sciences and Technology, University of Trento, Italy

2016/2017 **Teaching assistant**
Biostatistics, for Master Degree students in Quantitative and computational biology, CIBIO - University of Trento, Italy

2016/2017 **Teaching assistant**
Mathematical aspects of Bio-electromagnetism and Imaging for Master Degree students in Mathematics, University of Trento, Italy

2016/2017 **Teaching assistant**
Statistics for Stochastic Processes for Master Degree Students in Mathematics, University of Trento, Italy

2016/2017 **Teaching assistant**
Mathematical Analysis and Statistics I for Bachelor students in Biomolecular Science and Biotechnologies, University of Trento, Italy

2016/2017 **Teaching assistant**
Foundations of Computer Science for Bachelor students in Civil, Environmental and Mechanic Engineering, University of Trento, Italy

2016/2017 **Teaching assistant**
Mathematical Analysis and Statistics II, for Bachelors students in Biomolecular Sciences and Technology, University of Trento, Italy

2016/2017 **Teaching assistant**
Physiological Flow and Transport in Porous Tissue, for Master Degree students in Mathematics, University of Trento, Italy

2017/2018 **Teaching assistant**
Biostatistics, for Master Degree students in Quantitative and Computational Biology, CIBIO - University of Trento, Italy

2017/2018 **Teaching assistant**
Geometry I, Department of Physics, University of Trento, Italy.

2017/2018 **Teaching assistant**
Foundations of Computer Science, Department of Mathematics, University of Trento, Italy

2017/2018 **Teaching assistant**
Physiological Flow and Transport in Porous Tissue, for Master Degree students in Mathematics, University of Trento, Italy

2017/2018 **Teaching assistant**
Mathematical Analysis and Statistics II, for Bachelors students in Biomolecular Sciences and Technology, University of Trento, Italy

2018/2019 **Teaching assistant**
Biostatistics, for Master Degree students in Quantitative and Computational Biology, CIBIO - University of Trento, Italy

2018/2019 **Teaching assistant**
Geometry I, Department of Physics, University of Trento, Italy

2018/2019 **Teaching assistant**
Foundations of Computer Science, Department of Mathematics, University of Trento, Italy

2018/2019 **Teaching assistant**
Physiological Flow and Transport in Porous Tissue, for Master Degree students in Mathematics, University of Trento, Italy

2018/2019 **Teaching assistant**
Mathematical Analysis and Statistics II, for Bachelors students in Biomolecular Sciences and Technology, University of Trento, Italy

2019/2020 **Teaching assistant**
Geometry, for Bachelors students Physics, University of Trento, Italy

2019/2020 **Lecturer**
Statistics for Data Science for Master students in Computer Science, Faculty of Computer Science, Free University of Bozen-Bolzano, Italy

2019/2020 **Lecturer**
Statistics for Data Science for Master students in Computer Science, Faculty of Computer Science, Free University of Bozen-Bolzano, Italy

2019/2020 **Teaching assistant**
Analysis for Bachelor students in Computer Science, Faculty of Computer Science, Free University of Bozen-Bolzano, Italy

2020/2021 **Lecturer**
Statistics for Data Science for Master students in Computer Science, Faculty of Computer Science, Free University of Bozen-Bolzano, Italy

2020/2021 **Teaching assistant**
Analysis for Bachelor students in Computer Science, Faculty of Computer Science, Free University of Bozen-Bolzano, Italy

2021/2022 **Lecturer**
Mathematics and Statistics for Data Science for Master students in Computer Science, Faculty of Computer Science, Free University of Bozen-Bolzano, Italy

2021/2022 **Teaching assistant**
Analysis for Bachelor students in Computer Science, Faculty of Computer Science, Free University of Bozen-Bolzano, Italy

2022/2023 **Lecturer**
Mathematics and Statistics for Data Science for Master students in Computer Science, Faculty of Computer Science, Free University of Bozen-Bolzano, Italy

2022/2023 **Teaching assistant**
Analysis for Bachelor students in Computer Science, Faculty of Computer Science, Free University of Bozen-Bolzano, Italy

2023/2024 **Lecturer**

Mathematics and Statistics for Data Science for Master students in Computer Science, Faculty of Engineering, Free University of Bozen-Bolzano, Italy

2023/2024 **Lecturer**

Preparatory Course in Mathematics for Bachelor students in Computer Science, Faculty of Engineering Free University of Bozen-Bolzano, Italy

2024/2025 **Lecturer**

Mathematics and Statistics for Data Science for Master students in Computer Science, Faculty of Engineering, Free University of Bozen-Bolzano, Italy

2024/2025 **Lecturer**

Preparatory Course in Mathematics for Bachelor students in Computer Science, Faculty of Engineering Free University of Bozen-Bolzano, Italy

2025/2026 **Lecturer**

Mathematics and Statistics for Data Science for Master students in Computer Science, Faculty of Engineering, Free University of Bozen-Bolzano, Italy

Theses supervision

Since 2008 **Subject: bioinformatics and computatioanl biology**

Supervised 1 Ph.D. student, 2 Bachelor's theses, 6 Master's theses, 3 post-doctoral researcher, 1 research assistant.

Tutorials

2009 **Diffusion and space**

The Microsoft Research - University of Trento, Centre for Computational and Systems Biology, April 2009.

2009 **Biochemical kinetics, Inference and Missing data**

The Microsoft Research - University of Trento, Centre for Computational and Systems Biology, April 2009.

2010 **Models of diffusion coefficient in a non-homogeneous non-well-stirred reaction-diffusion system**

Fourth UKSim European Symposium on Computer Modeling and Simulation, 2010, pp. xxii-xxiii, doi: 10.1109/EMS.2010.12

Teaching assignments from foreign institutions

April 2025 **Invited lecturer**

Invited lecturer. Lecture entitled "Integrating latent network geometry into mechanistic modeling of the network dynamics" at the Lecture series Causal Analysis of Biomedical Data, organised by Luxembourg Centre of Systems Biomedicine of the University of Luxembourg.

Organizational/Communication skills

Since 2010 **Conferences, Workshops, Symposia**

1. Bioinformatics: from observation to data analysis 2025, April 16 and April 30 2025, webinar series, Free University of Bozen-Bolzano, Italy (Organizer: Paola Lecca, Unibz, Italy)
2. Program Committee member of Artificial Intelligence Approaches for Network Analysis, workshop of The International Conference on Computational Science (ICCS) 2025.
3. Data4SmartHealth 2024, 28 November 2024, Free University of Bozen-Bolzano, Italy (organizers: Floriano Zini and Paola Lecca, Unibz, Italy)
4. Technical Program Committee member of International Workshop on Foundations of Network Analysis, held in conjunction with IEEE BIBM 2024, Lisbon, Portugal December 3-6, 2024
5. Program committee member of 16th IEEE International Conference on Knowledge and Systems Engineering (KSE 2024), Eastin Hotel Kuala Lumpur, Malaysia 5 – 7

November 2024

6. Program committee member of 2nd Workshop on Foundations of Network Analysis, held in conjunction with IEEE BIBM 2023, Istanbul, Turkey, December 5-8, 2023
7. Program committee member of 15th IEEE International Conference on Knowledge and Systems Engineering (KSE 2023), October 18-20, 2023, Ha Noi, Vietnam
8. Program committee member of ICCS - INTERNATIONAL CONFERENCE ON COMPUTATIONAL SCIENCE (Workshop on Network Models and Analysis: From Foundations to Complex Systems), Prague, Czech Republic, 3-5 July, 2023 2023
9. Technical Program Committee member of VPH 2022 CONFERENCE VIRTUAL PHYSIOLOGICAL HUMAN, Digital twins for personalized treatment development and clinical trials 6 - 9 September 2022, Porto, Portugal.
10. Technical Program Committee member of 2022 4th International Applied Mathematics, Modelling and Simulation Conference (AMMS 2022) jointly held with 2022 5th International Conference on Mathematics and Statistics (ICoMS 2022) from June 17-19, 2022 in Paris, France.
11. Technical program committee member of the 13th International Conference on KNOWLEDGE AND SYSTEMS ENGINEERING (KSE 2021), November 10-12, 2021, Bangkok, Thailand & Online - Special Session on Bioinformatics and Computational Biology – BCB2021.
12. Organizer of "Multi-physics modelling" special session at 17th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering and the 5th Conference on Imaging and Visualization, 7 – 9 September 2021 (online).
13. Organizer of Bioinformatics and Computational Biology Track at the 36th ACM/SIGAPP Symposium On Applied Computing Virtual Conference, March 22-March 26, 2021.
14. KSE: Knowledge and Systems Engineering, Special Session Bioinformatics and Computational Biology – BCB2020, 12-14 November 2020, Chan Tho, Viet Nam.
15. Track Chair of Bioinformatics Track at ACM SAC 2020, Brno, Czech Republic March 30-April 3, 2020.
16. Organizer commitee member of CMBBE 2019: The 16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering and 4th Conference on Imaging and Visualization, 14 - 16 August 2019, New York City, United States.
17. Organizer of Special Session on Bioinformatics and Computational Biology – BCB2019 Da Nang, Vietnam October 24-26, 2019.
18. Member of the technical advisory panel 16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering and the 4th Conference on Imaging and Visualization, 14- 16 August 2019, in New York City, United States of America.
19. Track Chair of VipIMAGE 2019: VII ECCOMAS Thematic Confernece on Computational Vision and Medical Image processing, October 16-18, 2019, Porto, Portugal.
20. Track Chair of Bioinformatics Track at ACM SAC 2019, Limassol, Cyprus, 8-12 April 2019.
21. Program Comittee Member of MICCAI2018 workshop on Bio-Imaging and Visualization for Patient-Customized Simulations, Septmeber 16-20, 2018, Granada, Spain.
22. Track Chair of Bioinformatics Track at ACM SAC 2018, April 9 - 13, Pau, France 2018.
23. Program Commetee Member of CIBB2018: Computational Intelligence methods for Bioinformatics and Biostatistics, Caparica, Portugal, 6-8 September 2018.
24. Program Commetee Member of 15th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering and 3rd Conference on Imaging and Visualization, CMBBE2018, Lisbon, Portugal 26-29 March 2018.
25. Program Comittee Member of CIBB2017: Computational Intelligence methods for Bioinformatics and Biostatistics, 7-9 September 2017, Cagliari, Italy.
26. Program Commetee Member of International Conference VIPIMAGE - VI ECCOMAS Thematic Confernece on Computational Vision and Medical Image processing, October 18-20, 2018, in Axis Vermar Conference & Beach Hotel, Porto, Portugal.
27. Bio-Imaging and Visualization for Patient-Customized Simulations (BIVPCS), in Quebec City, Canada, on September 14, 2017.
28. Program Committee Member of International Conference VIPIMAGE - VI ECCOMAS Thematic Conference on Computational Vision and Medical Image Processing, October 18-20, 2017
29. Track Chair of Computational Biology and Bioinformatics Track at ACM SAC 2017, March 27 - 31, Marrakesh, Morocco 2017.

30. Track Chair of Computational Biology and Bioinformatics Track at ACM SAC 2016, April 4 - 8, Pisa 2016, Pisa, Italy.
31. Track Chair of VipIMAGE 2015: V ECCOMAS Thematic Conference on Computational Vision and Medical Image Processing, October 19-21, 2015, in H10 Costa Adeje Palace, Costa Adeje, Tenerife, Spain
32. Track Chair of Computational Biology and Bioinformatics Track at ACM SAC 2015, April 13 - 17, Salamanca 2015, Salamanca, Spain.
33. Co-organizer of 3S Biology Summer School, Centre for Integrative Biology, University of Trento, September 8-11, 2014, Trento, Italy.
34. Track Chair of BioHealth Informatics Track at ACM SAC 2014, March 24 - 28, 2014, Gyeongju, Korea.
35. Track Chair of Bioinformatics Track at ACM SAC 2013, March 18 - 22, 2013, Coimbra Portugal
36. Conference vice-chair of ACM SAC 2012, Riva del Garda (Italy), March 26-29, 2012.
37. Track Chair of Bioinformatics Track at ACM SAC 2011, Tunghai University,Taichung, Taiwan.
38. Program Committee Member of SIMUL 2012, The Fourth International Conference on Advances in System Simulation November 18-23, 2012, Lisbon, Portugal.
39. Program Committee Member of SIMUL 2011, The Third International Conference on Advances in System Simulation, October 23-29, 2011 – Barcelona, Spain
40. Program Committee Member of CompImage2012, Computational Modelling of Objects presented in Images, Rome 5-7 September 2012.
41. Program Committee Member of Int. Conference EUROMEDIA 2010, April 14-16, 2010, UPV Gandia, Gandia (Workshop on Medical Imaging Systems)
42. Track Chair of ACM SAC 2010 Track of Bioinformatics and Computational Systems Biology, March 22-26 Sierre , Switzerland 2010.
43. Program Committee Member of International Symposium on Biocomputing (ISB 2010) 15 17 February 2010, Calicut, Kerala, India.

Organizational / managerial skills

Research group leadership

The Microsoft research - University of Trento, Centre for Computational and Systems Biology, Italy

I held the Head of the Laboratory of Knowledge Inference and Data Manipulation at COSBI University of Trento, Italy from 2011 to 2012. As principal Investigator I coordinated the research activities of the laboratory, that were principally focused on

- the inference of biological networks from experimental omics data,
- and sensitivity analysis of network models.

The research activities has been carried out in robust and sustained collaborations with biologists and medical researchers at both Italian and foreign universities and research centres. The investigations identified the experimental data needed to build accurate and predictive models of biological systems.The investigations had two main goals:

- developing of efficient, tailored, and data integrative mathematical procedures to infer and analyze topological and causal structures among components and interactions of a biological system;
- developing experimental designs and statistical survey for the collection of high-throughput omics data useful to the construction of accurate and predictive model of biological processes.

At COSBI, my research studies interfaced with systems pharmacology, molecular nutrition and ecology, to support the development of models from experimental data with computational procedures of inference, data quality assessment, statistical analysis and sensitivity analysis. All these activities were complementary and synergistic to the research areas of Network Analysis and Network Simulation defined in the COSBI scientific plan.

School organization and direction

Department of Cellular, Computational and integrative biology - CIBIO, University of Trento, Italy

System, Synthetic and Semantics biology (3S Summer School), Povo, Trento, Italy, 8th-11th September 2014.

Publications

Book chapters

1. **P. Lecca**, Artificial Intelligence: From Drug Discovery to Clinical Pharmacology, Big Data Analysis and Artificial Intelligence for Medical Sciences, 2024, p. 253-271, Wiley 2024 (here)
2. B. Carpentieri, **P. Lecca**, Introduction, Big Data Analysis and Artificial Intelligence for Medical Sciences, 2024, p. 1-15, Wiley 2024 (here)
3. B. Carpentieri, **P. Lecca**, Preface, Big Data Analysis and Artificial Intelligence for Medical Sciences, 2024, p. xix - xx, Wiley 2024.
4. A. Re, **P. Lecca**, *On TD-WGcluster - theoretical foundations and guidelines for the user*, in Methods in Molecular Biology: Protein-Protein Interaction Networks, 2020; 2074:233-262.
5. **P. Lecca**, A. Re, *Module detection in dynamic networks by temporal edge weight clustering*, Computational Intelligence Methods for Bioinformatics and Biostatistics Volume 9874 of the series Lecture Notes in Computer Science pp 54-70, 2016.
6. **P. Lecca**, A. Re, *Network-oriented approaches to anti-cancer drug response*, Cancer Gene Networks Volume 1513 of the series Methods in Molecular Biology pp 101-117, 2016.
7. **P. Lecca**, A. Palmisano, *The present and the future perspectives of biological network inference*, In Bioinformatics & Computational Systems Biology: Recent Advances and Applications, Eds. Paola Lecca, Dan Tulpan, Rajaraman Kanagasabai, IGI-Global 2012.
8. **P. Lecca**, *A process algebra model of the cell mechanics of autoreactive lymphocites recruitment*, Technologies for Medical Sciences, Lecture Notes in Computational Vision and Biomechanics, Volume 1:311-333, 2012.
9. F. Jordan, **P. Lecca**, C. Livi, *Structural and dynamical heterogeneity in ecological networks*, Bioinformatics & Computational Systems Biology: Recent Advances and Applications, Eds. Paola Lecca, Dan Tulpan, Rajaraman Kanagasabai, IGI-Global, 2012
10. **P. Lecca**, P. Nguyen, C. Priami, P. Quaglia, *Network inference from Time-Dependent Omics Data*, Bioinformatics for Omics data, Methods Mol Biol. 719:435-55, Springer, 2011

Books

1. **P. Lecca**, *Identifiability and Regression Analysis of Biological Systems Models, Statistical and Mathematical Foundations and R Scripts*, SpringerBriefs in Statistics, Second Edition, 2024.
2. **P. Lecca**,B. Carpentieri, *Introduction to Mathematics for Computational Biology*, Springer Cham, 2023.
3. **P. Lecca**, *Identifiability and Regression Analysis of Biological Systems Models. Mathematical foundations and R scripts*, SpribgerBriefs, 2020.
4. **P. Lecca**, A. Re, *Theoretical Physics for Biological Systems*, CSR Taylor & Francis, 2019.
5. **P. Lecca**, A. Re, A. E. C. Ihekwaba, I. Mura, T.-P. Nguyen, *Computational systems Biology. Inference and Modelling*, Elsevier, 2016.
6. **P. Lecca**, I. Laurenzi, F. Jordan, *Deterministic versus stochastic modelling in biochemistry and systems biology*, Woodhead Publishing Series in Biomedicine No. 21, 2012.

Journals

1. **P. Lecca**, M. Lecca, A. E. Ihekwaba-Ndibe, AI-based methods for the assessment of DNA damage and repair mechanisms, Frontiers in Systems Biology - Systems Concepts, Theory and Policy in Biology and Medicine, 2026 (in press).
2. Kleinfelder, Karina, **Paola Lecca**, Roberta Valeria Latorre, Chiara Mortali, Sara Casati, Sofia Vanerio, Claudio Sorio, and Paola Melotti. 2026. "Drug Responsiveness in Patient-Derived Rectal Organoids Correlates with Clinical Response in CF Subjects: A Real-Life Analysis" Scientia Pharmaceutica 94, no. 1: 13. doi: 10.3390/scipharm94010013
3. M. Lecca, M. Gottardi and **P. Lecca**, A New Image Sharpening Filter based on Gradient and Retinex-inspired Contrast, in IEEE Access, VOLUME 13, 2025, doi: 10.1109/ACCESS.2025.3617230.
4. **P. Lecca**, A. Re, Determination of the latent geometry of atorvastatin pharmacokinetics by transfer entropy to identify bottlenecks, BMC Pharmacology and Toxicology 26(123),

2025, doi: https://doi.org/10.1186/s40360-025-00948-6
5. M. Lecca, **P. Lecca**, A dataset for illuminant- and device- invariant colour barcode decoding with cameras, Data in Brief, Volume 52, 109960, February 2024, doi: https://doi.org/10.1016/j.dib.2023.109960.
6. **Lecca P** and Lecca M, Graph embedding and geometric deep learning relevance to network biology and structural chemistry, Front. Artif. Intell. Sec. Machine Learning and Artificial Intelligence Volume 6 - 2023 (doi: 10.3389/frai.2023.1256352)
7. **Lecca P** and Ihekwaba-Ndibe AEC (2022) Dynamic Modelling of DNA Repair Pathway at the Molecular Level: A New Perspective. Front. Mol. Biosci. 9:878148. doi: 10.3389/fmolb.2022.878148.
8. Giulia Lombardi, Roberta Valeria Latorre, Alessandro Mosca, Diego Calvanese, Luisa Tomasello, Christian Boni, Manuela Ferracin, Massimo Negrini, Nader Al Dewik, Mohamed Yassin, Mohamed A. Ismail, Bruno Carpentieri, Claudio Sorio, and **Paola Lecca**, *Gene Expression Landscape of Chronic Myeloid Leukemia K562 Cells Overexpressing the Tumor Suppressor Gene PTPRG*, International Journal of Molecular Science, Special Issue on "From Omics to Therapeutic Targets in Cancer", 23(17):9899. doi: 10.3390/ijms23179899.
9. **Paola Lecca**, Adaoha E. C. Ihekwaba-Ndibe, *Dynamic modelling of DNA repair pathway at the molecular level: a new perspective*, Frontiers in Molecular Biosciences, Section Biological Modeling and Simulation 13, 2022, DOI: 10.3389/fmolb.2022.878148
10. **Paola Lecca**, *Machine learning for causal inference in biological networks: perspectives of this challenge*, Front. Bioinform. 1:746712. doi: 10.3389/fbinf.2021.746712.
11. **Lecca P.**, Corchado J. M. and Besozzi D., *Editorial: Network-Oriented Approaches to Anticancer Drug Response*. Front. Bioeng. Biotechnol. 9:692369, 2021. DOI: 10.3389/fbioe.2021.692369
12. Marco Pedrazzi, Silvia Vercellone , Elettra Barberis, Michela Capraro, Roberta De Tullio, Federico Cresta, Rosaria Casciaro, Carlo Castellani, Mauro Patrone, Emilio Marengo, **Paola Lecca**, Paola Melotti, Claudio Sorio, Marcello Manfredi and Monica Averna, *Identification of Potential Leukocyte Biomarkers Related to Drug Recovery of CFTR: Clinical Applications in Cystic Fibrosis*, Int. J. Mol. Sci. 22, no. 8: 3928, 2021. https://www.mdpi.com/1422-0067/22/8/3928.
13. **Paola Lecca**, *Control Theory and Cancer Chemotherapy: How They Interact*. Front. Bioeng. Biotechnol. 8:621269, 2021, doi: 10.3389/fbioe.2020.621269.
14. **Paola Lecca**, Michela Lecca, Cecilia Ada Maestri, Marina Scarpa, *Biexponential fitting for noisy data with error propagation*, Mathematical Methods in the Applied Sciences, Volume 44, Issue 13, Wiley, 2021. DOI: 10.1002/mma.7396.
15. Cecilia Ada Maestri , Antonella Motta, Lorenzo Moschini, Andreas Bernkop-Schnuerch, Randi Angela Baus, **Paola Lecca**, Marina Scarpa, *Composite nanocellulose-based hydrogels with spatially oriented degradation and retarded release of macromolecules*, Journal of Biomedical Research Part A, vol 108, pages 1509–1519, 2020. DOI: 10.1002/jbm.a.36922
16. **P. Lecca**, A. Re, *Identifying necessary and sufficient conditions for the observability of models of biochemical processes*, Biophysical Chemistry, 254: 106257, 2019
17. **P. Lecca**, A. Re, *A reaction-based model of the state space of chemical reaction systems enables efficient simulations*, *IEEE/ACM Transaction on computational biology and bioinformatics, 17(2):469-482. DOI: 10.1109/TCBB.2019.2894699*
18. **P. Lecca**, M. Lecca S. Caldrer, F. Rescigno, A. Farinazzo, V. Esposito, L. Rodella, A. Cerofolini, F. Lombardo, F. Catalano, C. D'Orazio, P. Melotti, C. Sorio, *Computing volumes of organoids from 3D confocal acquisitions with CORVO*, (Abstract on Journal) North American Cystic Fibrosis Conference, October 18-20, 2018, Denver, CO.
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Conference papers

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57. J. Himmelspach,**P. Lecca**, D. Prandi, P. Quaglia and A. Uhrmacher, *Developing A Hierarchical Simulator for Beta-binders*, In Procs of 20th ACM/IEEE/SCS Workshop on Priciples of Advanced and Distributes Simulation (PADS) 2006.
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62. **P. Lecca**, *EXPLODET Project: methods of automatic data processing and analysis for the detection of hidden explosive*, In the Proceedings Book of International Workshop on Detecting Environmental, Industrial & Bio-Medical Signals, Editor M. de Palma, 2003.
63. G. Viesti, M. Lunardon, G. Nebbia, M. Barbui, M. Cinausero, E. Fioretto, G. Prete, A. Pantaleo, G. D'Erasmo, M. Palomba, M. Abbrescia, G. Iaselli, F. Loddo, V. Paticchio, T. Ranieri, R. Trentadue, A. Colla, A. Musso, A. Piccotti, F. Poggio, G. Dellacasa, I. Lazzizzera, **P. Lecca**, J. Obhodas, D. Sudac, K. Nad, V. Valkovic, A. Brusegan, J.

Lobo and S. Hlavac, *The DIAMINE Landmine Detection System*, In the Proceedings Book of International Workshop on Detecting Environmental, Industrial & Bio-Medical Signals, M. de Palma Editor, (http://www.pd.infn.it/explodet/diamine.html) 2003.

Awards

2007 **Best paper award**

I won the young researchers' best-paper grant for the article *Molecular mechanism of glutamate-triggered brain glucose metabolism: a parametric model from FDG PET-scans*, Brain, Vision and Artificial Intelligence 2007, LNCS (Ed. F. Mele, G. Ramella, S. Santillo and F. Ventriglia), 4729:350-359 Springer Verlag, 2007.

2009 **Competition**

In a team with 11 COSBI researchers integrated with 3 French researchers and 1 German researcher I won first prize at the international modelling competition in Dagstuhl, Germany (information can be found at http://www.cosbi.eu/index.php/other-events/events-archive/243).

2021 **Best presentation award**

I have been awarded for the best presentation at the 3rd International Applied Mathematics, Modelling and Simulation, Conference (AMMS 2021) Paris (France) & online June 24-26, 2021 (organized by Hong Kong Chemical, Biological & Environmental Engineering Society HKCBEES)

National and international grants and funds (excluded commissioned research)

2018 - 2020 **Italian Cystic Fibrosis Foundation Grant**

Partner in a projected granted by Italian Cystic Fibrosis Foundation (2018). Project Title: *Testing intestinal organoids for the prediction of response to CFTR potentiators and correctors used in clinics*. Project ID: FFC#13/2018. Project Coordinator: Claudio Sorio, Department of Medicine, University of Verona, Italy.
My role in the project: principal investigator for the computational research line of the project at Department of Mathematics, University of Trento, Italy.
Web-page: `https://www.fibrosicisticaricerca.it/risultati-di-ricerca/`

Commissioned research projects funded by companies

2021-2026 **Azienda Sanitaria dell'Alto Adige**

Comissioned research project with Azienda Sanitaria dell'Alto Adige – Medicina Nucleare (https://www.sabes.it/it/ospedali/bolzano/1665.asp).

Project name: GLI-HOPE (All-Ages Malignant Glioma: Holistic Management In The Personalised Minimally-Invasive Medicine Era - From Lab To Rehab) Programmi di Rete del Ministero della Salute

Research title: Brain Glucose Metabolism Kinetics Mapping, My role in it: Principal Investigator of the Free University of Bozen-Bolzano, Italy.

2025 **Ki6-editori srl / Decor Lab & Allestire**

Comissioned orientation counseling with Ki6-editori srl / Decor Lab & Allestire, Bolzano
Orientation subject: use of augmented reality and AI techniques for the creation of local combinations and furnishings to be shown to customers
My role in it: point of contact between company and Unibz academic staff involved in the orientation phase of this project.

Commissioned research projects from international institutes

2018 **Louvain Centre for Toxicology and Applied Pharmacology (LTAP)/Institut de Recherche Expérimentale et Clinique Université Catholique de Louvain**
Implementation of a new imaged-controlled sweat test for in vivo quantification of CFTR function: value for diagnosis and efficacy of new therapies (commissioned by the scientific consortium of the FFC project grant #5/2016).

Participation in projects

From 2015 to 2019 **OptHySys**
Research assistant team member in the project OPTmization techniques for Hybrid dynamical SYStems (funded as part of the Strategic Plan 2014-2016 of the University of Trento, Italy) : from theory to applications, at the Department of Mathematics of University of Trento (Italy) (Principal Investigator: Dr. Fabio Bagagiolo). Web-page: `http://r.unitn.it/en/maths/opthysys`.

From 2012 to 2015 **Functional Validation of Prostate Cancer Driving Mutations**
Functional Validation of Prostate Cancer Driving Mutations. I was involved in the project as Research Fellow at CIBIO- University of Trento. The project was supported by grants issued to F. Demichelis by US Department of Defence Synergy Awards and by the US National Cancer Institute) In the context of this project, I developed cumulative models of cancer progression defining the order and the timing of the occurrence of mutation events.

From 2008 to 2011 **Nobel project**
Nobel Project: Molecular modeling of gene regulation, transcription and translation. Funding agency: Cariplo Foundation and Caritro Foundation. This project addresses the bio-inspired definition of new modelling languages and tools that are suited to represent and to analyse the properties and the time-dependent behaviour of complex systems composed of a huge number of competing, cooperating and communicating components. Starting from the excellent and challenging examples provided by a set of selected case studies from biological systems offered by the other NOBEL platforms, the project intends to identify the key modelling elements required to capture and characterize the aspects of modularity, self-organization and hierarchy to define and prototype a composable and scalable framework that integrates modelling and evaluation features for analysis, prediction of systems behaviour and inference of new knowledge. The involvement of bioscientists conducting project-specific ongoing experimental research on reverse engineering of living cells is essential to the strategic concept of this proposal. The close cooperation of experts from the ICT field and systems analysis (reverse engineering) and scientists from the field of molecular biosciences created an integrated multi-disciplinary effort whose results will be applicable to both research communities. Partners: Prof. Roberto Sitia, Fondazione San Raffaele Milano Platform: GENO PROTEOMICS OF AGE RELATED DISORDERS (GuARD).

From 2001 to 2002 **EXPLODET**
EXPLODET (EXPLOsive DETection) of the National Institute of Nuclear Physics): from 2001 to 2002. The project aimed to development of a thermal neutron sensor for hidden explosive search (details at http://www.pd.infn.it/explodet/tna.html).

From 2001 to 2002 **DIAMINE**
DIAMINE (Detection and Imaging of Antipersonnel Landmines by Neutron Backscattering): the project has been funded by the European Union under the contract IST-2000-25237 during the years 2001-2002.

Talks

Invited talks

2025-09-24 **The Bayesian basis of Decision-Making in Artificial Intelligence: Does It Help to Determine the Level of Confidence in Artificial Intelligence Results?**
7th International Applied Mathematics, Modelling and Simulation Conference (AMMS 2025)

2024-05-16 **The landscape of gene expression in chronic myeloid leukaemia**
Multiomics: from Big Data to Insights, NOI Techpark, Bolzano-Bozen May 16, 2024

2023-07-14 **From data to diagnosis: artificial intelligence in Nuclear Medicine**
Panelist at workshop organized by Azienda Sanitaria dell'Alto Adige at Eurac Research Bolzano-Bozen, Italy

2023-07-14 **The determination of the latent geometry of a network and its structural and dynamical implications**
5th International Applied Mathematics, Modelling and Simulation Conference (AMMS 2023)

2016-11-18 **Inference and models of complex biological systems**
CIMEC, University of Trento, Italy

2016-10-14 **Developing computational models for complex systems simulation. Efficient computing: an interest common to biology and astrophysics**
Department of Civil Environmental and Mechanical Engineering, Italy.

2016-09-26 **Multistep theory of carginogenesis: a new predictive model of age incidence of chronyc Myeloid Leukemia**
Department of Medicine, University of Verona, Italy

2015-10-29 **Hybrid stochastic-deterministic models for simulation of biochemical systems**
Department of Mathematics, University of Trento, Italy

2011-10-14 **Clinical Bioinformatics, Spatial pharmacokinetic-toxicokinetic modelling**
NETTAB 2011, Pavia, Italy

2009-04-28 **On the mathematical structure and algorithmic implementation of biochemical network models**
Int. Conference on Cellular and Molecular Biology, World Academy of Science, Engineering and Technology, Rome 28 April, 2009.

2007-06-01 **Which algorithm for emulating the chemical interactions in biomolecular systems?**
Department of Mathematics of University of Trento, Italy.

2007-08-28 **Stochastic formalisms and algorithms to model and simulate biological inter-actions**
Institute for Systems Biology, Seattle

Conference talks with peer-reviewed abstracts/paper

20-10-2025 **Feasibility study of applying deep learning techniques to solve 2D Poisson's equation**
Accepted talk at: 14th International Conference on Mathematical Modeling in Physical Sciences October 20-23, 2025

30-09-2024 **(I): Guidelines to design the architecture of Artificial Neural Networks for application in physical chemistry. (II): Network theory in support of climate change studies: analysis of temperature anomalies**
13th International Conference on Mathematical Modeling in Physical Sciences, Kalamata, Greece, 2024

28-08-2023 **28-08-2023, Learning systems of ordinary differential equations with Physics-Informed Neural Networks: the case study of enzyme kinetics**
12th International Conference on Mathematical Modeling in the Physical Sciences (IC-MSQUARE 2023), Belgrade, Serbia, August 28-31, 2023

2022-12-07 **Checking for non-Euclidean latent geometry of biological networks**
1st International Workshop on Foundations of Network Analysis held in conjunction with IEEE BIBM 2022, 6-8 December 2022.

2022-09-06 **Uncovering the geometry of protein interaction network: the case of SARS-CoV-2 protein interactome,**
11th International Conference on Mathematical Modeling in Physical Sciences, September 5-8, 2022.

2022-06-18 **New Proposal of Power Series Method to Solve The Navier-Stokes Equations: Application Contexts And Perspectives**
4th International Conference of Applied Mathematics, Modelling and Simulations, Paris, France, June 17-19, 2022.

2021-12-09 **Analysis of SARS-CoV-2 protein interactome map**
IEEE International Conference on Bioinformatics and Biomedicine (BIBM 2021) - Workshop on Integrative Data Analysis in Systems Biology (IDASB 2021), 9-12 December 2021 - Virtual online conference.

2021-09-07 **Agent-based control of multiphysics systems**
17th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, 7-9 September 2021 - Online conference

2021-09-06 **On the asymptotic stability of advection-diffusion equations of mass transport in bubble column bioreactor**
10th International Conference on Mathematical Modeling in Physical Sciences September 6-9, 2021 Virtual, on-line Conference

2021-09-06 **The effects of gravitational potential on chemical reaction rates**
10th International Conference on Mathematical Modeling in Physical Sciences September 6-9, 2021 Virtual, on-line Conference

2021-06-25 **The theory of active agents for simulating dynamical networks and its π-calculus specification**
3rd International Applied Mathematics, Modelling and Simulation Conference (AMMS 2021), June 24-26, 2021; best presentation awarded.

2020-12-16 **Stiffness estimate of information propagation in biological systems modelled as spring networks**
International Workshop on Biological Network Analysis and Integrative Graph-Based Approaches, Mingon Kang, Ananda - 2020 IEEE International Conference on Bioinformatics and Biomedicine (BIBM).

2020-11-13 **A network analysis computational pipeline to detect altered gene pathways in chronic myeloid leukemia**
Free Software Conference, Bozen-Bolzano, Italy

2020-10-27 **Computing organoids' volume in medical images: the case study of cystic fibrosis**
2020 IEEE International Conference on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB 2020, October 27-29, 2020)

2020-09-25 **A Computational Control Theory Approach to the Analysis of Virus-Host Interactome in Covid-19**
ACM - WonEncourage 2020, September 24-25, 2020.

2020-06-24 **Comparative dynamic network analysis to detect altered pathways in chronic myeloid leukemia human cell model,**
24th International Conference On Research In Computational Molecular Biology, 22-25 June 2020.

2018-11-18 **Multilinear Regression Analysis of Sweat Secretion Volumes in Cystic Fibrosis**
Proceedings of FRUCT'23, Bologna (Italy), 13-16 November 2018

2018-08-28 **Phase-space analysis of chaotic deterministic dynamics with Python: the case of biological systems with many degrees of freedom**
EuroSciPy 11th European Conference on Python in Science, EuroSciPy 11th European Conference on Python in Science 2018, Fondazione Bruno Kessler, 28-29 August 2018, Trento, Italy, 2018

2018-06-06 **CORVO: a software tool for computing volume of complex biological structures in medical images and videos**
SIAM Conference on Imaging Science Bologna, Italy

2014-09-30 **TO-DAG: a new graph-based timed model for cumulative cancer progression**
Cancer, Systems and Complexity School and Workshop, Como, Italy

2011-09-12 **Calibration of process algebra models of discretely observed stochastic biochemical systems**
The 23rd European Modeling & Simulation Symposium (EMSS 2011), Rome Italy

2009-03-25 **Deducing chemical reaction rate constants and their regions of confidence from noisy measurements of time series of concentration**
11th Int. Conference on Computer Modelling and Simulation, Emmanuel College Cambridge, 2009.

2009-03-24 **On the deduction of chemical reaction rate constants from measurements of time series of concentration**
The Microsoft Research Cambridge 2009.

2008-10-29 **Dynamics of reaction-diffusion systems in non-homogeneous media**
Int. Conference on Bioinformatics and Biomedicine 2008, Venice, Italy.

2008-09-19 **KInfer: a software tool for parameter inference in models of biochemical net-works**
XIX Congress Sibpa 2008 Rome, 2008.

2008-07-12 **Modelling and estimation of cellular mechanisms of cerebral glucose metabolism from dynamic Positron Emission Tomography scans**
Forum of European Neuroscience, Geneva, Switzerland

2008-06-30 **Estimating the kinetics of Na+ and Ca2+ waves in astrocytes**
ICAM-ECCOMAS Congress Venezia Lido, Italy

2008-06-04 **Identification of rate coefficients in dynamic models of biochemical systems**
European Conference of Mathematical and Theoretical Biology, Edinburgh, Scottland.

2007-10-11 **Glutamate-triggered brain glucose metabolism: a parametric model from FDG-PET-scans**
Brain, Vision and Artificial Intelligence Symposium, Naples, Italy

2007-10-10 **Molecular mechanisms of glutamate-triggered brain glucose metabolism**
Istituto Italiano Studi Filosofici, Napoli

2007-09-07 **A simple model for inferring kinetic parameters in biochemical reactions**
Institute for System Biology, Seattle

2007-03-26 **Quantitative data for simulating biochemical systems**
Fondazione Cariplo, Milano, Italy

2006-11-07 **Simulating kinetic in living systems. Collecting useful data for in silico experiments**
COSBI, University of Trento, italy

2006-04-24 **A time-dependent extension of Gillespie algorithm for biochemical stochastic π-calculus**
ACM Symposium on Applied Computing 2006, Dijon, France

2004-03-14 **Predicting cell adhesion probability via the biochemical stochastic π-calculus**
ACM Symposium on Applied Computing, Nicosia, Cyprus

2003-09-06 **Cell cycle control in Eukaryotes: a BioSpi model**
BioConcur 2003, Marseille, France

Memberships & Affiliations

Since February 2020 **Member of Istituto Nazionale di Alta Matematica "Francesco Severi", Gruppo Nazionale di Analisi Matematica, Probabilitá e Applicazioni, Italy. Web page:** `https://www.maths.unitn.it/111/indam-a-trento`.

Since January 2019	**Member of the National Institute of Nuclear Physics, TIFPA - Trento Institute for Fundamental Physics and Applications, Italy**
Since 2009	**Member of Italian Society of Pure and applied Biophysics (SIBPA)**
From 2008 to 2009	**Member of the European Society for Mathematical and Theoretical Biology**
Since 2007	**Member of Italian Society of Neuroscience (SINS)**
Since 2006	**Senior Professional Member of Association for Computing Machinery (ACM), New York , USA**

Scientific boards

Since January 2019	**Advisory Board Member of AIR Institute (International Research Institute Foundation for Artificial Intelligence and Computer, Salamanca, Spain. `https://innovationhub.es/team`)**
January - June 2017	**Member of the committee for the PhD Thesis evaluation for the PhD Scholarship Program of at the Department of Computer Science of University of Verona**
December 2008 - February 2009	**External reviewer of the Microsoft Research PhD Scholarship Program**