

Andrea Calzavara

Curriculum vitae

Ph.D. Student
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1. PERSONAL DETAILS, ACADEMIC POSITION, SCIENTIFIC PRODUCTION

1.1 Personal Details

Surname Calzavara
Name Andrea
Birth date December 4th 2000
Birthplace Padova
Nationality Italian
Residence Via Antonio Fiorazzo, 14, 35129, Padova (PD), Italy
Researcher ORCID: 0009-0009-2265-9053
unique Scopus Author ID: 58682454100
identifiers WoS ResearcherID: JMC-8517-2023

1.2 Academic position

Nov 2024 – **Ph.D. Student in Information Engineering** (Bioengineering curriculum)
Today University of Padova, Italy. SSD ING-INF/06
University scholarship (“borsa di dottorato”) funded by the University of Padova and its Department of Information Engineering.
Topic: “Enhancing type 1 diabetes care: A deep learning-powered clinical decision support system for proactive therapeutic interventions using explainable blood glucose forecasting”.
Supervisor: Prof. Andrea Facchinetti; Co-supervisor: Prof. Giacomo Cappon

Feb 2022 – **Research intern** in the Systems Biology and Bioinformatics Group (SysBioBig)
May 2022 for my Bachelor’s thesis (180 hours) at the Department of Information Engineering (DEI), University of Padova, Italy. SSD ING-INF/06. Supervisor: Prof. Massimo Bellato

1.3 Summary of scientific production

Journal papers 0 (0 as first author; 0 as second author; 0 without the PhD supervisor)

Submitted/To be submitted journal papers	2 (1 as first author; 1 as second author; 1 without the PhD supervisor)
Scopus-indexed conference papers	1 (0 as first author; 0 as second author; 1 without the PhD supervisor)
Other conference papers and abstracts	3 (1 as first author; 1 as second author, 2 without the PhD supervisor)
Citations	3 (Scholar), 0 (Scopus), 0 (WOS)
H-index	1 (Scholar), 0 (Scopus), 0 (WOS)

2. EDUCATION

- Nov 2024 – **Ph.D. Student in Information Engineering** (Bioengineering curriculum) at the University of Padova, Italy. SSD ING-INF/06
 Today University scholarship (“borsa di dottorato”) funded by the University of Padova and its Department of Information Engineering.
 Topic: “Enhancing type 1 diabetes care: A deep learning-powered clinical decision support system for proactive therapeutic interventions using explainable blood glucose forecasting”.
 Supervisor: Prof. Andrea Facchinetto; Co-supervisor: Prof. Giacomo Cappon
- Sept 2024 **Master's degree in Bioengineering (LM-21)** at the University of Padova, Italy.
 Final Grade: 110L/110. GPA: 29.90/30
 Thesis: “Deep Learning Algorithms for Blood Glucose Forecasting in Type 1 Diabetes”.
 Supervisor: Prof. Andrea Facchinetto, Co-supervisor: Dr. Francesco Prendin
- Jul 2022 **Bachelor's degree in Biomedical Engineering (L-8)** at the University of Padova, Italy. Final Grade: 110L/110. GPA: 29.82/30
 Thesis: “Implementation of a simulator for microbial communities based on a multi-agent model”.
 Supervisor: Prof. Massimo Bellato; Co-supervisor: Prof. Barbara di Camillo
- Jul 2019 **High-school diploma in Applied Sciences** at the Liceo Scientifico "Enrico Fermi", Padova, Italy. Final Grade: 83/100

3. TEACHING ACTIVITIES

3.1 Teaching assistance

- Academic Year **Teaching assistant** for the laboratory sessions of **Biological Signal Processing** (20 hours) and **Machine Learning for Bioengineering** (16 hours) in the Master's degree program in Bioengineering (LM-21) and for **Medical Informatics** (7 hours) in the Bachelor's degree program (L-8) at the Department of Information Engineering, University of Padova.

Academic Year **Teaching assistant** for the course **Biomedical Signal Processing** in the Bachelor's
22/23 degree Program in Biomedical Engineering (L-8) (50 hours, founded by the
University of Padova under the "Mille e una Lode" initiative, see section 6.2)

Total number of hours: 93 (93 for IBIO-01/A, ex ING/INF-06 courses)

4. RESEARCH ACTIVITY

4.1 Research activity topics

Development of deep learning algorithms for blood glucose forecasting in type 1 diabetes (2024-Today)

Type 1 Diabetes (T1D) is a chronic metabolic condition characterized by a deficiency in insulin production—a key hormone responsible for regulating blood glucose (BG) levels. As a result, individuals with T1D must continuously manage their BG to stay within the safe physiological range (70–180 mg/dL), often taking corrective actions when their levels deviate from this range. Forecasting algorithms can support this effort by enabling patients to act proactively, helping to prevent or mitigate impending glycemic events.

The field of BG forecasting in T1D has been extensively studied, with numerous algorithms proposed and several comprehensive reviews published. However, recent advancements in computational power and the increasing availability of continuous glucose monitoring (CGM) data have accelerated the adoption of deep learning approaches in this domain. Existing reviews, which generally cover developments up to 2020 and take a broader perspective, do not fully capture these emerging trends. To address this gap, we propose an updated review that focuses specifically on deep learning-based BG forecasting [SJ2].

In our review, we identify a key challenge in the field: the lack of a standardized evaluation framework, which hampers fair cross-study comparisons. Additionally, the most commonly used dataset—OhioT1DM—includes data from only 12 subjects, raising concerns about the generalizability of reported findings. This highlights the need for larger, more diverse, and comprehensive datasets to support the development and robust evaluation of BG forecasting models. To address this, we benchmarked the T1DEXI, which includes four weeks of data from 497 individuals with T1D. Using this dataset, we found that deep learning models outperform traditional autoregressive with exogenous input (ARX) models [A3], and that incorporating insulin, meal, and exercise information leads to improved performance over CGM-only approaches [C1].

In the review we also observed a limited adoption of eXplainable AI (XAI) techniques, which are essential for the safe and effective deployment of deep learning models in clinical practice. To address this gap, our upcoming publication focuses on evaluating the physiological fidelity of deep learning approaches, identifying their limitations, and proposing a solution through a physiologically-informed neural network.

4.3 Participation in competitive research projects

National projects

- 2022-2025 **A non-invasive tattoo-based continuous GLUCOse Monitoring electronic system FOR Type-1 diabetes individuals (GLUCOMFORT)**
PI: Andrea Facchinetto, Department of Information Engineering, University of Padova, Italy
Funded by MIUR (Italian Minister for Education) under the Progetti di Ricerca di Rilevante Interesse Nazionale 2020 (PRIN 2020) initiative. Protocol number identifier: Prot. 2020X7XX2P, topic identifier: PE8 (Physical sciences and engineering). Project budget: 638,940.00 €. (367,381.00 € for the University of Padova).
Role: PhD student

5. TALKS, SEMINARS, AND CONFERENCE PARTICIPATIONS

5.1 Invited talks

Demo presentations at international conferences – A. Calzavara speaker

- 2025 “Evaluating the Effect of Input Features on Deep Learning Models for Blood Glucose Forecasting” in the Demo and Innovation Fair of the 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society – EMBC, Copenhagen, Denmark, July 14-17, 2025. (see [C1] Section 10.3) [~3000 conference attendees]

5.2 Non-invited talks

Oral presentations at international conferences – A. Calzavara speaker

- 2025 “Evaluating the Effect of Input Features on Deep Learning Models for Blood Glucose Forecasting” in the 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society – EMBC, Copenhagen, Denmark, July 14-17, 2025. (see [C1] Section 10.3) [~3000 conference attendees]
- 2025 “Leveraging T1DEXI Study to Develop Deep Learning Models for Predicting Blood Glucose Levels” in the 18th International Conference on Advanced Technology & Treatment for Diabetes – ATTD, Amsterdam, Netherlands, March 19-22, 2025. (see [A3] Section 10.3) [~2500 conference attendees]

Total number: 2

Oral presentations at international conferences on contributed work – Other speakers

- 2023 Speaker: M. Bellato “Bactlife: an open-science-oriented simulator for bacterial communities’ evolution exploiting agent-based modeling and Dash GUI” in the 18th Conference on Computational Intelligence Methods for Bioinformatics & Biostatistics – CIBB, Padova, Italy, September 6-8, 2023 (see [SJ1] Section 10.4) [~1000 conference attendees]
- 2022 Speaker: M. Bellato “An agent-based simulator for microbial communities’ evolution” in the Bioinformatics and Computational Biology Conference – BBCC2022, Online, December 13-15, 2022 (see [A2] section 10.3).

Total number: 2

Poster presentations at national conferences

- 2023 Poster presented to the 8th edition of Italian National Bioengineering Group Congress, Padova, Italy. [~300 conference attendees]
- 2022 Poster presented to the 18th Annual Meeting of the Bioinformatics Italian Society, Verona, Italy. [~300 conference attendees]

Total number: 2

Seasonal schools

- 2025 1st International Summer School on AI for Diabetes Management, Girona, Spain, September 22-26
- 2025 Participation to the 1st AIxIA Summer School on Artificial Intelligence for Healthcare, Trento, Italy.
- 2021 Participation to the 40th edition of the Annual Summer School of the Italian National Bioengineering Group, Online.

Total number: 2

6. GRANTS, AWARDS, AND FELLOWSHIPS

6.1 Grants

- 1/11/2024-
30/09/2027 **University scholarship** (“borsa di dottorato” funded by University of Padova and its Department of Information Engineering) for attending the Ph.D. Course in Information Engineering (Bioengineering curriculum) at University of Padova.
- 2021, 2022,
2024 **University scholarship** (“Borsa di studio regionale” funded by University of Padova) awarded to capable and deserving students with limited financial means.

6.2 Awards

- 2025 **Luigi Divieti & Marisa Maranzana - Politecnico di Milano Award**
 Master's thesis prize awarded by the National Group of Bioengineering (GNB)
- 2025 **Special mention of Master's thesis** in the 3rd edition of the BCC Veneta Credito Cooperativo Award for the innovative theme and the theoretical and empirical contribution.
- 2022 **"Mille e una Lode Award"** by the University of Padova reserved for the best students from each degree course (~3% of the students)
- 2022 **Best Oral Presentation award** of the Bioinformatics and Computational Biology Conference – BBCC2022 for the work "Bactlife: an open-science-oriented simulator for bacterial communities' evolution exploiting agent-based modeling and Dash GUI" (speaker: M. Bellato)

6.3 Fellowships

- 2025 – Today **Student Fellow** of the IEEE Engineering in Biology and Medicine Society (EMBS)

7. EDITORIAL, REVIEWING, AND ADVISORY ACTIVITIES

7.2 Reviewer activity

- 2025 - **Reviewer for 1 Q1 and Q2 scientific journals**
 Today Scientific Reports (n=1), Artificial Intelligence In Medicine (n=1)

- 2025 – **Reviewer for conference**
 Today Annual International Conference of the IEEE Engineering in Medicine and Biology Society (n=2)

Total number: 1 for journals, 2 for conferences

8. THIRD-MISSION ACTIVITIES

8.1 Participation to orientation activities for prospective students

- 18/02/2025 Served as an orientation tutor for prospective Biomedical Engineering students at the University of Padova during the "Scegli con noi" Fair in Padova, Italy (2 hours).
- 30/11/2024 Served as an orientation tutor for prospective students of the Department of Information Engineering, University of Padova, at the Job&Orienta Fair in Verona, Italy (8.5 hours).

9. OTHER EXPERIENCE

Languages

Italian	Mother tongue
English	C1
French	A2
Spanish	A2

Digital skills

Advanced	Matlab, R, Python
Intermediate	LaTeX, Microsoft Office Package, Git/GitHub, Simulink
Basic	SLURM Job Scheduler, SQL

10. PUBLICATIONS

10.2 Manuscript submitted/to be submitted to international journals

[SJ1] M. Bellato, A. Calzavara, S. Rebecca, N. Venturini Degli Esposti, A. Lucchiari, M. Cappellato, and B. Di Camillo, "Bactlife: an open-science-oriented simulator for bacterial communities' evolution exploiting agent-based modeling and Dash GUI" BMC Bioinformatics Supplements - CIBB2023 Special Issue (under revision, submitted January 2024).

[SJ2] A. Calzavara, F. Prendin, G. Cappon, S. Del Favero, and A. Facchinetti "Systematic Review on Deep Learning Algorithms for Blood Glucose Forecasting in Type 1 Diabetes" Journal of Biomedical and Health Informatics (under revision, submitted May 2025).

10.3 Publication related to international conferences

Peer-reviewed Scopus-indexed conference papers

[C1] A. Calzavara, F. Prendin, G. Cappon, S. Del Favero, and A. Facchinetti "Evaluating the Effect of Input Features on Deep Learning Models for Blood Glucose Forecasting" in the 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society – EMBC, Copenhagen, Denmark, July 14-17, 2025 (**accepted for oral presentation, speaker A. Calzavara**).

Abstracts

[A1] M. Bellato, A. Calzavara, M. Cappellato, and B. Di Camillo "Implementation of a Python simulator for microbial communities evolution via agent-based modelling" in the 18th Annual Meeting of the Bioinformatics Italian Society, June 27-29, Verona, Italy.

[A2] M. Bellato, M. Cappellato, A. Calzavara, S. Rebecca, A. Lucchiari, and B. Di Camillo "An agent-based simulator for microbial communities' evolution" in the Bioinformatics and Computational Biology Conference – BBCC2022, Online, December 13-15, 2022 (**accepted for oral presentation, speaker M. Bellato**).

[A3] **A. Calzavara**, F. Prendin, G. Cappon, and A. Facchinetti, "Leveraging T1DEXI Study to Develop Deep Learning Models for Predicting Blood Glucose Levels", in the 18th International Conference on Advanced Technology & Treatment for Diabetes – ATTD, Amsterdam, Netherlands, March 19-22, 2025 (accepted for oral presentation, speaker **A. Calzavara**).

10.4 Publications related to national conferences

Peer reviewed Scopus-indexed conference papers

[CN1] M. Bellato, M. Cappellato, **A. Calzavara**, A. Lucchiari, S. Rebecca, and B. Di Camillo "Simulating microbial communities' evolution via Agent based modelling: a Python tool" in the 8th Congress of the National Group of Bioengineering – GNB, Padova, Italy, Jun 21-23, 2023.