EMANUELE SCAPIN

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GENERAL INFORMATION

· Name: Emanuele Scapin

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· Position: Full-time permanent high school teacher since 2012 at Istituto Tecnico Tecnologico "G. Chilesotti", Via dei Tigli 10, 36016 Thiene (VI), Italy
National qualification since 2006 for teaching in secondary schools, sector A041 Computer Sciences and Technologies ("Scienze e Tecnologie Informatiche"), and sector A026 Matematics ("Matematica")

· PhD in Computer Science, Mathematics and Physics, University of Udine, Italy (2022)
Degree in Computer Science ("Laurea in Scienze dell'Informazione"), University of Udine, Italy (1995)

· Enrolled since 2007 in the register of the Engineers' Association of Province of Vicenza, serial number 2895

TEACHING AND RESEARCH

Temporary Professor at University of Verona July 2024 - To Date

· **Computer Science Education**,
courses relating to the initial teacher training enabling courses 30 and 60 CFU (annex 2 of the Prime Ministerial Decree of 4 August 2023)

- The source of ideas and the role of the teacher in presenting a specific topic.
- Presentation of disciplinary aspects related to the specific topic to be addressed.
- Presentation of any existing Computer Science Education research on the specific topic.
- Problem-solving aspects related to the topic.
- Identification of students' alternative concepts.
- Analysis of possible teaching methods.
- Design of theoretical and/or laboratory activities: the lessons.
- Tools (languages, IDEs, tools, etc.) for theoretical and practical activities.
- Identification of possible student difficulties and the role of feedback.
- Highlighting student difficulties and designing support interventions, also considering different cognitive and learning styles.
- Gender differences in learning computer science topics.
- Aspects of taxonomy and assessment, including the production of assessment grids.
- Case studies on classic computer science topics (not only algorithms and coding but also related to Systems and Networking and Information Systems).
- Individual projects on planning teaching units, with the identification of the knowledge, skills, and abilities to be developed in students; identification of useful examples during presentations, as well as subsequent consolidation exercises, including laboratory activities, with the identification of criticalities for potential student difficulties and the identification of alternative methodologies to facilitate learning.
- Analysis in relation to students' cognitive and learning styles and the meta-cognitive approach.
- The challenges of Artificial Intelligence (AI) in Computer Science teaching.

Teaching in upper secondary schools 2003 - To Date

· **Computer Science**

- Introductory courses: coding and program language, iterations, recursion, array, algorithms
- OOP courses: object-oriented programming, class, polymorphism, hierarchy, Abstract Data Type (ADT), algorithms
- Database and web technologies: database design and management, SQL, Javascript, PHP, web application

· **System and networking**

- Introductory courses: Von Neumann's and x86 CPU architectures, x86 assembly language, ISO/OSI Physical and Data Link layers
- Networking: ISO/OSI Network and Transport layers, relation to TCP/IP model, IPv4/IPv6 Internet Protocol, routing and routing algorithms
- Networking and Security: ISO/OSI Session-Presentation-Application layers, relation to TCP/IP model, Cryptography (Classic, Symmetric-key, Public-key), Cybersecurity

· **Technologies and design of information systems**

- Introductory courses: coding of information, operative systems, algorithms of scheduling, memory management, I/O management
- Concurrent programming: concurrency and thread, synchronization, resources management
- Client-Server application: socket communication, concurrency and thread, web service SOAP, API Rest, Android app

· **Project management and business organization**

- Elements of Project Management
- Creating the project schedule
- Cost management and control and variance analysis
- Elements of software engineering

PhD teaching experience 2020 - 2021

· **February 2021 - June 2021**

- Programming and laboratory (20 hours)
  Teaching of the first year of the Computer Science degree course, University of Udine, Italy, Lecturer: Dr. Claudio Mirolo

· **February 2020 - June 2020**

- Didactics of Informatics (10 hours)
  Teaching of the first year of the Computer Science master degree course, University of Udine, Italy, Lecturer: Dr. Claudio Mirolo
- Programming and laboratory (10 hours)
  Teaching of the first year of the Computer Science degree course, University of Udine, Italy, Lecturer: Dr. Claudio Mirolo

Research 2019 - To Date

· **Didactics of Informatics**

· Investigation concerning learning students' difficulties with iterations, task-related models to improve the learning of iteration in the high school.

· Investigation concerning learning students' difficulties with concurrency programming and thread, task-related models to improve the learning of thread in the high school, identification of graphic tools to facilitate the learning of concurrent programming and thread by students.

· Design and implementation of introductory courses in Artificial Intelligence (AI) and Machine Learning (ML) for high school students, identifying training programs to incorporate into the curriculum.

EDUCATION

Università degli Studi di Udine, Udine, Italy *November 2018–October 2021*
Ph.D. in Computer Science, Mathematics and Physics
Research area: Computer Science Education
Thesis: "Task-related models for teaching and assessing iteration learning in high school"
Supervisors: Prof. Alberto Policriti and Dr. Claudio Mirolo

Università degli Studi di Padova, Padua, Italy *October 2020–July 2021*
Annual postgraduate course: *Tutor dell'apprendimento* (Learning Tutoring)

Università degli Studi di Udine, Udine, Italy *3–7 June 2019*
International Summer School on Artificial Intelligence: *AI-DLDA 2019 – From Deep Learning to Data Analytics*

Università degli Studi Guglielmo Marconi, Rome, Italy *October 2010–March 2011*
Italian annual postgraduate Master's course in Teaching Disciplines: *Dai fondamenti di geometria alle geometrie non euclidee*

Università degli Studi Guglielmo Marconi, Rome, Italy *September 2009–April 2010*
Italian annual postgraduate Master's course in Teaching Disciplines: *Elementi di logica matematica*

Università Ca' Foscari Venezia, Venice, Italy *September 2004–May 2006*
Postgraduate School for Secondary Teacher Education (SSIS Veneto)[1]
Teaching qualification in Computer Science and Mathematics for upper secondary schools

Università degli Studi di Udine, Udine, Italy *2004, first session*
Professional Qualification in Information Engineering

Università degli Studi di Udine, Udine, Italy *September 2002–May 2003*
Master's Degree in Computer Science

Università degli Studi di Udine, Udine, Italy *September 1989–March 1995*
Degree in *Scienze dell'Informazione*[2]
Thesis: "L'uso delle continuazioni nella semantica"
Supervisor: Prof. Furio Honsell
Final mark: 98/110

SINGLE COURSES

Università degli Studi di Udine *March 2026 - 21 September 2026*
Course: Machine Learning for Big Data
Professor: Prof. Giuseppe Serra
Mark: 30 L / 30

Università degli Studi di Udine *March 2025 - 24 July 2025*
Course: Internet of Things (IoT)
Professor: Dr. Ivan Scagnetto
Mark: 30 L / 30

[1]The Scuola di Specializzazione all'Insegnamento Secondario (SSIS) was a two-year Italian postgraduate programme for the professional preparation of lower- and upper-secondary school teachers.
[2]Degree awarded under the former four-year Italian university system.

RESEARCH QUALITY

Bibliometric Indicators 2019 - To Date

- **Scopus**: h-index = **3** – documents = 6 – citations = 39
- ResearchGate: h-index = 3 – documents = 11 – citations = 60

WORKING EXPERIENCE

IT Consultant and Software Engineer January 2004 - To Date
Freelancer software engineer with VAT number *Schio (VI), Italy*

- Main collaboration with Satelicom s.r.l., Battistolli Group, in Vicenza.
- Project manager in several information systems application development.
- Design and development of an application, in Delphi, for the management of vehicle safety with on-board devices operating with GSM/GPS technology, furthermore design and development of an Oracle database (management tables, views, indexes, triggers, stored functions and procedures in PL/SQL).
- Design and development of suite of applications, in Java, for the management of safe vehicle routes via geofencing with PTV xServer technology.
- Design and development of suite of web services SOAP, in Java, for exchanging data between remote applications.
- Design and development of a Android application for the management of vehicle fleets.
- Design and development a information system to manage patrols turns, with geo-localization, patrol route automatic generation (by PTV xTour), and dedicated Webservice SOAP.
- Design and development of an application, in Ruby on Rails, for the management of vehicle safety with on-board devices operating with GSM/GPRS/GPS technology, furthermore design and development of PostgreSQL database.
- Design and development suites of API Rest and API GraphQL.
- Development application tools, in C#, dedicated to the recovery and analysis of data present in MS SQL Server database.
- Design and management servers infrastructures with HP Hosts, VSphere virtualization, Veeam servers backup, web servers balancing, EDB PostgreSQL Barman backup.
- Design and development of a new infrastructure based on the IoT (Internet of Things) paradigm, using Kafka & Kafka Stream, MQTT protocol, Mosquitto MQTT broker, PostgreSQL database.

Università degli Studi di Verona July 2024 - To Date
Temporary Professor in Computer Science Education *Verona, Italy*

Computer Science Teaching courses related to the Initial Training Qualifying Paths (Percorsi abilitanti di formazione iniziale - PFI) for 30 and 60 CFU teachers (Annex 2 of the Prime Ministerial Decree of 4 August 2023).

Courses:

- Computer Science Teaching: Methodologies, Programming, Languages.
- Educational planning in Computer Science: laboratory.
- Information technology and technology to support teaching.

Istituto Tecnico Superiore J.F.Kennedy January 2016 - May 2017
Computer Science teacher *Thiene (VI), Italy*

- Computer Science teacher in a higher technical institute.
- Higher technical course on methods and technologies for the development of software systems – integrated applications on mobile devices.
- Module teacher on Java OOP (40 hours).

ITT G.Chilesotti September 2012 - To Date
Computer Science teacher *Thiene (VI), Italy*

- Computer Science teacher in a state technological institute (upper secondary school).
- Experience in teaching Computer Science, System and Networking, Technology.
- Responsible for the disciplinary area in Computer Science from 2012 to 2018.
- On leave for PhD from November 2018 and October 2021.
- Since September 2023 responsible for the specialization in Computer Science.
- Coordinator of various projects in collaboration with local IT companies.

Liceo Statale F.Corradini September 2010 - August 2012
Computer Science teacher *Thiene (VI), Italy*

- Computer Science teacher in a state lyceum (upper secondary school).
- Recruitment in September 2011.

IIS G.A.Remondini September 2009 - July 2010
Computer Science teacher *Bassano del Grappa (VI), Italy*

- Computer Science teacher in a state professional institute (upper secondary school).

Liceo Statale F.Corradini September 2008 - July 2009
Computer Science teacher *Thiene (VI), Italy*

- Computer Science teacher in a state lyceum (upper secondary school).

IIS S.Ceccato September 2007 - July 2008
Computer Science teacher *Montecchio Maggiore (VI), Italy*

- Computer Science teacher in a state economic institute (upper secondary school).

ITIS E.Fermi September 2006 - July 2007
Computer Science teacher *Bassano del Grappa (VI), Italy*

- Computer Science teacher in a state technological institute (upper secondary school).

Liceo Classico G.B.Brocchi September 2005 - June 2006
Computer Science teacher *Bassano del Grappa (VI), Italy*

- Computer Science teacher in a state lyceum (upper secondary school).

ITIS G.Chilesotti October 2004 - June 2005
Computer Science teacher *Thiene (VI), Italy*

- Computer Science teacher in a state technological institute (upper secondary school).

IPSIA C.Lobbia September 2003 - December 2003
Computer Science teacher *Asiago (VI), Italy*

- Computer Science teacher in a state professional institute (upper secondary school).

Salvagnini Italia S.p.A. January 2001 - September 2003
Software engineer *Sarego (VI), Italy*

- Software development, in C++, for application tools related of robotic bend presses management.

A.T.E. S.p.A. January 1999 - December 2000
Software engineer *Vicenza, Italy*

- Software development, in Visual Basic and C++, for application tools related satellite geo-localization devices management with GSM and GPS technology.

C.A.& G. S.p.A. October 1996 - January 1999
Software engineer *Cornedo Vicentino (VI), Italy*

- Development of assembly firmware for SGS-THOMSON (today STMicroeletronics) ST6 family micro-controllers.
- Software development for analysis tools in Turbo Pascal and Delphi.

Battaglione Logistico "Cadore" October 1995 - October 1996
Military service *Belluno, Italy*

- Compulsory military service in the Alpine troops.

C.A.& G. S.p.A. April 1995 - October 1995
Software engineer *Cornedo Vicentino (VI), Italy*

- Development of assembly firmware for SGS-THOMSON (today STMicroeletronics) ST6 family micro-controllers.
- Software development for analysis tools in Turbo Pascal.

TECHNICAL STRENGTHS

Operative Systems	Windows & Windows Server, Linux (Fedora, CentOS), Android
Computer Languages	Pascal/Delphi, C/C++, C#, Java, Ruby on Rails, Python
Web tecnologies	HTML, CSS, Javascript, PHP, Java Server Pages (JSP)
Protocols & APIs	XML, JSON, SOAP, REST, GraphQL
Databases	MySQL, PostgreSQL, Microsoft SQL Server, Oracle
Database Languages	SQL, PL/SQL
Tools	Vim, SoapUI, JetBrains Toolbox, Toad

SCIENTIFIC MEETINGS AND EVENTS

Participation in the following scientific conferences, meetings and events

- ITADINFO 2026 – 4th National Conference on Didactics of Informatics, Padua, Italy, October 9-11, 2026. Proceedings have been published at link `https://www.itadinfo.it/`.

- Online-Panel: "The Future of Programming Education: International perspectives on programming, AI literacy, and computational thinking", December 9, 2025, managed by Zurich University of Teacher Education (PHZH), `https://phzh.ch/ueber-die-phzh/aktuell/veranstaltungen/veranstaltung/?anlassId=144700696`

- ITADINFO 2025 – 3rd National Conference on Didactics of Informatics, Salerno, Italy, October 3-5, 2025. Proceedings have been published at link `https://www.itadinfo.it/`.

- ITADINFO 2024 – 2nd National Conference on Didactics of Informatics, Genoa, Italy, October 18-20, 2024. Proceedings have been published at link `https://gup.unige.it/ITADINFO-2024`.

- ISSEP 2023 – The 16th International Conference on Informatics in Schools – 23-25 October 2023, HEP Vaud, Lausanne, Switzerland. Proceedings have been published at link `https://issep2023.hepl.ch/`.

- ITADINFO 2023 – 1st National Conference on Didactics of Informatics, Bari, Italy, October 13-15, 2023. Proceedings have been published at link `https://www.itadinfo.it/attidelconvegno/`.

- ISSEP 2021 – 14th International Conference on Informatics in Schools: Situation, Evolution, and Perspectives, Nijmegen, The Netherlands, November 3-5, 2021, Online Conference. Proceedings have been published at link https://issep2021.science.ru.nl/online-local-proceedings/index.html.

- ISSEP 2020 – 13th International Conference on Informatics in Schools: Situation, Evolution, and Perspectives, Tallinn, Estonia, November 16-18, 2020, Online Conference. Proceedings have been published at link https://ceur-ws.org/Vol-2755/.

- DIDAMATiCA 2020 (DIDAttica e inforMATICA – IT for Teaching), Trieste, Italy, November 12-13, 2020, Online Conference. Proceedings have been published at link https://www.aicanet.it/didamatica2020

- WiPSCE 2020 – The 15th Workshop in Primary and Secondary Computing Education, October 28-30, 2020, Essen, Germany, Online Conference. Proceedings have been published as part of the ACM International Conference Proceedings Series. https://www.wipsce.org/2020/index.php

- ISSEP 2019 – 12th International Conference on Informatics in Schools: Situation, Evolution, and Perspectives, Larnaca, Cyprus, November 18-20, 2019. Proceedings have been published in Lecture Notes in Computer Science, vol 11913. Springer, Cham. https://cyprusconferences.org/issep2019/

- DIDAMATiCA 2018 (DIDAttica e inforMATICA – IT for Teaching), Cesena, Italy, April 19-20, 2018. Proceedings have been published at link https://www.aicanet.it/didamatica2018/atti-2018

REVIEWING ACTIVITY

Scientific committee member, and/or referee for conferences and workshops

- **ITADINFO 2026** *March 2026 - 11 October 2026*
  The fourth edition of the conference "ITAliano sulla Didattica dell'INFOrmatica" (ITADINFO 2026) – Padua, Italy

- **ITADINFO 2025** *March 2025 - 5 October 2025*
  The third edition of the conference "ITAliano sulla Didattica dell'INFOrmatica" (ITADINFO 2025) – Salerno, Italy

INVITED TALKS AND SEMINARS

- **Le sfide dell'Intelligenza Artificiale nell'insegnamento dell'Informatica** *21 May 2026*
  Invited lecture within the course *Didattica dell'Informatica* (Dr. Claudio Mirolo).
  University of Udine, Udine, Italy

- **CompreSsione e CompreNsione – Un'escursione algoritmica fra informazione e bit** *14–18 June 2021*
  Invited seminar.
  University of Udine, Udine, Italy

- **Avventure Algoritmiche – Algoritmi "Smart"** *28 October 2019*
  Invited seminar.
  University of Udine, Udine, Italy

INVITED ACADEMIC AND EDUCATIONAL ACTIVITIES

- **Computer Science Education – Didattica dell'Informatica** *29 January–26 March 2025*
  Invited training course (10 hours)
  ITIS E. Fermi, Bassano del Grappa (VI), Italy
  Funded under DM 66/2023, European Union – NextGenerationEU

AWARDS AND GRANTS

Awards

- **DIDAMATiCA 2020** (DIDAttica e inforMATICA – IT for Teaching), Trieste, Italy, November 12-13, 2020
  Organizers: AICA (Associazione italiana per l'informatica ed il calcolo automatico) and University of Trieste
  Best paper in Scientific session "Coding and STEM"
  Award received for the work entitled "An Investigation of High School Students' difficulties with Iteration-Control Constructs" by E. Scapin, C. Mirolo

PUBLICATIONS

International Journal

· Claudio Mirolo, Cruz Izu, Violetta Lonati, Emanuele Scapin. (2021). **Abstraction in Computer Science Education: An Overview**, Informatics in Education 20, no. 4, 615-639, DOI 10.15388/infedu.2021.27 https://infedu.vu.lt/journal/INFEDU/article/720/info

Papers in international refereed conferences and workshops proceedings

· Scapin, E., Dalla Pozza, N., Mirolo, C. (2023). **An Exploratory Investigation on High-School Students' Understanding of Threads**. In: Pellet, JP., Parriaux, G. (eds) Informatics in Schools. Beyond Bits and Bytes: Nurturing Informatics Intelligence in Education. ISSEP 2023. Lecture Notes in Computer Science, vol 14296. Springer, Cham. https://doi.org/10.1007/978-3-031-44900-0_8

· Mirolo C., Scapin E. (2022). **An Exploration of High School Students' Self-Confidence while Analysing Iterative Code**. In A. Bollin & G. Futschek (Eds.), Local Proceedings of ISSEP 2022 — 15th International Conference on Informatics in Schools: Situation, Evolution, and Perspectives. Wien, Austria: TUW - Vienna University of Technology. https://air.uniud.it/retrieve/2e6db96d-dbe1-46e5-af5c-39165e2a7805/mirolo_scapin_22.pdf

· Scapin E., Mirolo C. (2021). **Design and development of an instrument to investigate high-school students' understanding of iteration**. In E. Barendsen & C. Chytas (Eds.), Local Proceedings of ISSEP 2021 — 14th International Conference on Informatics in Schools: Situation, Evolution, and Perspectives. Nijmegen, The Netherlands: Radboud University. https://issep2021.science.ru.nl/wp-content/uploads/2021/11/Design-and-development-of-an-instrument-1.pdf

· Scapin E., Mirolo C. (2020). **An Exploratory Study of Students' Mastery of Iteration in the High School**. In K. Kori & M. Laanpere (Eds.), Local Proceedings of ISSEP 2020 — 13th International Conference on Informatics in Schools: Situation, Evolution, and Perspectives. Tallinn, Estonia: University of Tallinn. https://ceur-ws.org/Vol-2755/paper4.pdf

· Claudio Mirolo, Cruz Izu, and Emanuele Scapin. (2020). **High-school students' mastery of basic flow-control constructs through the lens of reversibility**. In Proceedings of the 15th Workshop on Primary and Secondary Computing Education (WiPSCE '20). Association for Computing Machinery, New York, NY, USA, Article 15, 1–10. DOI:https://doi.org/10.1145/3421590.3421603.

· Scapin, E., Mirolo, C. (2019). **An Exploration of Teachers' Perspective About the Learning of Iteration-Control Constructs**. In: Pozdniakov, S., Dagienė, V. (eds) Informatics in Schools. New Ideas in School Informatics. ISSEP 2019. Lecture Notes in Computer Science(), vol 11913. Springer, Cham. https://doi.org/10.1007/978-3-030-33759-9_2.

Papers in national journals and books

· Scapin, E., Mirolo, C. (2020). **An Investigation of High School Students' difficulties with Iteration-Control Constructs**. Mondo Digitale, 2020, 19(89), pp. 1–11. https://mondodigitale.aicanet.it/numero-89-2020-2/

Papers in national conferences and workshops proceedings

· Scapin E., Honsell F., Chilese A. (2026). **L'Odissea: una Stochastic Gradient Descent omerica? Alla ricerca di nuove piste nell'insegnamento dell'Informatica**. In Proceedings of ITADINFO 2026, Padua,

Italy, October 9-11, 2026. https://www.itadinfo.it/attidelconvegno/

· Dalla Pozza N., Scapin E. (2025). **Tre concetti chiave per un corso sul Machine Learning alle scuole superiori**. In Proceedings of ITADINFO 2025, Salerno, Italy, October 3-5, 2025. https://www.itadinfo.it/download/2900/?tmstv=1759227177

· Scapin E., Dalla Pozza N. (2024). **Indagine su Approccio Cognitivo e Risultati conseguiti dagli Studenti delle Scuole Superiori in Problemi di Programmazione Concorrente**. In Proceedings of ITADINFO 2024, Genoa, Italy, October 18-20, 2024. https://gup.unige.it/ITADINFO-2024

· Scapin E., Dalla Pozza N. (2023). **Sviluppo di un sondaggio sulla comprensione dei threads tra gli studenti delle scuole superiori**. In Proceedings of ITADINFO 2023, Bari, Italy, October 13-15, 2023. https://www.itadinfo.it/2023/attidelconvegno/ATTI-ITADINFO-2023.pdf

· Scapin E. (2018). **Gli invarianti per riflettere sull'iterazione nella scuola secondaria: un'esperienza sul campo**. In Proceedings of DIDAMATiCA 2018, Cesena, Italy, April 19-20, 2018. https://www.researchgate.net/publication/333479861_Gli_invarianti_per_riflettere_sull'iterazione_nella_scuola_secondaria_un'esperienza_sul_campo