

Desiree MANICARDI

PhD in “Computer Science and Computational Mathematics”

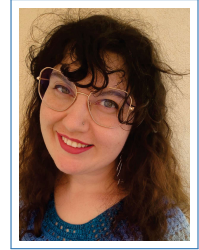
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Summary

- Bachelor's and Master's Degrees in “Computer Science”;
- **Ph.D.** in “**Computer Science** and Computational Mathematics”;
- Over 4 years of experience in academia, focusing on **modelling biological systems** (formal models, process algebra, stochastic models, and *Python implementation*);
- Over 4 years of professional experience in **Python** development (Matplotlib, Pandas, SciPy, Statistics, and NumPy);
- Experience with **GitHub** since 2020; I am currently learning how to use *Git*;
- I have attended over 20 courses in Computer Science in the past four years;
- I took several courses in *privacy and security*, *cloud computing*, *computer engineering* and *requirements analysis* during my degrees;
- I completed 16 projects at university (read the “Projects as a student” section for more information), of which: 8 projects using *UML*, one project using *KAOS* and *Problem Frames* diagrams, one about developing a user guide and 5 projects focusing on *software life cycle*;
- Since December 2023, I have been managing my website using *HTML*, *CSS*, *Bootstrap*, and *JavaScript*;
- Experience in *delivering Python and Java laboratory lectures* for Bachelor's and Master's students, in **Italian**, which is my native language;
- I co-wrote papers in **English**, and *I am the corresponding author* of our paper: “Step-by-step Robustness for Biochemical Networks” – see the Publications section.
- I was a speaker at ICTCS 2023 (24th Italian Conference on Theoretical Computer Science);
- I earned the FCE certification (First Certificate in English, March 2023, CEFR B2).

Current Position

from 04/2025 **Didactic tutor for the course “Didattica dell'Informatica”**, *University of Milan-Bicocca*, Milan, Italy

Education

from 11/2020 to 05/2024 **Ph.D. in “Computer Science and Computational Mathematics”**, *University of Insubria*, Como, Italy

- Thesis: **“Formal Models for Biological Systems”** (in English).
- I focused my research on *formal models for biological systems*. I started modelling some interesting biological systems such as the Heart system via *CospanSpan(Graph)*, which is a compositional model having *mathematical rigor* and tailored for modelling *large systems*. Then, I worked on a model to formalise a process algebra. It is user-friendly, easy to implement, and tailored for modelling *biochemical reaction networks*. The main contribution – the first one – is related to the study of the robustness of biochemical networks. In particular, we take inspiration from the notion of α -robustness, which, intuitively, verifies how by varying the initial concentration of some species, called conventionally the input species, the concentration of other species of interest, called the output species, varies at steady state. Robustness in our sense captures random effects and temporary effects that are typical of the stochastic model.
- Camp: “Innovation Camp for PhD Students – Deep Dive Into Innovation and Execution” (03-05/2021).
- Public Ph.D. Scholarship for the best 6 Ph.D. applications for the XXXVI Ph.D. Cycle at the “Computer Science and Computational Science” Ph.D. course, Theoretical and Applied Sciences Department of University of Insubria, October 2020.
- **Attended courses:**
 - *Advanced Topics in Cryptography*;
 - *Bioinformatics*;
 - *Computational Cognitive Modeling*;
 - *Early design of Internet of Things networks towards real deployment*;
 - *Graph Labelings, Colorings and Their Applications*;
 - *Modeling and Verifying Hybrid Systems*;
 - *Systems, Modelling & Simulations*;
 - *Technologies for processing streaming data pipeline*.

from 12/2016 to 07/2018 **Master’s Degree in “Computer Science”**, *University of Insubria*, Varese, Italy, *110/110 cum laude*

- Thesis: **“Modellazione di un Pacemaker Dual Chamber in Span(Graph)”** (in Italian) – Modeling a Dual Chamber Pacemaker in Span(Graph).
- Main courses: Software Engineering, Requirements Engineering, Programming in Java and C, Models of Computation, Models for Biological Systems, Privacy and Security, Artificial Intelligence.
- *Six projects*.
- Two scholarships.

from 09/2013 to 12/2016 **Bachelor’s Degree in “Computer Science”**, *University of Insubria*, Varese, Italy, *101/110*

- Thesis: **“Progettazione e sviluppo di un’applicazione per il filtraggio di messaggi di Twitter”** (in Italian) – Design and development of an application for filtering Twitter messages.
- Main courses: Database, Privacy and Security, Coding theory, Programming in Java, Software Design, Web applications.
- *Seven projects*.
- One scholarship.

Experience

Research Experience

- from 03/2024 to 02/2025 **Recognised Researcher ("Assegnista di Ricerca")**, *University of Insubria*, Como, Italy
- Research Title: "Specifica e analisi delle differenze comportamentali nei sistemi biomedici".
 - Project: "MEDICA: Modelling and vErification of alkaptonuria and multiple sclerosis Driven by biomedICA data" ("MEDICA: Modellazione e verifica dell'alcaptonuria e della sclerosi multipla guidate dai dati").
 - See the website [here](#).

Computer Science

- from 11/2017 to 05/2018 **Traineeship**, *University of Insubria*, Como, Italy
- Analysis of the Span-Cospan(Graph) formalism, focusing on timing.
Using *Span(Graph)* and (*timing*) *Cospan(Graph)* formalisms.
- from 02/2016 to 09/2016 **Traineeship**, *University of Insubria*, Varese, Italy
- Design and development of a web application aimed at filtering tweets using Twitter API.
Using *OAuth*, *API REST*, *Twitter API*, *PHP*, *CSS*, *Putty*.

Teaching activities - Didactic support (in Italian)

- A.Y. 2021-22 **Tutor for the course "Programmazione"**, *University of Insubria*, Como, Italy
- Programming language: *Java*.
- A.Y. 2020-21 **Adjunct Professor for the course "Software Python"**, *University of Turin*, Turin, Italy
- In Italian: *Professoressa Universitaria a Contratto*.
The course was configured as supplementary teaching of the "Methods of simulation for statistics" course – Department of Economics and Statistics "Cognetti de Martiis", Master in "Statistical and Economic Methods for Decisions" (Corso di Laurea Magistrale in "Metodi statistici ed economici per le decisioni").
Programming language: *Python*.
See the program [here](#).
- A.Y. 2020-21 **Assistant for the course "Programmazione"**, *University of Insubria*, Como, Italy
- Programming language: *Java*.
- S.Y. 2020-21 **Tutor for the course "Le Basi della Scienza dei Dati"**, *"I Lincei per la Scuola" Foundation*, Milan, Italy
- A.Y. 2019-20 **Assistant for the course "Le Basi della Scienza dei Dati"**, *University of Milan-Bicocca*, Milan, Italy

S.Y. 2011-12 **Tutor for the course “Nonni su Internet”**, *Istituto Tecnico Economico Enrico Tosi*, Busto Arsizio, Italy
Delivered individual and small group lessons on navigating the Internet and using the Microsoft Office suite.

Miscellaneous

from 12/2018 **Administrative employee**, *Comune di Olgiate Olona*, Olgiate Olona, Italy
to 12/2019

from 07/2012 **Administrative Traineeship**, *Comune di Olgiate Olona*, Olgiate Olona, Italy
to 08/2012

Projects as a *Recognised Researcher* (“*Assegnista di Ricerca*”)

from 03/2024 *Modelling and vErification of alkaptonuria and multiple sclerosis Driven by biomedical-*
to 02/2025 *CAI data (MEDICA)*, financed by MIUR-PRIN 2022.
○ Four universities: University of Pisa, University of Turin, University of Siena and University of Insubria.
○ See the website [here](#);
○ Programming languages: *Python* and mainly *Java*.

Projects as a student

As a Ph.D. Student

from 06/2021 **Read patients’ heart beats per minute divided by gender and age**
to 07/2021 *smart-health, IoT, NoSQL, PHP, JavaScript, authentication, MongoDB, Node-RED, creating dashboards, UML, StarUML, TCP and MQTT protocols, LinuxOS*
Design and development of a simulated smart-assed IoT application, using *PHP* to simulate hardware entities.
No grade, but passed.

As a Master Student

from 11/2017 **Traineeship** *Span(Graph), (timing) Cospan(Graph) formalisms*
to 05/2018 Analysis of the Span-Cospan(Graph) formalism, focusing on timing.

from 05/2018 **Remote insulin calculation for non-pediatric diabetic patients**
to 06/2018 *smart-health, IoT, Java, authentication, MongoDB, Node-RED, creating dashboards, UML, StarUML, TCP and MQTT protocols, LinuxOS*

Design and development of a simulated smart-assed IoT application, using *Java* to simulate hardware entities.

Grade: 27/30 (only project).

from 01/2018 **Support vector machine for collaborative filtering** *data mining, Java, Weka*
to 02/2018 Data mining application considering different classification algorithms: *Multilayer Perceptron, IBk, Naive Bayes, Random Forest, and J48*.
Grade: 29/30 (only project).

from 12/2017 **3D videogame** *Unity, HTML*
to 01/2018 Creation of a video game using the following tools and techniques: animations, particle systems, physics, collisions, meshes, shaders, textures, 3D models, and audio.
No grade, but passed.

from 10/2017 **A project about computer and requirements engineering**
to 12/2017 *UML, StarUML, KAOS and Problem Frames diagrams, software life cycle*
Study of the software lifecycle using UML diagrams, StarUML, KAOS, and Problem Frames: Analyzed and documented software processes to improve understanding and communication of system requirements.
Grade: 29/30 (only project).

07/2017 **Manage a library** *JSON, NoSQL database, software life cycle*
Management of a book list.
Grade: 29/30 (theory & project).

from 12/2016 **A real-time application** *UML, StarUML, C, Keil uVersion4, software life cycle*
01/2017 Development of a simulated automated sorting system with diverters and routers for packages, along with testing management.
Grade: 30/30 (only project).

As a Bachelor Student

from 02/2016 **Traineeship** *OAuth, API REST, Twitter API, PHP, CSS, Putty*
to 09/2016 Design and development of a web application aimed at filtering tweets using Twitter API.

06/2016 **Three apps Android** *fragments, data storage, location API, threads e AsyncTask*
Creation of three Android apps using fragments, data storage, location API, threads, and AsyncTask.

Grade: 30/30 (only project).

05/2016 **A web site** *HTML, CSS, JavaScript, AJAX, JQuery, PHP, SQL, MySQL, PhpMyAdmin, authentication, Apache HTTP Server, UML and ER diagrams, StarUML*

Creation of a website for adding, editing, deleting, and searching quotes and their authors.

Grade: 26/30 (theory & project).

from 11/2015 **A social network** *Java, PostgreSQL, SQL, UML and ER diagrams, StarUML,*
to 05/2016 *software life cycle, develop a user guide, authentication*

Design and development of a social network.

Grade: 27/30 (only project).

08/2015 **A project about analysis and recognition in social networks** *Java, Gephi*

Dissemination of information on the social network Twitter: analysis of social network structure considering friends/followers. Identified local bridges (or edges with low neighborhood overlap) and verified their correspondence to weak ties based on behavior in retweets, mentions, and replies. The network was partitioned based on these ties.

Grade: 26/30 (theory & project).

from 02/2015 **A project about software design** *Java, UML diagrams, StarUML, software life cycle*
to 04/2015 Design and development of an application to manage an inventory of items.

Grade: 30/30 (theory & project).

from 10/2014 **Manage a transport company** *Java, Assembly, UML, StarUML*

to 02/2015 Development of an application to manage public transportation in a town which allows users to select the fastest route from point A to point B at a specified time, with results sorted by the number of transfers and travel time.

Grade: 27/30 (only project).

from 01/2015 **A hardware and software project** *ArduinoUNO*

to 02/2015 Designed and development of a game using an Arduino UNO, LCD screen, piezo buzzer, potentiometer, switch, and two resistors. It aimed at *teaching Morse code*, allowing users to attempt to write the Morse translation of displayed characters by pressing a switch briefly (for a dot) or for an extended period (for a dash), with feedback provided on the LCD screen.

Grade: 30/30 (only project).

Publications

- [1] Valentina Castiglioni, Ruggero Lanotte, Michele Loreti, Desiree Manicardi, and Simone Tini. Robustness for biochemical networks: Step-by-step approach. *Theoretical Computer Science*, page 114934, 2024.
- [2] Alessandro Gianola, Stefano Kasangian, Desiree Manicardi, Nicoletta Sabadini, Filippo Schiavio, and Simone Tini. Cospanspan(graph): A compositional description of the heart system. *FUNDAMENTA INFORMATICA*, 171:221–237, 2019.
- [3] Alessandro Gianola, Stefano Kasangian, Desiree Manicardi, Nicoletta Sabadini, and Simone Tini. Compositional modeling of biological systems in cospanspan(graph)(extended version). Technical report, Technical report, <https://gianola.people.unibz.it>, 2020.
- [4] Alessandro Gianola, Stefano Kasangian, Desiree Manicardi, Nicoletta Sabadini, and Simone Tini. Compositional modeling of biological systems in cospanspan(graph). In *CEUR Workshop Proceedings*, volume 2756, pages 61–66. CEUR-WS, 2020.
- [5] Ruggero Lanotte, Desiree Manicardi, and Simone Tini. Step-by-step robustness for biochemical networks. volume 3587, page 299 – 313, 2023.
- [6] Desiree Manicardi. Formal models for biological systems. 2024.

Conferences

- Conference Presentation: “Step-by-step Robustness for Biochemical Networks”, Italian Conference on Theoretical Computer Science 2023 (Palermo, Italy, September 13-15, 2023). – *I presented our research.*
- Conference Presentation: D. Manicardi and N. Sabadini, “Cospan/Span(Graph): an algebra for open, reconfigurable automata networks.”, Workshop in honour of R. F. C. Walters (Tallinn, Estonia, July 17-18, 2023).
- Conference Presentation: D. Manicardi, N. Sabadini and S. Tini, “Automata and intelligent agents”, NeuroSpine, V International Meeting (online, November 16, 2020).
- Poster: A. Gianola, S. Kasangian, D. Manicardi and N. Sabadini, “A Compositional Model of the Heart-Pacemaker System in CospanSpan(Graph)”, Workshop iHeart, 2019 RISM Congress: Modelling the Cardiac Function, (Varese, Italy, July 22-24, 2019).

Computer Skills [selected]

Strenghts

Database SQL During my university studies, I did two projects and the Bachelor thesis using SQL.
NoSQL During my university studies, I did two projects using NoSQL.

Programming Java

*I have been studying this language since 2013.
During my university studies, I did six projects using Java.
I tutored this language at the University of Insubria during the A.Y. 2020-2021 and
2021-2022.*

Python

*I have been using Python for my research since 2020.
During the A.Y. 2020-2021, I served as an adjunct professor of this language at
the University of Turin.*

Object-Oriented Programming

Good – Intermediate

Backend Node.js
Command-line Tools Terminal
PowerShell
CMD
Database MySQL, MongoDB, PostgreSQL
Normalization
Diagrams UML, ER
Environment Eclipse
OS Windows

Programming C, C++, C#

Parallel, distributed and concurrent programming

Security Antivirus System

Authentication

Tools pgAdmin, Node-RED

Version GitHub

Control

Systems

Web HTML, CSS, JavaScript, JQuery *I'm managing a personal website since December 2023.*

PHP

JSON

AJAX

Single-page applications, static applications

Knowledge

Database Hippocratic Databases

Diagrams Kaos, Problem Frames

Model Client-Server

Network Putty
management

I used it for my Bachelor thesis.

OS Linux

	MacOS	
	Mobile – Android	
Programming	R	
	Real-time programming	
	API REST	<i>I used Twitter API for my Bachelor thesis</i>
	Bash	
Security	OAuth	<i>I used it for my Bachelor thesis.</i>
	RBAC (Roll-Based Access Control)	
Version Control Systems	Git	

Certifications

Computer Science	Google digital training - Fondamenti di marketing digitale , Google, 06/2020 Técnicas Cuantitativas y Cualitativas para la Investigación , EdX, Universidad Politécnica de Valencia, 01/2019 Data Access in C# and .NET Core , EdX, Microsoft, 09/2018 Asynchronous Programming with Javascript , EdX, Microsoft, 08/2018 Introduction to Python: Absolute Beginner , EdX, Microsoft, 08/2018 Architetture orientate ai servizi , University of Insubria, 06/2018 Sistemi organizzativi a rete , University of Insubria, 06/2018
Mathematics	IGCSE Mathematics Extended , University of Cambridge, 06/2013 IGCSE Mathematics Core , University of Cambridge, 06/2012

Languages

Italian	Native	
English	Fluent	<i>First Certificate in English (CEFR Level B2, 03/2023), I co-wrote papers in English – see the Publications section, I did my Ph.D. in English, and I was a speaker at ICTCS 2023 (24th Italian Conference on Theoretical Computer Science).</i>

Extra

- Registered in the *Albo dei soggetti accreditati*, University of Milan-Bicocca (2020 – 2021)

Hobby

Genealogy Tree Researching my family history and genealogy, successfully tracing my ancestry back to an ancestor born in 1768.

For further information, see my [my website](#) or [my GitHub](#) or [my LinkedIn account](#).

