Laetitia Laversa

Ph.D. in Computer Science

Professional Experiences

2022 – 2023 **Postdoctoral Reasearcher**
Université Paris-Saclay
INRAE - Micalis lab, Brs team, Jouy-en-Josas
Keywords *Artificial Neural Network, Metabolic Network, Mechanistic Modeling, FBA*

In this postdoc, I used active learning for synthetic biology in various projects. In machine learning, we need data to train our models. In synthetic biology, these data are the results of experiments. Having a good set of data is crucial to having a good model, but doing all the possible experiments can be too costly, in terms of time or resources. Active learning is a branch of machine learning that can be used to select the relevant data for training and therefore limit the number of experiments.

2021 – 2022 **Teaching and Research Associate (ATER)**
Université Côte d'Azur

2018 – 2021 **Ph.D. in Computer Science (DCCE)**
Université Côte d'Azur
Laboratoire I3S, Comred & Mdsc teams, Sophia-Antipolis
Advisors Pr. Lozes Étienne, Dr. Di Giusto Cinzia
Title Synchronizability for distributed systems
Keywords *Distributed Systems, Verification, Communicating Automata*
Abstract In order to check for errors in distributed systems, they can be modeled as systems of communicating automata. Verification problems such as reachability are undecidable in such a model. Because of that, the use of approximations is necessary. k-synchronizability is one of these techniques. A system is k-synchronizable if, for all executions, there is an equivalent execution that can be divided into phases containing k messages. This thesis contains an analyse of k-synchronizable systems (reachability problem, various cases of membership problem) but also some variations to the definition of k-synchronizability and a comparative study of the state-of-art classes of systems and our new classes.

2018 **Research Internship Master 2**
Laboratoire I3S, Mdsc team, Sophia-Antipolis
Advisors Dr. Di Giusto Cinzia, Pr. Lozes Étienne
Title Decidability of synchronizability for mailbox systems
Abstract We focus on the synchronizability property of distributed systems modelled in communicating automata. A system is synchronizable if its asynchronous behavior is equivalent to the one with synchronous communication, according to their send traces. By reduction to Post's problem, we give an alternative proof of the undecidability of synchronizability for a peer-to-peer system, as well as for systems communicating in mailbox with the addition of final states.

2017 **Research Internship Master 1**
Laboratoire I3S, Mdsc team, Sophia-Antipolis
Advisors Dr. Di Giusto Cinzia, Dr. De Maria Elisabetta
Title Parameter learning for neural networks modeled as timed automata
Abstract In this work, biological neurons are formalized as timed automata. The objective is to study the learning of parameters by model checking and by simulation. In the second case, two back-propagation algorithms are defined. We find that by enriching the neuron model, in particular by adding a priority on the algorithm to be applied on each neuron of the system, better results can be achieved.

Education

University

2018 – 2021 **Ph.D. in Computer Science**
Université Côte d'Azur

2016 – 2018 **Research Master in Computer Science**
Université de Nice Sophia-Antipolis

2013 – 2016 **Bachelor Degree in Computer Science**
Université de Nice Sophia-Antipolis

Schools

2023 **Summer School: Formal Modelling of Biological Regulation Networks**
Université Côte d'Azur, Porquerolles, Pr. Jean-Paul Comet

2018 **Summer School: Verification Technology, Systems and Applications**
INRIA, Nancy, Dr. Merz Stephan

2018 **Winter School: Software Verification and Computer Proof**
INRIA, Sophia-Antipolis, Dr. Bertot Yves

Publications

Conferences

2023 **A Partial Order View of Message-Passing Communication Models.**
Di Giusto C., Ferré D., Laversa L., Lozes É.
In 50th Symposium on Principles of Programming Languages, POPL 2023 (Vol. 7, p. 1601-1627)

2021 **A Unifying Framework for Deciding Synchronizability**
Bollig B., Di Giusto C., Finkel A., Laversa L., Lozes É., Suresh A.
In 32th International Conference on Concurrecy Theory, CONCUR 2021 (Vol. 203 of LIPIcs, pp.14:1- 14:18)

2021 **Guessing the Buffer Bound for k-synchronizability**
Di Giusto C., Laversa L., & Lozes É.
In 25th International Conference of Implementation and Application of Automata, CIAA 2021 (Vol. 12803, p. 102)

2020 **On the k-synchronizability of Systems**
Di Giusto C., Laversa L., & Lozes É.
In 23th International Conference of Foundations of Software Science and Computation Structures, FOSSACS 2020 (Vol. 12077, p. 157)

Journals

2019 **Spiking Neural Networks Modelled as Timed Automata: with Parameter Learning**
De Maria E., Di Giusto C., & Laversa L.
Natural Computing (Vol 19.1, p. 135-155)

Teaching & Supervisions

In Computer Science Departement, Université Côte d'Azur
Computer Science Basis Licence 1 - 54h (2018), 40h (2019), 56h (2020), 168h (2021)
Database Licence 2 - 22h (2019), 24h (2021)
Object-oriented Programmation Licence 3 - 18h (2018)
Communication and concurrency Master 1 - 2h (2021)

Supervisions of Research Internship

2023 **Picard-Marchetto Ambre**, M2 - *Probabilistic Automata, Spiking Neural Networks*
2022 **Ferré Davide**, M2 - *Message Sequence Charts, Temporal Logic*
2020 **Portet Thomas**, M1 - *Communicating Automata, k-synchronizability*

Invited Stay

2020 **Laboratoire Spécification et Vérification, Université Paris-Saclay**
Collaboration with Pr. Finkel Alain, Pr. Bollig Benedikt and Suresh Amrita (Ph.D. student) during 2 months

Communications

Conferences

2021 **Guessing the buffer bound for k-synchronizability**
CIAA – in remote

2020 **On the k-synchronizability of Systems**
FOSSACS – in remote

Seminar

2023 **Active learning for BIOS project**
BIOS Meeting – Palma de Majorque, Spain

2022 **Guessing the buffer bound for k-synchronizability**
GT ALGA – in remote

2022 **Formal methods for distributed systems**
Liechtenstein meets Côte d'Azur – Sophia-Antipolis

Popularizing science

2020 **"Ma thèse en 180 secondes"**
Explain the context and the aim of our Ph.D. in 3 minutes

2018, 2019 **"Fête de la science"**
Games presentations as help for computer science and algorithms introduction

Responsabilities

2020 – 2022 **Treasurer of the Association of Ph.D. Students STIC (ADSTIC)**
Association of interns, Ph.D. students and post-doctoral fellows of the Sophia-Antipolis STIC campus
- Organisation of social, sporting and scientific events
- Account management and budgeting
- Support for Ph.D. students in difficulty

2018 **Programming competition**
Université de Nice Sophia-Antipolis
- Organisational assistance
- Support for students

Skills

Programming languages and other tools

Python, LaTeX, Java, OPL, Scheme, Netlogo
Use of Cplex, Uppaal, CADP, STABC

Languages

French (Mother tongue), **English** (Fluent), **Spanish** (Fluent)

References

Pr. Lozes Étienne etienne.lozes@unice.fr, 04.89.15.44.00
Dr. Di Giusto Cinzia cinzia.digiusto@gmail.com, 04.89.15.43.85
Dr. De Maria Elisabetta edemaria@i3s.unice.fr, 04.89.15.43.72