Soel Micheletti

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Education

2020-present	**ETH Zurich**, *MSc. in Data Science.*
	Focus on Machine Learning and Algorithms.
2017-2020	**ETH Zurich**, *BSc. in Computer Science.*
	Finished with honours (GPA 5.37/6.00, top 15%).

Selected Scientific Experience

Spring 2022 — **Research in Data Science: *Unravelling Stroke Recovery***, *Interdisciplinary work together with the Lucerne Canton Hospital's medical staff*, To be published in 2022.

Applied a well-known algorithm (GLasso) to estimate undirected graphical models and give insights on how different recovery categories influence each other; implemented a recurrent neural network to predict recovery patterns.

Spring 2021 — **Semester Project: 3D Hand Pose Recognition**, grade: 6.0/6.0.

Implemented an Encoder-Decoder architecture in Pytorch to efficiently predict heatmaps of the joints.

Fall '20 — **Research Project on inference from Medical Data**, *grade: 6.0/6.0.*

- Designed a complete classification pipeline on a MRI dataset (imputation, outlier detection, feature engineering, selection and tuning of the best algorithms to stack in the final model).
- Developed robust algorithms to handle highly imbalanced datasets.

Spring '20 — **Thesis about Evolutionary Algorithms**, *grade: 5.5/6.0.*

- Formally proved results about the performance of evolutionary/ genetic algorithms on relevant benchmark functions.
- MATLAB simulations to interpret the results and propose better performing variants of the algorithm.

2016-2017 — **Research Project on Stochastic Simulation**, *grade: 6.0/6.0.*

- Designed a Monte Carlo algorithm to estimate the area of geographical surfaces and implemented a GUI in Java for end-users.
- Special prize *Odd Fellows* and nominated best project in Computer Science at the 2018 Taiwan International Science Fair.

Selection of Awards, Achievements and Honours

2021 **Distinguished delegate at the National Model United Nations (NMUN) held in New York City**, *Honour recognized to the top 20% of the participants based on their team-work attitude, diplomatic capabilities and attitude to propose creative solutions to problems of international relevance.*

2018 **First prize in *Computer Science***, *Taiwan International Science Fair.*

2017 **Best overall high-school degree among more than 200 students (Average: 5.82/6.00)**, *Prize for best student of the year; prize for the best bilingual Matura Italian-German; prize for highest grade in the German class*, Liceo Cantonale di Locarno.

2017 **Special Prize *Odd Fellows* and invitation to the *Taiwan International Science Fair 2018***, *National Competition of Schweizer Jugend Forscht (most prestigious scientific fair for high school students in Switzerland, acceptance rate ∼ 25%).*

Selected Professional Experience

I am a hard worker. I have done many different things (cashier, barman, runner, ...) and all those experiences taught me something. Here I list the most relevant jobs for my IT career.

2016-2018 **Regular guest at the TV debating show Linea Rossa**.

- Linea Rossa was a popular TV show at RSI (the official television broadcaster in Ticino).
- Participated in weekly discussions and debates about various topics (politics, fake news, social media, university, dating apps, ...)
- Improved many useful soft-skills (public speaking, debating, better structuring my speeches, active listening to other participants, ...).

2016 **Web Developer**, *Wonews SA*.

- Gained experience with HTML and CSS.

2013-present **Multiple experiences as Teacher**, *See below.*

Teaching Experience

Parallel to my Data Science studies, I am highly involved in teaching. As Albert Einstein said, *Ïf you can't explain it simply, you don't understand it well enough."* Teaching pushes me to think to fundamental concepts and explain them as clearly as possible, which ultimately allows me to understand the topics even better. In many cases, teaching assistants pick their favorite course and stick to it during their studies. I am doing it differently. I want to gain as much as possible from this experience, and so I decided to work on multiple areas: from Theoretical Computer Science to Software Engineering, and also a bit of Computer Networks.

Spring 2022	**Computer Networks**, *ETH Zurich*.
	Graded the exercise submissions for about 300 students.
Fall 2021	**Intensive course for Algorithms and Data Structures**, *ETH Zurich*.
	Wrote a script containing the whole scope of the course; held a week of intensive sessions to assist the students in the exam preparation, providing them intuitive explanations of complex algorithms and tricks to perform well.
Fall 2021	**Algorithms and Data Structures**, *ETH Zurich*.
	Held weekly exercise sessions for about 20 students; graded their exercise sheets; answered the students' questions in the online chat during lectures.
Spring 2021	**Computer Networks**, *ETH Zurich*.
	Graded the exercise submissions for about 300 students; involved in the preparation of a project regarding the implementation of the Rapid Spanning Tree Protocol (RSTP); answered the students' questions in the online chat during lectures.
Spring 2021	**Algorithms and Probability**, *ETH Zurich*.
	Held weekly exercise sessions for about 20 students; graded their exercise sheets; prepared quizzes and mini-tests covering the course content.
Fall 2020	**Algorithms and Data Structures**, *ETH Zurich*.
	Held weekly exercise sessions for about 20 students; graded their exercise sheets; answered the students' questions in the online chat during lectures.
Spring 2020	**Summer intensive course for Algorithms and Probability**, *ETH Zurich*.
	Wrote a script containing the whole scope of the course; held a week of intensive sessions to assist the students in the exam preparation, providing them intuitive explanations of complex algorithms and tricks to perform well.
Spring 2020	**Parallel Programming**, *ETH Zurich*.
	Held weekly exercise sessions for about 20 students; helped the students implementing algorithms in Java; wrote a script containing the whole scope of the course.
Fall 2019	**Algorithms and Data Structures**, *ETH Zurich*.
	Held weekly exercise sessions for about 20 students; graded their exercise sheets; answered the students' questions in the online chat during lectures.
2013-2018	**Mentored 30+ high-school students in Maths, Physics and Chemistry classes**.

Talks

2022	Speaker at the IT Data Science Event by the Swiss Study Foundation.
2021	Francisco Ruiz et al., SHOPPER: A PROBABILISTIC MODEL OF CONSUMER CHOICE WITH SUBSTITUTES AND COMPLEMENTS, presented in the context of the *Advanced Topics in Machine Learning and Data Science* seminar at ETH Zurich.
2019	Naeemul Hassan et al., TOWARD AUTOMATED FACT-CHECKING: DETECTING CHECK-WORTHY FACTUAL CLAIMS BY CLAIMBUSTER, presented in the context of the *Seminar on Media Innovation* at ETH Zurich.
2018	Invited to present my research RANDOM NUMBER GENERATORS AND THEIR APPLICATIONS IN COMPUTER SCIENCE WITH THE MONTE CARLO METHOD at the Taiwan International Science Fair.

2017	Presented my high school final project RANDOM NUMBER GENERATORS AND THEIR APPLICATIONS IN COMPUTER SCIENCE WITH THE MONTE CARLO METHOD at the National Competition of *Schweizer Jugend Forscht*.

Undergraduate Coursework

ETH Zurich	Algorithms and Data Structures; Algorithms and Probability; Algorithms, Probability and Computing; Analysis I-II; Complex Analysis; Computer Networks; Computer Systems; Data Modelling and Databases; Design of Digital Circuits; Discovering Management; Discrete Mathematics; Functional Programming and Formal Methods; Introduction to Machine Learning; Information Security; Introduction to Neuroinformatics; Introduction to Programming; Linear Algebra; Numerical Methods for CSE; Parallel Programming; Probability and Statistics; Systems Programming and Computer Architecture; Theoretical Computer Science; Visual Computing.

Graduate Coursework (ongoing)

ETH Zurich	Advanced Machine Learning; Algorithms Lab; Big Data; Computational Statistics; Data Analytics for Non-Life Insurance Pricing; High Dimensional Statistics; Information Theory; Machine Perception; Optimization for Data Science; Reinsurance Analytics; Statistical Modeling.

Sample of Computer Science Skills

During my studies at ETH Zurich (constantly ranked among the top 10 universities in the world), I developed a strong background in mathematics, statistics, machine learning and (optimization) algorithms. These skills were not just useful to analyse algorithms, but also to solve the typical tasks in competitive programming and, more broadly, to tackle real-life problems in a rigorous way towards an optimal solution. Being in such a stimulating but competitive environment pushed me to be a very fast learner, which is among my most valuable qualities. The following list includes a sample of more concrete skills, but I am looking forward to learning new ones and/ or improving what is already there.

Languages:	Python, C++, Java, R, Haskell, C, MATLAB...
Algorithms:	Knowledge of Dynamic Programming, Graph Algorithms (Shortest Paths, Minimum Spanning Trees, Matching, Coloring, Flows in Networks, Min Cuts, ...), Geometric Algorithms (Delaunay Triangulation, Convex Hulls, Smallest Enclosing Circle, Point Location, Voronoi Diagrams, ...), Linear Programming, skilled in designing Randomized Algorithms, ...
Big Data:	SQL, Hadoop, Spark, NoSQL, MongoDB, MapReduce, JSONiq, Neo4j, ...
Libraries:	Pytorch, Pytorch Lightning, Scikit-learn, Pandas, Keras, Eigen, BGL, CGAL, ...
Maths & Physics:	Practical knowledge of different fundamental areas of mathematics and physics (statistics,probability theory, optimization, analysis, linear algebra, others).

Swiss Study Foundation

The Swiss Study Foundation has been supporting excellent students and postgraduates at universities and technical colleges who due to their personality, creativity and intellectual skills are in a position to contribute to science, business, culture and politics. The Foundation's mission is to promote young people who are willing and capable of assuming leading positions in all sectors of society. Since 2018 I am a proud member of the Swiss Study Foundation, that offered me highly valuable learning

opportunities complementary to my studies, together with diverse networking opportunities with people from various backgrounds. Here a list of selected events I attended and organized:

2022 **IT Data Science (co-organizer):** introduction of fundamental topics in Data Science and Machine Learning (steps of a Data Science project, main ideas of supervised learning, bias-variance trade-off) and presentation of some cool ideas in Deep Learning (GANs, transfer learning, and intuition on transformers).

2021 **Story Telling Camp:** presentation of different techniques to tell a story in an engaging way and prepared a Pecha Kuchaßtyle presentation about my first solo travel experience.

2021 **NMUN:** negotiations about the Illicit Trade of Small Arms and Light Weapons in behalf of Madagascar at the NMUN event held in New York City (held online because of the pandemic).

2020 **The Art of Debating:** introduction to the competitive form of British Parliamentary Debating. We had theoretical sessions with the former European champion and we applied the concepts in a team tournament.

2019 **IT Life Sciences:** introduction to genetics and assisted to talks about CRISPR/Cas9.

2019 **IT Persönliches Selbstmanagement:** intensive weekends where we had discussions about factors to consider in developing a career and individual mentorship program.

Languages

English (proficient, C2); **German** (fluent, C1); **Italian** (mother tongue); **French** (Basic knowledge, B1); **Spanish** (Elementary knowledge, A1).