Sebastiano Tronto

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About me

I am a software developer with a PhD in Mathematics. I am currently employed as a scientific software engineer at ALTEN Nederland, where I am working on a data processing application in Python.

I am passionate about writing correct and efficient software. In my free time I enjoy working on my personal coding projects, tinkering with Linux systems and writing about all of this in my blog. I also hold the current world record for solving the Rubik's cube in the fewest moves possible.

Skills

Programming languages
Work experience in C# and Python. Very good knowledge of C and C++. Basic knowledge of many other languages including Rust, Java, Javascript and J.

Algorithm design and optimization
Strong knowledge of various programming techniques and algorithms. Experience in low-level optimization, including manual multi-threading, cache optimizations, SIMD and more.

UNIX system administration
As a Linux user since 2008, I have a deep understanding of this OS and other UNIX-like systems. I manage a personal server running OpenBSD that I use for hosting websites, serving git pages and other services.

Communication skills
Both during my academic career and at my current job, I have given many talks on technical subjects, including Mathematics and software development. I regularly write about various computer science related topics in my personal blog. See tronto.net/talks and tronto.net/blog.

Languages
English (fluent), Italian (mother tongue). Basic reading and listening skills in French and Dutch.

Work experience

2025-2026 | Scientific software developer (AFM data processing)
I am currently working on a data processing application for advanced metrology machines for semiconductor wafers developed by Nearfield Instruments. This software elaborates the nanometric-precision data collected by atomic force microscopes and presents it to the user, enabling interactive analysis as well as batch processing. This application is developed in Python, using QT (PySide6) for the UI, and various libraries such as numpy and scipy for the computational part.

2022-2025 | Scientific software developer (reservoir engineering)
My first assignment as a software developer for ALTEN was an integrated reservoir simulator developed by Shell. It was a large C# and C++ project that relied on both external components and in-house developed ones. Working on this project gave me familiarity with scientific simulation software in the domain of subsurface engineering, as well as experience with working in a Scaled Agile Framework. My tasks included working both on the user interface (WPF) and on the computational core of the system, which required knowledge of, among other things, computational geometry and numerical analysis.

2018-2022 | Doctoral researcher and teacher
As a PhD candidate I actively pursued research in Number Theory, more precisely on *Kummer theory* for elliptic curves and other algebraic groups. My research activities included both team work and autonomous study, as well as presenting my work at international conferences. In my four years as a PhD student I published a total of 9 papers, see tronto.net/research.

During this time I regularly taught classes, both as a teacher assistant and as a main instructor. I have supervised multiple student projects, ranging from first year research assignments to Master Theses. In 2021 I was awarded the *University of Luxembourg Teaching Award* for my outstanding course *Mathematical Software*. The course material is available at git.tronto.net/mathsoftware.

Education

2018-2022 | PhD in Mathematics

Joint PhD at the University of Luxembourg and the University of Leiden. Thesis title: *Kummer theory for commutative algebraic groups*. Defended in September 2022.

2016-2018 | Master's degree

Double master degree in Mathematics at the University of Milan and the University of Leiden (ALGANT program). Special focus on Algebra, Geometry and Number Theory. Graduated *summa cum laude*.

2013-2016 | Bachelor degree

Bachelor degree in Mathematics at the University of Trento. Graduated with honor.

Other activities

Competitive and hobby programming

I have been a hobbyist programmer since 2006. During high school I took part in several competitive programming contests, achieving multiple national level medals. This culminated in my participation in the 2012 International Olympiads in Informatics. To this day, I still enjoy solving coding puzzles, such as the Advent of Code, in my free time.

Among my personal coding projects, the most successful one is *nissy-core*, which is to my knowledge one of the fastest optimal Rubik's cube solvers currently available. Working on this application enabled me to explore countless topics: from SIMD to WebAssembly, from prefetching optimization to interoperability between C and Python, and more. See git.tronto.net/nissy-core.

I maintain a collection of shell scripts that I use for general computing and system administration tasks. The scripts are focused on composability, minimalism and portability across different UNIX-like systems (mainly Linux and OpenBSD). See git.tronto.net/scripts.

Speedcubing and related activities

I can solve a Rubik's cube in around 8 second on average, as well as solving it blindfolded in less than 20 seconds. I regularly take part in *speedcubing* competitions. I have obtained multiple podium placements at World and European Championships, and I currently hold the world record for finding the most efficient solution for the Rubik's cube, as well as several other national records. As a delegate for the World Cube Association (WCA) I am responsible for ensuring that all regulations are followed during official competitions.

Between 2021 and 2024 I was the leader of the WCA Disciplinary Committee, the entity responsible for investigating and deliberating on violations of the WCA Regulations and Code of Conduct. My tasks included ensuring that the team worked efficiently, coordinating with Association's Board of Directors, as well as carrying out regular work as a member of the Committee. This experience taught me how to be an effective leader, and made me appreciate the complexities of managing a team of people while being responsible for their results.