

Chanattan Sok

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linkedin.com/in/chanattan-sok | github.com/chanattan | Born on the 6th of August 2002

Current position

I am an M.Sc. student in computer science in the penultimate year at École normale supérieure (ENS) de Rennes, France. I am an aspiring researcher focusing on modeling, simulation, and optimization techniques to address complex, real-world problems. My research interests lie at the intersection of decision-making aid, environmental sustainability, and artificial intelligence.

I explore the potential of multi-agent systems in critical fields: using game theory to analyze decision-making in economics and public policies, and agent-based modelling to simulate complex human and robotic behaviors. This dual approach addresses key challenges at the intersection of technology and society.

As a young scientist, I strive to tackle challenges creatively and bring diverse perspectives to problem-solving. My aim is to bridge the gap between technical expertise and societal impact through innovative research.

Upcoming works

This section lies down future works that have been officially planned but not yet started.

Research assistant at LAMSADE - Paris Dauphine, PSL, Paris, France May/June - Aug 2025

*Research on optimal transportation based on social-choice allocation. The work will be related to **Fair Railway Network Design** and would be mainly supervised by **Jérôme Lang**.*

Ongoing works

- Working on a paper submission to **JFSMA 2025** before submitting to an international conference.
"Resolving spatial conflicts between pedestrians: a social choice theory approach"
Chanattan Sok, *Olivier Simonin*

Education

ENS Diploma - École normale supérieure de Rennes, Rennes, France Aug 2022 - Aug 2026

The ENS Diploma is a prestigious French diploma which consists of a selective and intensive 4-year program focused on research.

- 1st year as last B.Sc. year of Fundamentals of Computer Science
- 2nd year of MS in Fundamentals of Computer Science - coursework: *Signal processing, Complexity theory, Advanced operating systems, Compilers, Advanced algorithms, Machine learning, Representation of knowledge and logic and Semantics and assisted proof with Coq.*
- 3rd year dedicated to research internships - *students can also choose to pass the **French Agrégation**, the most competitive and prestigious examination for civil service in the French public education system.*
- 4th year as a research M.Sc. in computer science

B.Sc. in Fundamentals of Computer Science - École normale supérieure de Rennes & Univ Rennes, Rennes, France Aug 2022 – Aug 2023

- Highly-intensive program to provide wide knowledge to tackle research problems.
- *Coursework:* Algorithms and combinatorial optimization, Image processing, Distributed algorithms, Computer Architecture, Calculability and formal languages, Theory of programming languages, Cybersecurity and Logic.

2nd year of B.Sc. in Computer Science - Sorbonne University (ex-UPMC), Paris, France Sept 2021 - May 2022

- Solid theoretical and broad background on the fundamentals of computer science.
- Ranked 5th among 170+ students in computer science and mathematics, and 2nd/345 in object-oriented

programming.

Preparatory classes to Grandes Écoles (CPGE) - Lycée Albert Schweitzer,
Raincy, France

Sept 2020 - May 2021

- Selective program to enter the best ranked schools in France.
- Intensive courses in mathematics, physics and engineering sciences are given.

Research positions

**Research fellow at the City Science Lab HafenCity University Hamburg,
an MIT Media Lab collaboration** - Hamburg, Germany

Feb 2025 - May 2025

*Research and work on climate impacts reflected on world-scale effects and urbanism caused by daily consumption and choices. The work involves the **GAMA** and **Connected Urban Twins** projects from **Research Institute for Development** and **City Science Lab**. My research is supervised by **Arnaud Grignard** and **Rico Herzog**.*

- Part of a Research Fellowship program in the City Science Lab.
- State-of-the-art study of Integrated Assessment Models (IAMs) in integration with GAMA.
- Development of a two-scale societal simulation in GAMA, incorporating active citizen decision-making and real-time feedback, to highlight the impacts of consumption and raise awareness of policy implications.

Research assistant in the *Multi-Robot Systems/Human-Centered AI/AI for Humanity* group (CHROMA) - Inria Lyon & INSA Lyon, France

Sept 2024 - Dec 2024

https://github.com/chanattan/spatial_resolution

*Resolution of spatial conflicts between pedestrians with agent-based modeling, game and social choice theories, supervised by **Olivier Simonin***

- Studied state-of-the-art of crowds/social interactions models
- Designed CNM (Conflicts Negotiation Model) an innovative multi-agent model integrating social choice theory, enabling pathfinding through negotiation-based strategies.
- Implemented CNM, ad-hoc SFM (Social Force Model) and CBS-MAPF on a custom python simulator.

Research assistant in the *Programming Languages* group - Aarhus
University, Denmark

May 2024 - Aug 2024

*Software research on type inference and reduction of Java types, supervised by **Magnus Madsen***

- Conducted research on type inference, focusing on type construction and reduction, and proposed novel Java type representations in Flix.
- Implemented Java interoperability for **Flix**, a safe and effect-based functional-first programming language developed in Scala, enabling seamless Java integration and expanding the language's modularity and reasoning capabilities.

Research assistant in the *Data Management team* (SHAMAN), IRISA,
Univ Rennes, Thales group - Rennes & Lannion, France

Sept 2023 – May 2024

<https://github.com/chanattan/Blossom>

*Research project at ENS Rennes to initiate research perspectives with WebAssembly on data management, supervised by **Laurent d'Orazio***

- First author of a research paper on WebAssembly in serverless computing, published at the SSDBM 2024 conference (<30% acceptance rate), in collaboration with Thales, a global leader in aerospace, defense, and digital solutions.
- Developed Blossom, an experimental and open-source Rust-based platform to compare Wasm-based and Rust-native joins in serverless environments, providing valuable insights into WebAssembly's performance and energy consumption.

Student research fellow in data management/UX/UI/AI, ENS Rennes -
Bruz, France

Nov 2023 – May 2024

*Provide computer science knowledge in collaboration with lawyers from Anticor (French association) and ENS Rennes: assist lawyers in the detection of frauds in France public markets, supervised by **Julien Perez***

- Conducted research on using a stable LLM for data pre-processing and real-time user applications.

- Studied of data management on public data sources in SQL and Panda in Python.
- Researched on UX/UI and software development to build an assistant tool for lawyers.
- Laid the foundations for interdisciplinary research with the French anti-corruption association Anticor, influencing the French government to further these initiatives.

Research assistant in the *Multi-Agent Systems team (MAS)*, Sorbonne University, LIP6, CNRS, CES - Paris, France

May 2022 – July 2022

Study of Earnest's model (2008) based on Putnam's two-level game theory, supervised by [Nicolas Maudet](#) and [Aurélié Beynier](#) (gitlab.lip6.fr/sok/tweakable_model)

- Re-implemented and extended an economic-political model to a global generic negotiation model on Python with Mesa. The model took inspiration from COP meetings.
- The new model emphasized the instability of stochastic ABM models, highlighting counter-intuitive interpretations in negotiations compared to the original Earnest's model, and gained attention from communities for its novel insights.
- Participated in the [NEGOCLIM](#) project: research and work with humanitarians, mathematicians and renowned economists from the [Centre d'Économie de la Sorbonne \(CES\)](#) such as [Stéphane Zuber](#) or [Agnieszka Rusinowska](#).

Teaching

- **Referring tutor and founder of the computer science and maths tutoring for bachelor students**, ISTIC - Univ Rennes, Rennes, France Sept 2023 - March 2024
- **Guest lecturer in multi-agent systems**, invited by [Pr. Franz Kurfess](#) - Calpoly University, San Luis Obispo, California. Jan 2024
Gave a talk on agent-based modelling and simulations, an application to negotiations for consensuses.
- **CPES (Cycle Pluridisciplinaire d'Enseignement Supérieur) science tutor in maths and computer science for first year bachelor students.** - Lycée Châteaubriand, Rennes Sept 2023 - March 2024
CPES is along preparatory classes, a highly-selective and intensive 3-year program to prepare for the most competitive entrances for the best ranked schools in France.
- **High-school tutor in general sciences (maths, computer science and physics)** - Rennes Sept 2023 - March 2024
Taught and mentored through the Cordées de la réussite program, empowering high school students to succeed academically and fostering greater social equality and opportunity.
- **Assistant professor in mathematics and physics for middle-school students** - Collège Évariste Galois, Paris. Sept 2021 - March 2022
Competitive program for bachelor's students, I taught general science classes and assisted a math teacher with classroom management in a middle school.
- **Private teacher in computer science** - Independent. 2015 - 2024
Provided private tutoring in Python, Java OOP, C, C++, and algorithms to students ranging from primary school to university, preparing for selective programs.

Publications

WebAssembly Serverless Join: A Study of its Application

July 2024

Chanattan Sok, Laurent d'Orazio, Reyhan Tekin, Dimitri Tombroff

SSDBM 2024, Rennes, France

[10.1145/3676288.3676305](https://doi.org/10.1145/3676288.3676305)

Projects

Here is a list of projects I have been involved in, as a member or participant.

NEGOCLIM project (from summer 2023)

sites.google.com/view/negoclim

The NEGOCLIM project brings together researchers in economics and computer science to study climate negotiations. It is funded by the MITI - Aide à la décision action of the Centre National de la Recherche Scientifique (CNRS). I have been a participant of this project during my research internship starting May 2023.

An ENS Rennes - Anticor Law-clinic project (2023 - 2024)

github.com/chanattan

Research project led by a collaboration between Anticor (French anti-corruption association), ENS Rennes and computer science students, with the ambitious aim of using computer methods to help lawyers detect fraud in French public market.

Additional Experiences and Activities

Co-president of the oenology club, ENS Rennes

Sept 2023 - March 2024

- Organized wine-tasting events in partnership with a local winery. Led presentations on wine tasting techniques and the various types of wines, enriching attendees' experience.
- Managed event logistics, including overseeing the budget and administrative tasks.

Founder of Tutorat ISTIC, tutoring program for bachelor students in computer-science/engineering, Univ Rennes (ISTIC)

Sept 2023 - March 2024

- Managed tutors sessions & tutoring classes as the representative tutor
- Organized meetings with ISTIC administration for reports & organization (student difficulties, programs, sessions...)

Finalist in an eloquence competition (Concours d'éloquence ENS Rennes), ENS Rennes

2023

Winner of a local hackathon (Palm'Hackathon ISTIC 2023), Univ Rennes - ISTIC

2023

- Developed a Rust game in group under 24 hours in competition against other university students, the theme was "investigation". We ranked 1st among 6 other groups of students.

Treasurer of RJMI Rennes 2023 (Rendez-vous des Jeunes Mathématiciennes et Informaticiennes) - ENS Rennes

Oct 2022 - March 2023

- Led treasury management for an annual event bringing together high school girls to promote and support excellence in mathematics and computer science, empowering the next generation and advancing equal opportunities in these critical fields.

Freelance developer - Online

2015 – 2019

- Built automated tools with Java 7-8 Swing as an independent developer (scraper, data management software, ...)

Technologies

Languages & more: Java 7/8, Python, Scala 2, C, C++, SQL, OCaml, Rust, Coq, GAMS

Languages

French (native), English (proficient), German (notions)