Chanattan Sok

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github.com/chanattan | Born on the 6th of August 2002

Current Position

I am a master student in Computer Science at École normale supérieure (ENS) de Rennes in France. I am an aspiring researcher focusing on modeling, simulation, and optimization techniques to address complex, real-world problems. I am interested in strategic agents for negotiation, coordinating teams of agents, or decision-making in dynamic and partially observable environments—whether for societal concerns, recommender systems, or the simulation of social behaviors.

I explore the potential of multi-agent systems in critical fields with game theory or Reinforcement Learning, in general or in economics and public policies, and ABM to simulate complex human, or robotic behaviors.

Education

Master's Degree in Computer Science – AI2D (Artificial Intelligence, Algorithms, Interaction, Decision Making) - Sorbonne University, Paris, France   Sept 2025 - May 2026

Previously named Androide master. The master's degree focuses on on research in autonomous agents, decision-making models, and AI algorithms for complex systems.

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.

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

Measuring fairness in railway networks: graph theory meets social choice. Supervised by Jérôme Lang and Arianna Novaro.

- Developed a Python software to evaluate different equity indices on editable railway networks.
- Proposed different metrics to evaluate equity based on the topology of certain railway networks.
- Conducted tests to compare real GIS-based (Geographical Information System) railway networks, e.g., France vs. Germany.

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.
- Processed real data of Hamburg (Geographical Information System based).
- Developed an urban digital twin model simulated in GAMA, incorporating decision-making aid for policies in urban embodied carbon, enabling to bridge the gap between stakeholders and digital urban twins for the city of tomorrow. The model uses Agent-Based Modeling for buildings and to aggregate opinions of citizens in an automated decision-making process.
- The work is in collaboration with the Ministry of Urban Development and Housing and the Ministry of Environment and Energy in Hamburg. Stub of the work presented quickly at Digital Urban Twins conference 2025 at City Science Lab HCU by Arnaud Grignard.

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. Paper accepted at JFSMA 2025.
- 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
Press article about our work on Marianne.net, a French weekly magazine that covers politics and society

- Conducted research on using existing LLMs for data pre-processing and real-time user applications.
- Creation of data scheme to manage public data sources in SQL and Panda in Python.
- Built a simple software with UX/UI development to offer 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 Aurélie Beynier (gitlab.lip6.fr/sok/tweakable_model)

- Re-implemented and extended the economico-political model of Earnest to a global generic negotiation model on Python with Mesa. The model took inspiration from COP meetings. Deliberation in international negotiations were made through preferences representation and vote theory as the core of the research.
- Highlighted the instability of stochastic ABM models, emphasizing counter-intuitive interpretations in negotiations compared to the original model.
- 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 prepatory 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

Simulation and resolution of spatial conflicts between pedestrians based on social choice theory. — July 2025

Chanattan Sok, Olivier Simonin

JFSMA 2025, Dijon, France
Soon to appear. [HAL]

WebAssembly Serverless Join: A Study of its Application — July 2024

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

SSDBM 2024, Rennes, France

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   Sept 2023 - March 2024
computer-science/engineering, Univ Rennes (ISTIC)

- 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),   2023
ENS Rennes

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

- 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   Oct 2022 - March 2023
Mathématiciennes et Informaticiennes) - ENS Rennes

- 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 (scrapper, 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)