Chao Li

Curriculum vitae | Updated 26 October 2026

Senior Researcher, Sirius University of Science and Technology
Engineer and Ph.D. Candidate, ITMO University

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Research profile

I am a Senior Researcher at Sirius University of Science and Technology and a Ph.D. Candidate at ITMO University. My research focuses on how norms emerge, spread, and guide decisions in multi-agent systems. I combine mathematical modelling, agent-based simulation, and machine learning to study collective behaviour and human-AI interaction, with applications in healthcare, software engineering and the social sciences. As a core member of the TacitAI project, I investigate decision modelling in distributed and hybrid cognitive systems under incomplete information.

Norm Dynamics in Multi-Agent Systems

Descriptive norms, norm perception and induction, and the connection between individual decisions and collective behaviour.

Hybrid Cognitive Systems and Tacit Knowledge

Decision modelling under incomplete information, knowledge representation, and normative reasoning.

Human-AI Interaction and Decision Support

Interpretable modelling and simulation for distributed healthcare and intelligent decision support.

Education

2023-Present	**Ph.D. Candidate in Mathematical Modelling, Numerical Methods and Software Complexes** Faculty of Artificial Intelligence Technologies, ITMO University
2020-2023	**M.Sc. in Software Engineering for Neurotechnologies** Faculty of Software Engineering and Computer Technology, ITMO University
2016-2020	**B.Sc. in Information Security** School of Software Engineering, Nanchang University

Scientific supervisor

Sergey V. Kovalchuk, Ph.D.

Associate Professor | Faculty of AI Technologies, ITMO University
Research Group Leader | Research Center for IT and AI, Sirius University of Science and Technology
Principal Engineer | Huawei Research Institute, Saint Petersburg, Russia

https://iterater.github.io/

Appointments and experience

2026-Present
Senior Researcher
Scientific Center for Information Technology and Artificial Intelligence, Sirius University of Science and Technology, Sirius Federal Territory (Sochi), Russia

2026-Present
Engineer
Research Center for Artificial Intelligence 'Strong Artificial Intelligence in Industry', ITMO University, Saint Petersburg, Russia

2024-2026
Engineer
National Center for Cognitive Research (NCCR), ITMO University, Saint Petersburg, Russia

2022-2023
Engineer (Intern)
ROBOTRACK, a brand of Brain Development LLC, Saint Petersburg, Russia

2020-2021
Intern
Industrial and Commercial Bank of China (ICBC), China

Academic exchange

2026
Deutsches Elektronen-Synchrotron (DESY), Hamburg, Germany
International Conference on Computational Science (ICCS 2026) - presentation in the Computational Health track.

July 2025
Nanyang Technological University, Singapore
High Performance Computing Institute.

June 2024
University of Málaga, Spain
International Conference on Computational Science.

Research projects

2026-Present | Hybrid Cognitive Systems for Decision-Making Based on Tacit Knowledge under Incomplete Information (TacitAI)

Sirius University of Science and Technology

Research on formalising tacit knowledge and modelling decisions in distributed and hybrid cognitive systems. The work explores adaptive intelligent decision support under incomplete information.

Role: Core team member; independently responsible for the research direction on decision-modelling technologies in distributed and hybrid cognitive systems

Funding: State Programme for Scientific and Technological Development of the Sirius Federal Territory

Project FTS-2026-2.3-VY-2454-8945

Topics: Tacit-knowledge formalisation; Hybrid cognitive systems; Distributed decision modelling; Adaptive intelligent decision support

2025-2026 | Breakthrough Research in Artificial Intelligence Conducted by AI Research Centers

Research Center 'Strong Artificial Intelligence in Industry', ITMO University

Research on large foundation models, large language models, machine learning and multi-agent systems.

Role: Research team member

Funding: Ministry of Economic Development of the Russian Federation

Project 325086; state registration 125080409305-1

Topics: Large foundation models; Large language models; Machine learning; Multi-agent systems

2024-2026 | Intelligent Decision-Support Technologies Based on Modelling and Control of Human-AI Interaction

National Center for Cognitive Research, ITMO University

Modelling and control of human-AI interaction for intelligent decision support, with an emphasis on explainable AI and behaviour modelling.

Role: Research team member

Funding: Russian Science Foundation (RSF)

Project 324047; state registration 124052400016-3

Topics: Human-computer interaction; Explainable AI; Decision support; Behaviour modelling

2021-2024 | Strong Artificial Intelligence Technologies in Industry

Research Center 'Strong Artificial Intelligence in Industry', ITMO University

Research and development on strong AI and digital solutions, including digital twins and digital objects.

Role: Research team member

Funding: Exploratory R&D funded by the Analytical Center for the Government of the Russian Federation

Project 321315; state registration 121121300433-5

Topics: Strong AI; Digital solutions; Digital twins; Digital objects

2019-2020 | Intelligent Guide Cane for the Visually Impaired

Nanchang University 'Internet+' Innovation and Entrepreneurship Competition

Design and implementation of an assistive cane using IoT sensing, structured-light image reconstruction, embedded navigation and audio feedback.

Role: Team member (system design and implementation)

Topics: IoT sensing; Structured-light image reconstruction; Embedded navigation; Audio feedback

Research outputs

17 outputs: 2 journal articles, 8 conference papers, 4 abstracts & talks, 1 study guide, 1 manuscript, 1 master's thesis.

Journal articles

1. A Nonlocal Aggregation-Diffusion Model with Adaptive Perception Kernels for Descriptive Norm Dynamics

Chao Li, Ilia Derevitskii, Sergey Kovalchuk

Mathematics, vol. 14, no. 20, 3837, 2026

DOI: 10.3390/math14203837

2. Multi-agent norm perception and induction in distributed healthcare

Chao Li, Olga Petruchik, Elizaveta Grishanina, Sergey V. Kovalchuk

Journal of Biomedical Informatics, vol. 166, 104835, 2025

Master's thesis

3. Person Search in Images by Semantic Description

Chao Li, A. V. Rusak

ITMO University, 2023

In Russian

Conference papers

4. Data-Driven Structural Optimization of Descriptive Norms: Bridging Micro and Macro Dynamics in Medical Contexts

Chao Li, I. Derevitskii, Sergey V. Kovalchuk

Lecture Notes in Computer Science, vol. 16786, pp. 388-402, Springer, 2026

5. Modeling Medical Descriptive Norm Convergence and Violation via Nonlocal Transport and Agent Learning

Chao Li, Olga Petruchik, Sergey V. Kovalchuk

Proceedings of the 18th International Conference on Agents and Artificial Intelligence (ICAART), vol. 3, pp. 2314-2321, SCITEPRESS, 2026

6. Role-Conditioned Descriptive Norm Dynamics via Nonlocal Transport and Agent Learning

Chao Li, Olga Petruchik, Sergey V. Kovalchuk

Lecture Notes in Computer Science, Springer, 2026

7. Modelling the Dynamics of Software Developer Roles from Source-Code Repository Data

E. A. Tarasov, **Chao Li**, Sergey V. Kovalchuk

Modern Research and Technological Aspects of Software Engineering: Proceedings of the All-Russian Scientific and Technical Conference, pp. 338-343, Orenburg State University, 2026

ISBN 978-5-7410-3589-4

8. Cross-Scale Modeling of Healthcare Norms and Patient Features Dynamics with Interpretable Machine Learning

Chao Li, Dutao Zhang, Fei Ren, Sergey V. Kovalchuk

Computational Science - ICCS 2025 Workshops, vol. 15908, pp. 113-127, Springer, 2025

DOI: 10.1007/978-3-031-97557-8_9

9. Towards Explaining Emergent Behavior in Multi-Agent Systems: Micro-Parameter Space Structuring with Feature Importance in the Heatbug Model

Sergey V. Kovalchuk, **Chao Li**, Oleg V. Kubryak

2024 IEEE/WIC International Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT), pp. 824-829, IEEE, 2024

10. Towards Modeling of Distributed Intelligence Systems in Modern Healthcare

Chao Li

XIII Congress of Young Scientists: Proceedings, vol. 3, pp. 61-64, ITMO University, 2024

ISBN 978-5-7577-0726-6

Scientific supervisor: Sergey V. Kovalchuk

11. Modelling of practice sharing in complex distributed healthcare system

Chao Li, Olga Petruchik, Elizaveta Grishanina, Sergey V. Kovalchuk

Lecture Notes in Computer Science, vol. 14835, pp. 224-238, Springer, 2024

Conference abstracts and talks

12. Cognitive Architectures of Normative Alignment: Value-Driven Inference versus Discrete Mathematical Computation

Chao Li, I. Derevitskii, S. Kovalchuk

11th International Conference on Cognitive Science: Book of Abstracts, pp. 41-42, 2026, Nizhny Novgorod, 24-28 August 2026

Conference abstract

13. Computational Cost of Medical Norm Reasoning in Distributed Agents

Chao Li

AI on Cloud: The Rise of Human-Machine Synergy, Apsara Conference 2025, 2025

Conference talk

14. Smart blind guide cane based on structured light image reconstruction

Chao Li

2024

Conference abstract / talk

15. Towards Modeling of Distributed Intelligence Systems in Modern Healthcare

Chao Li

53rd (LIII) Scientific and Educational-Methodological Conference of ITMO University, 2024

Conference talk

Teaching material

16. Selected Topics in Reinforcement Learning: Practical Hands-on

Sergey V. Kovalchuk, Ashish T. S. Ireddy, **Chao Li**

Buk, 2025

Kazan, Russia | ISBN 978-5-00254-097-6 | 67 pages

Submitted manuscripts

17. Joint optimization of logical structures and parameters in executable prescriptive norm system

Chao Li, Sergey Kovalchuk

Expert Systems with Applications (Elsevier), 2026

Submitted; with editor