

# Matej Jusup

matej.jusup@gmail.com · linkedin.com/in/matej-jusup

www.matej-jusup.com

## HIGHLIGHTS

---

**Co-developed the first LLM that plays chess at the world champion level at Google DeepMind.**

*Gemini Chess Gem: [goo.gle/ChessChamp](https://goo.gle/ChessChamp).*

**Designed a scalable probabilistic decision-making model for safe real-time multi-agent fleet control.**

*Demonstrated coordination of 10,000+ autonomous vehicles with sub-second planning latency.*

**PhD with 5 years of industry experience, including a leadership position.**

*Proven ability to drive innovative research from conception to deployment with expertise in AI, ML and Data Science.*

**Silver medalist at the Croatian junior (under 20 years) chess championship.**

*On [www.chess.com](https://www.chess.com) 99.999% percentile among over 100 million registered users.*

## EDUCATION

---

### PhD in Artificial Intelligence

*ETH Zurich*

Zurich, Switzerland

*Sep 2020 – Oct 2025*

**Key Contribution:** Operating a fleet of tens of thousands of agents in real time while satisfying safety constraints.

THESIS: Safe and Scalable Ride-Sourcing Vehicle Rebalancing: A Constrained Mean-Field RL Approach

SUPERVISORS: Prof. Francesco Corman and Prof. Andreas Krause

RESEARCH AREA: Reinforcement Learning, Multi-Agent Systems, Sequential Decision Making, Data-Driven Algorithms

### MSc in Mathematical Statistics

*University of Zagreb*

Zagreb, Croatia

*Oct 2013 – Feb 2017*

SUPERVISOR: Prof. Marko Vrdoljak

DISTINCTION: Graduated with honors.

### Visiting Student

*University of Bielefeld*

Bielefeld, Germany

*Sep 2015 – Jul 2016*

RESEARCH VISIT: Two semesters funded by Erasmus+ during which I wrote my MSc thesis.

HOST: Prof. Andreas Dress

### BSc in Mathematics

*University of Zagreb*

Zagreb, Croatia

*Oct 2010 – Jul 2013*

## WORK EXPERIENCE

---

### Student Researcher

*Google DeepMind — Gemini Post-Training Team*

Zurich, Switzerland

*Apr 2024 - Sep 2024*

**Key Contribution:** The first LLM that plays chess at the grandmaster level using human-comparable planning efficiency.

HOSTS: Eric Malmi and Aliaksei Severyn

PUBLICATION: First co-author of a spotlight paper at ICML 2025 — <https://arxiv.org/abs/2412.12119>

PLANNING WITH LLMs: Enhanced LLMs with search-based planning techniques to improve multi-step reasoning.

ASYNCHRONOUS MCTS: Introduced dynamic virtual counts to balance exploration–exploitation with few simulations.

PROMPT ENGINEERING: Assisted in designing board-game prompts and test-time internal search linearization.

TECHNOLOGY STACK: Python, Transformer Pre-Training, Supervised Fine-Tuning, Tree-Search Methods

### Senior Machine Learning Researcher

*Cantab Predictive Intelligence (tech startup)*

Zagreb & Cambridge

*Mar 2019 - Jul 2020*

**Key Contribution:** Lead a team of four researchers on a few projects running in parallel.

BEHAVIORAL CREDIT SCORING: Gradient-boosting model for default risk, achieving a market-leading Gini of 75%.

AI-DRIVEN MARKETING: Boosted heart drug sales by 10% via data-driven A/B-tested campaign for pharma client.

PERSONALIZED NEWSLETTER: Built a hybrid recommender (content-based + collaborative); 1.5% CTR in PoC.  
DELIVERY DELAY ESTIMATION: Predicted COVID-era mall delays using ARIMA and supervised learning.  
TECHNOLOGY STACK: Python, PyTorch, PySpark, Databricks, Statsmodels, AWS/Azure, Sklearn, Numpy, Pandas, Git

Machine Learning Researcher

Morgan Stanley

Budapest, Hungary  
Oct 2017 - Feb 2019

**Key Contribution:** Built scalable models for risk, liquidity, and trade execution in financial systems.  
SYSTEMIC RISK MODEL: Built a parallel hill climber heuristic, solving the problem in 3 minutes, averaging 5% from optimal.  
CASH TRACEABILITY SYSTEM: Developed a real-time uncollateralized debt tracker from daily data feeds.  
E-TRADING LIMITS CALIBRATION: Tuned model to block high-risk trades via statistical analysis of client behavior.  
LISTED DERIVATIVES LIQUIDITY: Developed a PoC liquidation model driven by intraday futures data.  
TECHNOLOGY STACK: Python, CPLEX, OR-Tools, Q/kdb+, PyQ, SQL, Pandas

Software Engineer

Morgan Stanley

New York, London & Budapest  
Aug 2016 - Sep 2017

ANNUAL GRAD PROGRAM: Participated in a 15-week program for 50 globally selected students.  
MARGIN CALCULATOR MICROSERVICE: Implemented and unit-tested features for NYSE and HKG stock exchanges.  
TECHNOLOGY STACK: Java, C++, Spring Beans, JUnit

SELECTED PUBLICATIONS

- 1. J. Schultz\*, J. Adamek\*, M. Jusup\* et al. (2024), *Mastering Board Games by External and Internal Planning with Language Models*, ICML 2025 (\* = equal contribution) — **spotlight**
- 2. M. Jusup et al. (2023), *Safe Model-Based Multi-Agent Mean-Field Reinforcement Learning*, AAMAS 2024 — **oral**
- 3. M. Jusup et al., *Scalable Ride-Sourcing Vehicle Rebalancing with Service Accessibility Guarantee: A Constrained Mean-Field Reinforcement Learning Approach*, arXiv preprint

SELECTED TALKS

CroAI (invited)  
Superhuman Planning with LLMs — [click for description](#)

Zagreb, Croatia  
June 2025

ZurichNLP (invited)  
Mastering Board Games with Language Models — [click for slides](#)

Zurich, Switzerland  
Feb 2025

Google DeepMind Booth at NeurIPS (invited)  
Mastering Chess with Language Models

Vancouver, Canada  
Dec 2024

AAMAS 2024 (conference)  
Safe Model-Based Multi-Agent Mean-Field Reinforcement Learning

Auckland, New Zealand  
May 2024

ETH Zurich AI Center (invited)  
A Vehicle Repositioning Using a Safe Mean-Field Reinforcement Learning

Zurich, Switzerland  
Sep 2023

PROGRAMMING SKILLS

Advanced: Python

Minor Experience: TensorFlow · SQL · Java · C · R · Matlab

Work Experience: CLI · PyTorch · PySpark · Q/kdb+ · C++

VCS & Cloud: Git · Databricks · AWS · Azure

Core Packages: Numpy · Sklearn · Pandas · SciPy · Statsmodels · CPLEX · OR-Tools · PyQ · Matplotlib · Plotly

LANGUAGES

English: Professional working proficiency

Croatian: Native speaker

German: Basic