

# Matej Jusup

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www.matej-jusup.com

## HIGHLIGHTS

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**Co-developed the first LLM that plays chess at the world champion level as a student researcher at Google.**

*Gemini Chess Gem: goo.gle/ChessChamp.*

**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 in 2011.**

*On www.chess.com 99.999% percentile among over 100 million registered users.*

## EDUCATION

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### PhD in Artificial Intelligence

ETH Zurich

Zurich, Switzerland

Sep 2020 – June 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

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### Student Researcher

Google

Zurich, Switzerland

Apr 2024 - Sep 2024

**Key Contribution:** The first LLM that plays chess at the world champion level using a human search budget.

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 mail delays using ARIMA and supervised learning.

TECHNOLOGY STACK: Python, PyTorch, PySpark, Databricks, Statsmodels, AWS/Azure, Sklearn, Numpy, Pandas, Git

## Morgan Stanley

Oct 2017 - Feb 2019

SYSTEMIC RISK MODEL: Built a parallel hill climber heuristic, solving the problem in 3 minutes, averaging 5% from optimal.

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

## Morgan Stanley

New York, London &amp; 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 HGK stock exchanges.

TECHNOLOGY STACK: Java, C++, Spring Beans, JUnit

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

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**CroAI (invited)**

Zagreb, Croatia

*Superhuman Planning with LLMs — click for description*

June 2025

ZurichNLP (invited)

Zurich, Switzerland

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

Feb 2025

Google DeepMind Booth at NeurIPS (invited)

Vancouver, Canada

Mastering Chess with Language Models

Dec 2024

AAMAS 2024 (conference)

Auckland, New Zealand

Safe Model-Based Multi-Agent Mean-Field Reinforcement Learning

May 2024

ETH Zurich AI Center (invited)

Zurich, Switzerland

A Vehicle Repositioning Using a Safe Mean-Field Reinforcement Learning

Sep 2023

## 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

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**English:** Professional working proficiency

**Croatian:** Native speaker

German: Basic