Gabriel Smithline

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Summary

Second-year PhD Candidate in Computer Science & Engineering at the University of Michigan–Ann Arbor, specializing in multi-agent systems, computational game theory, and AI safety.

Website: gsmithline.github.io

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References:
Professor Michael P. Wellman — Computer Science & Engineering, University of Michigan
wellman@umich.edu
Dr. Mithun Chakraborty — Computer Science & Engineering, University of Michigan
dcsmc@umich.edu

Education

University of Michigan — *Ann Arbor, MI*

Ph.D. in Computer Science and Engineering — *Aug 2024 – Present (expected Aug 2029)*

- Member of the Strategic Reasoning Group in the AI Lab.
- **Advisor:** Prof. Michael P. Wellman.
- Relevant coursework: Data Mining and Graph Machine Learning, Advanced AI, Natural Language Processing, and Complexity Theory.

Tufts University — *Medford, MA*

M.S. in Computer Science — *May 2022 – May 2024*

- Completed degree while working full time.
- **Project:** *Deception as a Defensive Strategy in Stackelberg Security Games*.
- Relevant coursework: Machine Learning, Artificial Intelligence, Reinforcement Learning, Stochastic Processes, Algorithms, Theory of Computation, and Graduate Discrete Structures.

Lafayette College — *Easton, PA*

B.A. in Mathematical Economics & Data Science — *Aug 2017 – May 2021*

- **Project:** *Understanding COVID-19's Impact on Apartment Rental Markets: A Game-Theoretic and Statistical Approach*.
- Four-year NCAA Division I men's lacrosse student-athlete, dedicating 30+ hours per week to athletics alongside academics.

Professional Experience

Air Force Research Laboratory (AFRL) — *Fort Walton, FL*

Multi–Agent Systems & Game Theory Research Fellow — *Mar 2024 – Aug 2024*

- **First author** on *Hot Starts in Pursuit–Evasion Games*
- Presented at AAMAS Autonomous Robots and Multirobot Systems workshop.
- Designed GNN–based initialization strategies for multi–pursuer pursuit–evasion and built a reproducible Python simulation stack, including capture logic and survival/hazard analyses.
- Partnered with Autonomy, Navigation & Control groups; delivered documented tooling and experiment pipelines.
- Full paper **here**.

Tufts University — *Medford, MA*

Machine Learning Course Assistant — *Aug 2023 – May 2024*

- Led weekly recitations and office hours; authored grading rubrics and targeted feedback for core ML assignments.
- Created concise demos clarifying bias–variance tradeoffs, regularization, and cross–validation.

Jefferies — *New York, NY*

Quantitative Associate — *May 2023 – Feb 2024*

- Automated VaR/Monte Carlo VaR pipelines, reducing fixed–income risk runtime by ∼50%.
- Built reusable pricing components to support e–trading expansion.

Capital One — *Washington, DC*

Software Engineer, Enterprise Data & Machine Learning — *Aug 2021 – Dec 2022*

- Scaled a low–latency data API to ∼52k TPS with sub–5 ms response time.
- Shipped production ML inference for fraud detection; earned AWS Certified Solutions Architect–Associate.

Research

Measuring Competition and Cooperation in LLM Bargaining: An Empirical Meta-Game Analysis

Ann Arbor, MI

Graduate Student Researcher *Oct 2024 – Present*

- **G. Smithline**, C. Mascioli, M. Chakraborty, and M. P. Wellman.
- **First author**; designed and built a game–theoretic evaluation framework for interactive AI in bargaining.
- Funded by the **Cooperative AI Foundation (CAIF)**; preliminary results presented at the ICML Multi–Agent Systems in the Era of Foundation Models: Opportunities, Challenges and Futures workshop.
- Full paper currently under review.

Market Selection with Midpoint Matching: A Strategic Agent–Based Analysis

Ann Arbor, MI

Graduate Student Researcher *Feb 2025 – Aug 2025*

- **G. Smithline**, A. Gu, and M. P. Wellman.
- **First author**; built a digital twin of Nasdaq's Midpoint Extended–Life Order (M–ELO) and an EGTA pipeline to study mechanism selection against the continuous double auction (CDA).
- Assessed equilibrium behavior, strategy adoption, and stability via replicator dynamics across diverse market conditions.
- Accepted at ACM Conference on AI in Finance (ICAIF) 2025.

Projects in Progress

Parameter Efficiency in Mixture–of–Experts (MoE)

Ann Arbor, MI

Graduate Student Researcher *Sep 2025 – Present*

- **Co–first author**; studying parameter efficiency and routing behavior of an MoE module embedded in a single–layer Transformer on minimal arithmetic tasks.
- Evaluating gating quality and specialization; proposing a counterfactual gating loss. When an alternate expert would reduce task loss, zero the original expert's gradient and train the gate toward that expert. Measuring specialization and accuracy under tight parameter budgets.

Negotiating Agents: Strategic and Behavioral Evaluation

Ann Arbor, MI

Graduate Student Researcher *Sep 2025 – Present*

- Project funded by **OpenAI**.
- Designing and testing methods to fine–tune general LLMs for negotiation using computational game theory and multi–agent RL.

Selected Honors

2025	**Summer School Invitee,** Cooperative AI Foundation	*London, UK*
2024	**SCAMP Invitee (Special Conference on Applied Mathematical Problems),** Institute for Defense Analyses (IDA)	*Bowie, MD*
2024	**Hap Arnold Scholar,** Air Force Research Laboratory (AFRL)	*Fort Walton, FL*
2021	**David Heard Award,** Lafayette College	*Easton, PA*
2021	**Data Education and Feminism Scholar at Lafayette and Beyond (DEFLAB),** Lafayette College	*Easton, PA*
2018, 2020–2021	**Academic All–Patriot League,** Lafayette College	*Easton, PA*

Service

ACM International Conference on AI in Finance (ICAIF) 2025

Subreviewer *Aug 2025*

AAAI Conference on Artificial Intelligence (AAAI) 2026

Subreviewer *Aug 2025*