Moshe Mash, Ph.D.

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Summary

- AI Research Scientist with a Ph.D. and Carnegie Mellon Robotics Institute postdoctoral fellowship, specializing in large language models, natural language processing, and multi-agent systems. Over a decade of experience translating research into production — built predictive systems at Amdocs saving millions annually, deployed clinical ML models at Diagnostic Robotics, led NLP/LLM research at DICTA, and now founder of MashInnovateAI. Recipient of the Best Paper Award at ACM EC 2016, with publications in JACM, AIJ, Science Translational Medicine, and CHI.
- **Core Skills:** Python · PyTorch · HuggingFace Transformers · LLM fine-tuning & RAG · Natural Language Processing · Multi-Agent Systems · Game Theory · Production ML · SQL · Distributed Training · Healthcare & Clinical ML · Human-Centric AI

Education

Ph.D., Software and Information Systems Engineering | Ben-Gurion University of the Negev | 2014–2018

- **Dissertation:** Reaching Fair Agreements in Group Settings
- **Advisor:** Prof. Ya'akov (Kobi) Gal

M.Sc., Computer Science (AI specialization) | Bar-Ilan University | 2011–2013

- **Thesis:** Joint Exploration with Self-Interested Agents
- **Advisor:** Prof. David Sarne

B.Sc., Software Engineering | Shenkar College of Engineering and Design | 2007–2011

Academic Positions

Postdoctoral Researcher | Carnegie Mellon University, Robotics Institute | 2019–2023

- Hosted by **Prof. Reid Simmons** and **Dr. Stephanie Rosenthal**.

- Conducted research on the behavior and cognitive processes of machine learning practitioners as they develop AI models.
- Designed frameworks to capture, model, and analyze workflows, with emphasis on decision-making, iteration cycles, and knowledge bottlenecks.
- Developed predictive methods to identify critical moments of difficulty (“stuckness”) in ML development, enabling targeted support and improved productivity.
- Collaborated with multidisciplinary teams to integrate human-centric AI approaches into machine learning tools and environments.
- Mentored graduate students in AI and human-computer interaction research.
- Research funded by J.P. Morgan, which renewed the award for a second consecutive year based on the project's strong results.

Research Assistant | **Weizmann Institute of Science** | **2011–2012**

- Developed image-processing algorithms for 3D biomedical images.

Industry Research Positions

Principal AI Researcher & Founder | MashInnovateAI | 2024–present

- Lead AI research and development services; provide end-to-end support from proof of concept through production deployment.
- Primary client: DICTA – The Israel Center for Text Analysis, continuing the NLP and LLM research I led as a Dicta employee (2023–2024), now as an independent researcher.
- Design and deliver custom AI systems for partners across NLP, LLM fine-tuning, RAG, and applied ML.
- Tech stack: Python, PyTorch, HuggingFace Transformers, LLM fine-tuning, RAG, and SQL.
- Partner directly with client research teams, translating their requirements into deployed, production-ready AI systems.

AI Researcher | DICTA – The Israel Center for Text Analysis | 2023–2024

- Conduct research at the intersection of computational linguistics and Jewish studies, focusing on rabbinical and modern Hebrew.
- Developed NLP pipelines for authorship attribution, including models predicting the rabbi/author of texts where attribution is disputed.
- Achieved high predictive accuracy and used these models to weigh in on long-debated questions of authorship in classical Jewish texts — determining the likely author of works whose attribution had been disputed in traditional scholarship.
- Designed AI-driven systems for automatic citation generation and cross-referencing of classical sources.
- Built advanced machine learning and LLM-based tools to support scholarly research in Hebrew texts, integrating prediction, text similarity, and semantic analysis.
- Took models from research through to production deployment, delivering systems that are actively used by scholars and researchers for live analysis of Hebrew texts.
- Published prototypes and tools provided academic collaborators with tools enabling automated scholarly insights.
- Tech stack: Python, PyTorch, HuggingFace Transformers, large language models, retrieval-augmented generation (RAG), and classical NLP.

AI Researcher | Diagnostic Robotics | 2019

- Developed machine learning models for the healthcare domain, with applications in risk prediction (e.g., ER diagnoses, hospitalization forecasting).
- Collaborated with clinicians and researchers to refine AI-driven predictive healthcare decision-support systems.
- Tech stack: Python, scikit-learn, and clinical/EHR data pipelines.

AI Researcher | Amdocs | 2018–2019

- Led the development of an innovative system predicting at-risk maintenance contract renewals, saving the company millions of dollars and still in operational use years later.
- Designed, built, and deployed the system from scratch, including problem definition, algorithm design, evaluation, and deployment pipeline.
- Tech stack: Python, scikit-learn, SQL, and a production deployment pipeline.

Research Interests

Artificial Intelligence, Machine Learning, Natural Language Processing, Multi-Agent Systems, Game Theory, Human-Centric AI, Data Science Workflows.

Research Agenda

My active research applies large language models and modern NLP to high-value text-analysis problems, organized around two directions aimed at peer-reviewed and patentable outcomes: (1) computational analysis of Hebrew and rabbinic texts — authorship attribution, automatic citation generation, and semantic cross-referencing (with DICTA); and (2) computational analysis of legal and patent text, including textual studies of disparate outcomes in the patent system. Both build on prior work spanning multi-agent systems, game theory, and human-centric AI.

Awards & Recognition

- **Best Paper Award** – ACM Conference on Economics and Computation (2016)
- **Excellence in Teaching Award** – Ben-Gurion University (2016, 2017)
- **Ph.D. Scholarship for Academic Excellence** – Ben-Gurion University (2014)

Teaching & Advising

Ben-Gurion University of the Negev – Software and Information Systems Engineering Dept.

- Teaching Assistant, Databases – Fall–Spring 2016, 2017, 2018
- Teaching Assistant, Analysis and Design of Software Systems – Spring–Summer 2016, 2017, 2018
- Teaching Assistant, Intelligent Systems – Spring–Summer 2015
- Teaching Assistant, Decision Support Systems – Fall–Spring 2015
- Departmental Seminar Coordinator – 2015, 2016, 2017, 2018
- Final Projects Coordinator (4th Year) – 2015, 2016, 2017, 2018
- Final Projects Adviser (Undergraduate) – 2015, 2016

Tel-Aviv Yafo Academic College – Information Systems Dept.

- Professor, Databases – Spring–Summer 2015, Fall–Spring 2015
- Lecturer, Game Theory – Spring–Summer 2015
- Teaching Assistant, Databases – Spring–Summer 2014

Bar-Ilan University

- Teaching Assistant, Statistical Methods in Computer Science – Spring–Summer 2014
- Teaching Assistant, Object-Oriented Programming – Fall–Spring 2013, 2014
- Teaching Assistant, Machine Learning – Fall–Spring 2014
- Teaching Assistant, Introduction to Computing – Fall–Spring 2013

Shenkar College of Engineering and Design

- Teaching Assistant, Introduction to Programming Systems – Spring–Summer 2012
- Teaching Assistant, Introduction to Computer Science – Fall–Spring 2012
- Teaching Assistant, Introduction to Object-Oriented Programming – Fall–Spring 2012

College of Management (Academic)

- Teaching Assistant, Object-Oriented Programming – Spring–Summer 2012

High School Teaching (Israel Ministry of Education)

- Mathematics Teacher (2010–2013) – taught Bagrut levels 3–5 points, specializing in students with learning disabilities (via Nitzan Association).

Professional Service

- **Reviewer:** AAAI, IJCAI, AAMAS, KDD, CHI, EC, ECAI, Group Decision & Negotiation
- Developed voting algorithm for Best Paper selection (IAAI 2018)
- Organized departmental seminars at Ben-Gurion University

Military Service

Israel Defense Forces (2004–2007)

- Infantry Special Forces (89th Commando Brigade)
- Developed internal qualification & operations management system

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Publications

Journal Articles

- Gerhardt D., Marcowitz-Bitton M., Schuster W.M., Elmalech A., Suissa O., Mash M. (2026). Gendered Words and Grant Rates: A Textual Analysis of Disparate Outcomes in the Patent System. Northwestern Journal of Technology and Intellectual Property, 23(3), Article 2.
- Raphael I, Xiong Z, Sneiderman CT, Raphael RA, Mash M., et al. The T cell receptor landscape of childhood brain tumors. Science Translational Medicine. 2025 Mar 19; 17(790): eadp0675.
- Mash, M., Zick, Y., Bachrach, Y., & Gal, K. (2017). How to Form Winning Coalitions in Mixed Human-Computer Settings. ACM Transactions on Intelligent Systems and Technology (TIST).
- Gal, K., Mash, M., Procaccia, A., & Zick, Y. (2017). Which Is the Fairest (Rent Division) of Them All? Journal of the ACM (JACM).
- Rochlin, I., Sarne, D., & Mash, M. (2014). Joint Exploration with Self-Interested Agents and the Fallacies of Cooperation Enhancers. Artificial Intelligence Journal (AIJ).

Conference Proceedings

- Mash, M., Oryol, S., Rosenthal, S., & Simmons, R. (2022). Predicting Data Scientist Stuckness During the Development of Machine Learning Classifiers. VL/HCC.
- Mash, M., Rosenthal, S., & Simmons, R. (2021). DSWorkFlow: A Framework for Capturing Data Scientists' Workflows. CHI.
- Gal, K., Mash, M., Procaccia, A., & Zick, Y. (2016). Which Is the Fairest (Rent Division) of Them All? EC. (Best Paper Award)
- Mash, M., Lin, R., & Sarne, D. (2014). Peer-Designed Agents for Evaluating Distribution of Outcomes in Human Environments. AAMAS.
- Mash, M., Rochlin, I., & Sarne, D. (2012). Join Me with the Weakest Partner, Please. IAT.