Amirreza Razmjoo Fard

AI Engineer - Imitation Learning, RIVR Technologies AG, Zurich, Switzerland

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RESEARCH INTERESTS

Data Flywheel, Contact-rich Manipulation, Generative Models for Motion Planning, Sampling-based motion planning, Task and Motion Planning,

EDUCATION

École Polytechnique Fédérale de Lausanne (EPFL), Jan. 2021 — Nov. 2025
PhD, EDEE program Lausanne, Switzerland
Thesis Topic: Feasibility Guided Exploration and Adaptation for Constrained Robotic Manipulation
Keywords: Contact-rich Manipulation, Sampling-based MPC, Products of Experts, Generative Models
Supervisor: Dr. Sylvain Calinon, Prof. Auke Ijspeert

Sharif University of Technology, Sep. 2018 — Sep. 2020
MSc in Mechanical Engineering Tehran, Iran
GPA: 18.85/20 (4.0/4.0)
Thesis Title: Teaching to Point at Different Objects as an Interactive Gesture to a Robot by Learning from Demonstration
Supervisors: Prof. Ali Meghdari, Dr. Alireza Taheri

University of Tehran (with honors), Sep. 2014 — Sep. 2018
BSc in Mechanical Engineering Tehran, Iran
GPA: 18.83/20 (3.95/4.0)
Thesis Title: Development of a Health-Monitoring Device for Activity Recognition and Fall Detection
Supervisors: Dr. Sadighi, Dr. Zakerzadeh

EXPERIENCE

RIVR Technologies AG Zurich, Switzerland
AI Engineer – Imitation Learning Feb. 2026 – Present

- Developing robot manipulation capabilities for autonomous delivery systems using reinforcement and imitation learning, leveraging a data flywheel to iteratively improve policies from real-world data.

Idiap Research Institute Martigny, Switzerland
Research Assistant Jan. 2021 – Jan. 2026

- Developed **TT-PoE-MPC**, a sampling-based model predictive control algorithm that combines feasibility distributions with MPPI/DIAL-MPC (optimality-focused approaches). This reduced the learning burden (only feasibility needs to be learned, optimality is computed online) and improved success rates by **20% on average** (range: 5–35%), while also reducing cost and planning steps. Applied to tasks such as *non-prehensile manipulation, obstacle avoidance, and manifold navigation.*
- Designed novel **task representations** to enhance optimal control methods, including: – *Configuration Space Distance Fields*, which linearize planning in configuration space and accelerate convergence. – *Robust Manifolds*, enabling robots to withstand external disturbances (e.g., humanoid resisted ∼200N user-applied force for 2–8s without losing stability). – Kinematic-aware signed distance fields (SDFs) and stiffness manifolds for constraint-aware control.
- Collaborated on **robust policy learning**, leveraging Tensor-Train decomposition for direct policy retrieval from weighted advantage functions. This reduced training time by **∼80%** and enabled faster, safer deployment.
- Contributed to **task and motion planning** research, combining high-level symbolic reasoning with low-level control, including: – Dynamic Logic-Geometric Programming (D-LGP). – Graphs of tensor networks for long-horizon planning. – Learning symbolic and continuous planning from demonstrations.

Honda Research Institute GmbH Offenbach, Germany
Research Intern Oct. 2024 – Mar. 2025

- Developed **Composition of Conditional Diffusion Policies (CCDP)**, a diffusion-policy based algorithm that guides sampling during the denoising process. This approach enabled robots to avoid previously failed samples and increased success rates by an average of **44%** (range: 23–84% depending on the task), without requiring additional classification, skill segmentation, or high-level planning. Applied and validated on tasks such as *door opening, object manipulation, and object packing, etc.*

CEDRA (Center of Excellence in Design, Robotics, and Automation) Tehran, Iran
Research Assistant Sep. 2018 – Sep. 2020

- Demonstrated how to combine features with non-linear relationships across coordinate systems using **Products of Experts**.
- Developed a **ROS-based control system** for two social robots (Arash2 & Armin), including a learning-from-demonstration module, GUI integration, and navigation system support in collaboration with a front-end developer.

AWARDS

Nomination for EDEE Best Thesis Award 2025
Nominated for PhD thesis

Outstanding Paper Award at TARo Workshop at IROS 2025
For the paper *CCDP:Model-Free Failure Recovery with Guided Diffusion Sampling*

Outstanding Paper Finalist at RSS 2024
For the paper *Configuration Space Distance Fields for Manipulation Planning*

Summa cum laude 2018
Achieved the top rank among 121 students upon graduating from the University of Tehran.

Admission Offer 2018
Excellent student, M.Sc. admission offer to Sharif University of Technology.

Dean's list 2015-2018
Ranked among the top 10 individuals of the year in that particular program.

F.O.E prize 2015, 2017
Recipient of the award given to the top three students of the year.

Ranked 256 (top 0.2%) 2014
Among more than 220,000 people in the nationwide university entrance exam.

SKILLS

- **Robot Control:** Diffusion-Policy, Flow-Matching Policy, Imitation Learning, MPPI, DIAL-MPC, iLQR
- **Research Topics:** Product of Experts, Generative Models, Optimal Control, Learning from Demonstrations, (physical-) Human-Robot Interaction, Contact-rich Manipulation, Impedance/Admittance Control,
- **Programming:** Python, MATLAB, ROS, LaTeX, Linux, C++ (Basics)
- **Softwares (libraries):** IsaacLab, Mujoco, Pytorch, IsaacGym, Pybullet, Pinocchio, Crocoddyl, CasADi, Genesis
- **Languages:** English (Professional Working Proficiency), Azerbaijani (Native), Persian (Native)

REFERENCES

Dr. Lorenz Wellhausen E-mail: lorenz.wellhausen@rivr.ai
CTO Software at RIVR Technologies AG

Dr. Sylvain Calinon E-mail: sylvain.calinon@idiap.ch
Senior Researcher at Idiap Research Institute, Head of RLI Group Telephone: (office) +41 27 721 77 61

Dr. Michael Gienger E-mail: Michael.Gienger@honda-ri.de

Chief Scientist at Honda Research Institute

SELECTED PUBLICATIONS

- Y. Li, N. Darwiche, A. Razmjoo, S. Liu, Y. Du, A. Ijspeert, and S. Calinon, **Geometry-aware Policy Imitation**, ICLR, 2026
- T. Xue, Y. Zhang, A. Razmjoo, and S. Calinon, **Monte Carlo Tree Search with Tensor Factorization for Robot Optimization,**, under review, 2025
- A. Razmjoo, T.Xue, S. Shetty and S. Calinon, **Sampling-Based Constrained Motion Planning with Products of Experts**, IJRR, 2025
- Y. Zhang, T. Xue, A. Razmjoo, and S. Calinon, **Learning Problem Decomposition for Efficient Sequential Multi-Object Manipulation Planning**, RA-L, 2025.
- A. Razmjoo, S. Calinon, M. Gienger, and F. Zhang, **CCDP: Composition of Conditional Diffusion Policies with Guided Sampling**, IROS, 2025.
- T.Xue, A. Razmjoo, S. Shetty and S. Calinon, **Robust Contact-rich Manipulation through Implicit Motor Adaptation**, IJRR, 2025
- O. Beker, N. Gürtler, J. Shi, A. Geist, A. Razmjoo, G. Martius, and S. Calinon, **A Smooth Analytical Formulation of Collision Detection and Rigid Body Dynamics With Contact**, IROS, 2025.
- T. Xue, A. Razmjoo, and S. Calinon, **Robust Manipulation Primitive Learning via Domain Contraction**, CoRL, 2024.
- Y. Zhang, A. Razmjoo, and S. Calinon, **Learn2Decompose: Learning Problem Decomposition for Efficient Task and Motion Planning**, RA-L, 2024.
- T. Xue, A. Razmjoo, S. Shetty, and S. Calinon, **Logic-Geometric learning and Control Using Graph of Tensor Networks**, *RSS-Workshop*, 2024.
- O. Beker, A. Razmjoo, A. Zamir, and S. Calinon, **VIMEX: Exemplar-Based Visual Memory for Robotic Task Description**, under review, 2024
- Y. Zhang, T. Xue, A. Razmjoo, **Logic Dynamic Movement Primitives for Long-horizon Manipulation Tasks in Dynamic Environments**, *RA-L*, 2024
- T.Xue, A. Razmjoo, S. Shetty and S. Calinon, **Logic-Skill Programming: An Optimization-based Approach to Sequential Skill Planning**, *RSS*, 2024
- Y.Li, X. Chi, A. Razmjoo, S. Calinon, **Configuration Space Distance Fields for Manipulation Planning**, *RSS*, 2024, (**Best Paper Finalist**)
- T. Xue, A. Razmjoo, and S. Calinon, **D-LGP: Dynamic Logic-Geometric Program for Combined Task and Motion Planning**, *ICRA*, 2024.
- Y. Li, Y. Zhang, A. Razmjoo, and S. Calinon. **Learning Robot Geometry as Distance Fields: Applications to Whole-body Manipulation.**, *ICRA*, 2024.
- A. Razmjoo, T. Brecelj, K. Savevska, A. Ude, T. Petrič, and S. Calinon, **Optimal Latent Manifold for Reliable Physical Interaction: A Sit-to-Stand Assistance Application**, 6th Ergonomic Physical Human-Robot Collaboration: Harnessing Advancements in Robot Learning workshop, *IROS*, 2023.
- A. Razmjoo, T. Brecelj, K. Savevska, A. Ude, T. Petric, and S. Calinon, **Learning Joint Space Reference Manifold for Reliable Physical Assistance**, *IROS*, 2023.
- B. Ti, A. Razmjoo, Y. Gao, J. Zhao, S. Calinon, **A Geometric Optimal Control Approach for Imitation and Generalization of Manipulation Skills**, *Robotics and Autonomous Systems (RAS)*, 2023.

- A. Razmjoo, T. S. Lembono, S. Calinon, **Optimal Control Combining Emulation and Imitation to Acquire Physical Assistance Skills**, *ICAR*, 2021.