

Amirreza Razmjoo Fard

Research Assistant, École Polytechnique Fédérale de Lausanne (EPFL)/Idiap Research Institute, Martigny, Switzerland
amirreza.razmjoo@gmail.com — +41 (76) 467-7413 — www.linkedin.com/in/amir-razmjoo — amirrazmjoo.github.io

European Candidate Eligibility in Switzerland: In accordance with Article 21(3) of the Foreign Nationals and Integration Act (formerly AuG), as a non-European graduate who studied in Switzerland, I am eligible for European-level consideration—i.e., the usual priority restrictions are waived—for a period of at least six months following my defense. For further details, please contact me or Mr. Philippe Ory (EPFL) at philippe.ory@epfl.ch or +41 21 693 5051.

RESEARCH INTERESTS

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 — present
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

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.

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

- 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.

CEDRA (Center of Excellence in Design, Robotics, and Automation)

Research Assistant

Tehran, Iran
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

Outstanding Paper Award at TARo Workshop at IROS	2025
For the paper <i>CCDP:Model-Free Failure Recovery with Guided Diffusion Sampling</i>	
Outstanding Paper Finalist at RSS	2024
For the paper <i>Configuration Space Distance Fields for Manipulation Planning</i>	
Admission Offer	2018
Excellent student, M.Sc. admission offer to Sharif University of Technology.	
Summa cum laude	2018
Achieved the top rank among 121 students upon graduating from the University of Tehran.	
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.	
The Foundation of the University of Tehran Scholarship	2016-2017
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, L^AT_EX, Linux, C++ (Basics)
- **Softwares (libraries):** Mujoco, Pytorch, IsaacGym, Pybullet, Pinocchio, Crocoddyl, CasADi, Genesis
- **Languages:** English (Professional Working Proficiency), Azerbaijani (Native), Persian (Native)

REFERENCES

Dr. Sylvain Calinon

Senior Researcher at Idiap Research Institute, Head of RLI Group

E-mail: sylvain.calinon@idiap.ch
Telephone: (office) +41 27 721 77 61

Dr. Michael Gienger

Chief Scientist at Honda Research Institute

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

Dr. T. S. Lembono

Applied Scientist at Amazon

E-mail: tlembono@amazon.de

Teng Xue

Research Assistant at the Idiap Research Institute

E-mail: teng.xue@idiap.ch

SELECTED PUBLICATIONS

- Y. Li, N. Darwiche, A. Razmjoo, S. Liu, Y. Du, A. Ijspeert, and S. Calinon, **Geometry-aware Policy Imitation**, under review, 2025
- 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
- T. Xue, A. Razmjoo, Y. Zhang and S. Calinon, **Unifying Robot Optimization: Monte Carlo Tree Search with Tensor Factorization**, Under review, 2025
- Y. Zhang, T. Xue, A. Razmjoo, and S. Calinon, **Goal Decomposition and Temporal Distance Learning for Reactive Task and Motion 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**, arxiv, 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. Brecej, 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. Brecej, 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.