Amirreza Razmjoo Fard

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European Candidate Eligibility: 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
Lausanne, Switzerland
Doctor of Philosophy, EDEE program
Thesis Topic: Improving Optimization-based Methods for Efficient Physical Robot Interaction
Keywords: Contact-rich Manipulation, Sampling-based MPC, Products of Experts, Generative Models
Supervisor: Dr. Sylvain Calinon

Sharif University of Technology, Sep. 2018 — Sep. 2020
Tehran, Iran
Master of Science in Mechanical Engineering
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
Tehran, Iran
Bachelor of Science in Mechanical Engineering
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

- Designed a local failure recovery system for a robot, enabling it to autonomously avoid previous failures without requiring additional classification, skill segmentation, or high-level planning.
- Developed **Composition of Conditional Diffusion Policies (CCDP)**, a method that dynamically adjusts the sampling process at runtime by restricting specific regions, allowing the system to explore alternative possibilities and improve failure avoidance.
- **Research Keywords:** Diffusion Policies, Composition of Conditional Diffusion Models, Sampling Guidance, Failure Recovery

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

- Developed efficient methods for robotic systems to **handle constraints** while **interacting with dynamic environments**. Designed a **robust manifold** to enable seamless **physical human-robot interaction** and leveraged the concept of **products of experts** to enhance the sampling efficiency of **sampling-based planning methods**. Applied these techniques to tasks such as **non-prehensile manipulation, obstacle avoidance**, and more.
- **Research Keywords:** Optimal Control, Underactuated System, Task Representation, Geometry-aware Control, Products of Experts, Generative Models

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

- We demonstrated how to combine features with non-linear relationships observed in various coordinate systems using **products of experts** which improved the performance and generalizability of **learning from demonstration** techniques. Additionally, we developed a ROS-based control system for two social robots, Arash2 & Armin, to support my research and simplify operation for non-experts.
- **Keywords:** Learning from Demonstration, Products of Experts, Social Robots, ROS, Linux.

NODET (National Organization for Development of Exceptional Talents) Tehran, Iran
Research Assistant Feb. 2019 — Sep. 2019

- Under the guidance of Prof. Hoda Mohammadzade and as a member of the FallArm team, I designed and implemented an innovative fall detection system by leveraging dynamic haar-cascade features.
- **Research Keywords:** Fall Detection in Videos, Computer Vision, and Image Processing

CAST (Center of Advanced Systems and Technologies) Tehran, Iran
Undergraduate Research Assistant Sep. 2017 — Sep. 2018

- Memebr of Dynamic portfolio.
- **Keywords:** Mechanical Design, Component Selection

Festo Tehran, Iran
Vocational Trainee Jun. 2017 — Sep. 2017

- I gained comprehensive knowledge of hydraulic-based systems, encompassing an understanding of the principles behind hydraulic systems, reading schematics, and mastering the intricacies of valve selection to optimize system performance across a range of industries and applications.

AWARDS

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

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

- **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):** Mujoco, Pytorch, IsaacGym, Mujoco, Pybullet, Pinocchio, Crocoddyl, CasADi
- **Languages:** English (Professional Working Proficiency), Azerbaijani (Native), Persian (Native)

Related Courses

Legged Robots, EPFL *Prof. Auke Ijspeert*
Keywords: Humanoid Modeling, Reinforcement Learning (RL), Central Pattern Generator (CPG)
Projects: 1- Developed control strategies for the Atlas robot's walking gait using divergent term modulation. 2- Designed and implemented a CPG-RL framework enabling a dog robot to perform varied behaviors (walking, running, etc.).
Score: 5.5/6

Model Predictive Control, ETH *Prof. Melanie Zeilinger, Dr. Andrea Carron*
Keywords: Optimal Control Basics, Feasibility and Stability in Receding Horizon Systems, Robust MPC
Project: Developed a temperature control system for a vaccine storage unit.
Score: 6/6

REFERENCES

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

Dr. T. S. Lembono E-mail: tlembono@amazon.de
Applied Scientist at Amazon

Teng Xue E-mail: teng.xue@idiap.ch
Research Assistant at the Idiap Research Institute

SELECTED PUBLICATIONS

- A. Razmjoo, S. Calinon, M. Gienger, and F. Zhang, **CCDP: Composition of Conditional Diffusion Policies with Guided Sampling**, under review, 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**, under review, 2025.
- Y. Zhang, T. Xue, A. Razmjoo, and S. Calinon, **Goal Decomposition and Temporal Distance Learning for Reactive Task and Motion Planning**, under review, 2025.
- A. Razmjoo, T.Xue, S. Shetty and S. Calinon, **Sampling-Based Constrained Motion Planning with Products of Experts**, under review, 2024
- T.Xue, A. Razmjoo, S. Shetty and S. Calinon, **Robust Contact-rich Manipulation through Implicit Motor Adaptation**, under review, 2024
- 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. 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.