

# Nima Maghooli

Research Assistant at Advanced Robotics and Automated Systems (ARAS) Laboratory | Hi-Tech Robotic Solutions

## CONTACT INFORMATION

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Advanced Robotics and Automated Systems ([ARAS](#)) Laboratory,  
Center of Excellence in Robotics and Control, Department of  
Mechanical Engineering, K. N. Toosi University of Technology,  
Tehran, Iran.

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## EDUCATION

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- **M.Sc. in Mechanical Engineering (majoring in Dynamics and Control),** Sep 2020 - Present  
[K. N. Toosi University of Technology](#) Tehran, Iran
  - Thesis title: Data-Driven Modeling and Controller Design with Implementation for Tendon-Driven Continuum Robots (TDCRs) using Vision-Based Deep Reinforcement Learning,
  - Seminar title: Learning-Based Modeling & Control for TDCRs,
  - GPA: 18.87 (out of 20), Rank: 1<sup>st</sup>,
  - Supervisor: [Prof. S. Ali A. Moosavian](#).
- **B.Sc. in Mechanical Engineering,** Sep 2015 - Sep 2020  
[University of Tehran](#) Tehran, Iran
  - Internship: Mapna Turbine Engineering and Manufacturing Company ([TUGA](#)),
  - GPA for the last two semesters (43 units): 17.78 (out of 20),
  - GPA: 15.24 (out of 20),
  - Supervisor: [Dr. Tara Farizeh](#).

## RESEARCH AND TEACHING EXPERIENCE

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- **Research Assistant (K. N. Toosi University of Technology)**
  - Advanced Robotics and Automated Systems Laboratory (Sep 2021 - Present)
- **Teaching Assistant (K. N. Toosi University of Technology)**
  - Advanced Robotics (Control of Robots), Prof. S. Ali A. Moosavian (Spring 2022, Spring 2023)  
*Kinematics, Kinetics/Dynamics, Planning, Position Control, Force & Impedance Control*
  - Advanced Dynamics, Prof. S. Ali A. Moosavian (Fall 2021, Fall 2022)  
*Classical Dynamics, Motion of Celestial Bodies, Analytical Dynamics, Stability Analysis*
- **Teaching Assistant (Scientific Association of Mechanical Engineering, University of Tehran)**
  - MATLAB & Simulink Workshop (Jun 2020)  
*Control System Design and Optimization for Linear & Nonlinear Dynamic Systems*

## RESEARCH INTERESTS

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- Data-Driven and Intelligent Control
- Vision-Based Sensing for Closed-Loop Control
- Deep Reinforcement Learning Application for Learning-Based Control
- System Identification and Parameters Estimation
- Dynamics Modeling, Simulation, and Implementation of Robotic Systems

- **N. Maghooli**, F. S. Tabatabaee-Nasab, and S. Ali A. Moosavian, “Self-Tuning Robust Tracking Control for Autonomous Underwater Vehicles,” 2022 10th RSI International Conference on Robotics and Mechatronics (ICRoM), Tehran, Iran, 2022, pp. 279-284, doi: 10.1109/ICRoM57054.2022.10025058. [\[Link\]](#)
- **N. Maghooli**, M. Bajelani, S. A. Khallilpour, HD Taghirad, and S. Ali A. Moosavian, “Optimal Modified Transpose Jacobian Control for Robotic Systems”, [to be submitted]
- **N. Maghooli**, O. Mahdizadeh, S. Shekari, and S. Ali A. Moosavian, “Data-Driven Modeling for Tendon-Driven Continuum Robots using Black-Box Identification”, [in preparation]
- **N. Maghooli**, O. Mahdizadeh, S. Shekari, and S. Ali A. Moosavian, “Modified Direct Inverse Control for Tendon-Driven Continuum Robot”, [in preparation]
- **N. Maghooli**, M. Bajelani, O. Mahdizadeh, S. Shekari, and S. Ali A. Moosavian, “Position Control for Tendon-Driven Continuum Robots using Vision-Based Deep Reinforcement Learning”, [in progress]

## SKILLS SUMMARY

- **CAE:** MATLAB-Simulink (Advanced), ADAMS (Intermediate), ROS (Basic)
- **CAD and CAM:** CATIA (Advanced), L<sup>A</sup>T<sub>E</sub>X (Intermediate), Prezi (Basic)
- **Programming Languages:** Python (Intermediate), C++ (Basic), HTML (Basic)
- **Languages:** Persian (Native), English (Rather Fluent, IELTS Test will be taken on Summer 2023)

## HONORS AND AWARDS

- **Rank in M.Sc.**
  - 1<sup>st</sup> out of 30 students of Mechanical Engineering (Dynamics and Control), K. N. Toosi University of Technology, 2023.

## COURSES

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|--|--------------------------------------|
| • Advanced Robotics (19.5/20)                      | • Nonlinear Control (19/20)          |
| • Reinforcement Learning (20/20)                   | • Advanced Control Systems (18.5/20) |
| • Artificial Intelligence & Expert Systems (20/20) | • Advanced Dynamics (18.5/20)        |
| • Automatic Control (19.1/20)                      | • Robotics (18.5/20)                 |
| • Advanced Engineering Mathematics (20/20)         | • Computer-Aided Design (17/20)      |
| • Fuzzy Logic & Neuro-Fuzzy Control (Volunteer)    | • System Identification (Volunteer)  |

## ACADEMIC PROJECTS

- **Dynamics Modeling, Planning and Control for 5-DoF Rail-Mounted Industrial Robot** [\[Link\]](#)
  - Advanced Robotics, Instructor: [Prof. S. Ali A. Moosavian](#) Spring 2021  
*Analytical Modeling (Forward & Inverse Kinematics, Jacobian, and Kinetics/Dynamics Model), Path Planning, Control System Design for Trajectory Tracking (PID, IDC, TJ, MTJ, SMC, MRAC), and Force Interaction with Environment (IC, OIC, MIC)*
- **Performance Comparison of FLC & PID Controllers for 3R Spatial Robotic Arm** [\[Link\]](#)
  - Artificial Intelligence & Expert Systems, Instructor: [Dr. Esmaeil Najafi](#) Spring 2022  
*Coding GA-PSO Hybrid Evolutionary Algorithm for finding the Optimal Gains for PID Controller, and Optimal Membership Functions Parameters and Rule-Base for Fuzzy Logic Controller*

- **Agent Navigation in Discrete Environments by Reinforcement Learning Algorithms** [[Link](#)]  
 – Reinforcement Learning, Instructor: [Dr. S. Hossein Khasteh](#) Spring 2022  
*Implementation of Dynamic Programming, Monte Carlo, and Temporal Difference (Q-Learning & SARSA) Algorithms for the Agent Navigation in Discrete Environments*
- **Data-Driven Modeling for Tendon-Driven Continuum Robot as a MIMO System** [[Link](#)]  
 – System Identification, Instructor: [Dr. Mahdi Aliyari-Shoorehdeli](#) (Volunteer Student) Fall 2021  
*Dynamics Modeling for TDCR using Linear & Nonlinear Identification techniques for MIMO Systems, such as ARX, ARMAX, OE, BJ, NARX, ANFIS, and MLP Neural Network*
- **Design and Optimization of Fuzzy Logic Controller for Tendon-Driven Continuum Robot** [[Link](#)]  
 – Fuzzy Logic & Neuro-Fuzzy Control, Instructor: [Prof. Ali Ghaffari](#) (Volunteer Student) Fall 2021  
*Optimization of Membership Functions Parameters and Rule-Base for FLC by GA-PSO Algorithm and Replacing the Designed Controller with Adaptive Neuro-Fuzzy Inference System (ANFIS) for Computational Cost Reduction*
- **PID Controller Design for Ball & Beam System Actuated by the Servo-Motor** [[Link](#)]  
 – Automatic Control, Instructor: [Dr. Tara Farizeh](#) Fall 2019  
*Control System Design, Gain Tuning, and Optimization by MATLAB-Simulink Toolboxes*
- **Analytical Kinematics & Dynamics/Kinetics Modeling and Verification** [[Link](#)]  
 – Robotics, Instructor: [Dr. Kambiz Ghaemi Osgouie](#) Spring 2020  
*Analysis and Sketching of the PUMA-560 Manipulator (6-DoF) by CATIA and MATLAB*

## VOLUNTEER AND EXECUTIVE EXPERIENCE

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- **Member of Conference Organising Committee** May 2017  
 – The Conference of Future of Electric Vehicles, Challenges and Opportunities, Department of Mechanical Engineering, University of Tehran.

## REFERENCES

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- **[Prof. S. Ali A. Moosavian](#)** Professor  
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 – Email: [moosavian@kntu.ac.ir](mailto:moosavian@kntu.ac.ir)  
 – Phone: (+98 21) 84063-238
- **[Prof. Mansour Nikkhah Bahrami](#)** Retired Professor  
 Department of Mechanical Engineering, University of Tehran Tehran, Iran  
 – Email: [mbahrami@ut.ac.ir](mailto:mbahrami@ut.ac.ir)  
 – Phone: (+98 21) 61114-009
- **[Dr. Tara Farizeh](#)** Assistant Professor  
 Department of Mechanical Engineering, University of Tehran Tehran, Iran  
 – Email: [tara.farizeh@ut.ac.ir](mailto:tara.farizeh@ut.ac.ir)  
 – Phone: (+98 21) 44608-604
- **[Dr. Rahele Rostamian](#)** Guest Postdoctoral Researcher  
 Department of Chemistry, University of Zurich Zurich, Switzerland  
 – Email: [r.rostamian@ut.ac.ir](mailto:r.rostamian@ut.ac.ir)