

Professional Summary

Visionary Robotics Engineer with over 20 years of expertise in robotics design, advanced mobility systems, and wearable human-machine interfaces. Specialized in hybrid terrestrial-aerial robots, space exploration mechanisms, and cutting-edge engineering solutions for extreme environments. Renowned for multidisciplinary collaboration, leadership in high-impact projects, and contributions to advancing robotic technologies. Inventor with multiple patents, award-winning researcher, and published author in leading scientific journals and conferences.

Education

PhD in Mechanical & Aerospace Engineering	Illinois Institute of Technology,	Chicago, IL,	May 2015
MSc in Mechatronics Engineering	K. N. Toosi University of Technology,	Tehran, Iran,	July 2008
BSc in Mechanical Engineering	K. N. Toosi University of Technology,	Tehran, Iran,	July 2005

Professional Experience

 **Group lead & Robotics Mechanical Engineer**  **NASA JPL**  Pasadena, CA  Mar 2017 – Present

- *Extreme Environment Robotics Group Lead*: Mentor team members, write proposals, secure funding for new projects, drive technological advancements, and expand the group's portfolio.
- *Mars Sample Return Mission*: Led manipulation system development for the Sample Recovery Helicopter.
- *Mars Rover 2020*: Conducted flight qualification of robotic arm force torque sensors.
- *Principal Investigator* for the deployable self-anchoring sensor payload & ultra-lightweight Mars perching system.
- *Led hardware development for DARPA Subterranean Challenge*, earning top awards
- *Designed robotic inspection systems for industrial applications*, including distillation columns.

 **Mechanical Design Engineer**  **DAQRI**  Los Angeles, CA  Apr 2015 – Mar 2017

- Designed mechanical hardware for the DAQRI Smart Helmet, the first wearable AR interface, including camera enclosures, optical subsystems, and thermal management solutions.
- Collaborated with electronics teams to integrate advanced sensors and processors seamlessly into the system.
- Optimized designs for manufacturability and assembly through tolerance analyses and process improvements.

 **Research Assistant**  **IIT Robotics Lab**  Chicago, IL  May 2011 – Apr 2015

- Designed and prototyped hybrid terrestrial-aerial robots with innovative mobility features.
- Programmed autonomous quadcopter navigation using OpenCV and Microsoft Kinect.
- Conducted performance assessments for novel robotic locomotion systems.

 **Research Assistant**  **IIT Manufacturing Lab**  Chicago, IL  Aug 2009 – May 2011

- Operated atomic force microscope for Nano-Imaging, Nano-Fabrication, and manipulation.
- Developed automated nano-manipulation algorithms using C++ and OpenCV.

 **Mechanical Engineer**  **Booria CAD/CAM Systems**  Tehran, Iran  Sep 2008 – Aug 2009

- Designed and manufactured Robotuft carpet tufting machine.
- Conducted structural analysis using Ansys and optimized machine designs.

 **Robotics Engineer**  **ResQuake Robotics Team**  Tehran, Iran  Sep 2003 – Sep 2008

- Developed mobile robots for rugged terrain, incorporating localization and mapping algorithms.
- Designed autonomous stair-climbing mechanisms and implemented control systems for ResQuake robots.

Skills

🔧 Hardware

- Robotic arm and mobility system design
- Sensor integration and electronics packaging
- Wearable technologies
- CNC machining, 3D printing, laser cutting

🗣️ Languages

- English (fluent), German (inter.), Farsi (native)

💻 Software

- C++, Python, MATLAB, OpenCV, ROS
- Microcontroller programming (ATMEL, PIC)

📐 CAD and FEA

- SolidWorks, AutoCAD, Inventor, GD&T
- MSC ADAMS, Ansys, MSC Patran

Patents

- **Hybrid Aerial and Terrestrial Vehicle:** US 20140131507 A1
- **Headwear:** D801587
- **Portable Computing Device:** D850444

Awards & Honors

- JPL team award for delivering Mars 2020 flight robotic arm (2019)
- JPL award for outstanding tech development in underground exploration robotics (2019)
- DARPA Subterranean Challenge: Urban Circuit 1st place (2020), Tunnel Circuit 2nd place (2019)
- Illinois Tech Sigma Xi Research Award for Outstanding Graduate Student (2014)
- Illinois Tech Best Research Poster Award (2010)
- International Robocup Rescue Real League Awards: 3rd place overall (2008), Best Operator Interface (2006), Best Mechanical Design (2005)

Notable Projects

- **Mars Sample Recovery Helicopter:** Led the design of autonomous manipulation systems
- **DARPA Subterranean Challenge:** Directed hardware solutions for autonomous subterranean exploration, achieving top competition honors.
- **DAQRI Smart Helmet:** Engineered wearable AR systems, incorporating advanced sensors.
- **HyTAQ Robot:** Developed a patented hybrid robotic platform with terrestrial and aerial mobility capabilities.

Publications

Published in *Nature Communications*, *IEEE Trans. on Robotics*, and several robotics conferences. over 1,100 citations.

Selected Journal Articles:

- “Multi-Modal Mobility Morphobot (M4) with Appendage Repurposing for Locomotion Plasticity Enhancement,” *Nature Communications*, 2023.
- “Mechanical Design, Planning, and Control for Legged Robots in Distillation Columns”, *Journal of Computational and Nonlinear Dynamics*, 2023.
- “Design and Performance Assessment of HyTAQ, A Hybrid Terrestrial and Aerial Quadrotor,” *IEEE Transactions on Robotics*, 2014.

Selected Conference Presentations:

- “Design, Prototype, and Performance Assessment of an Autonomous Manipulation System for Mars Sample Recovery Helicopter,” *IEEE IROS*, 2024.
- “PARSEC: An Aerial Platform for Autonomous Deployment of Self-Anchoring Payloads on Vertical Surfaces,” *IEEE ICRA*, 2023.
- “Demonstrating Autonomous 3d Path Planning On a Novel Scalable UGV-UAV Morphing Robot”, *IEEE IROS*, 2023
- “Autonomous Perching and Take-Off On Vertical Walls for A Quadrotor Micro Air Vehicle,” *IEEE ICRA*, 2015.