Curriculum Vitae

Mehrnaz Aghanouri Kupaei

Medical Robotics, PhD
Tehran University of Medical Sciences, Tehran, Iran

Personal Information

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Research Interests

- Medical Robotics, Artificial intelligence
- Computer vision, Machine learning
- Intelligent Systems

Education

PhD.

Sep. 2018 – June. 2024
Tehrann University of Medical Sciences, Tehran, Iran
Medical Robotics
GPA: 3.7/4
PhD thesis: *"Kinematic and dynamic calibration of a 7-DoF Master robot with application in robotic surgery using neural network"*, Under supervision of Dr. Alireza Mirbagheri

M. Sc.

Sep. 2014 – Feb. 2017
K. N. Toosi University of Technology, Tehran, Iran
Mechanical Engineering
Major: Mechatronics
GPA: 3.5/4
Master thesis: *"Control system design for navigation of a wireless capsule endoscope"*, Under supervision of Dr. Ali Ghaffari

B. Sc.

Sep. 2007 – Feb. 2012
Isfahan University of Technology (IUT), Isfahan, Iran
Mechanical Engineering
GPA: 3.3/4

Major: Mechatronics and Control

Bachelor Project: *"Improvement of a bond graph modeling software tool in MATLAB®"*, Under supervision of Dr. Saeed Behbahani

Honors & Awards

- Selected student for the forth and fifth period of Ahmadi Roshan plan, National Elite Foundation, Tehran, Iran.
- Ranked in the first place of the PhD Nationwide university entrance exam, Sep. 2018.
- Ranked 3rd place among Mechatronics students throughout M.Sc., K. N. Toosi University of Technology, Iran.
- Ranked 2nd place among Mechatronics students throughout B.Sc., Isfahan University of Technology, Iran.

Publications

- Aghanouri, Mehrnaz, Arab Alibek, Hossein, and Alireza Mirbagheri. " A Two-Step Method for Reducing Geometric and Non-Geometric Errors in the Pose of Hybrid Mechanism Master Robots with Application in Robotic Telesurgery", submitted to the International Journal of Robotic Research.

- Ramazan Rajabi, Mehrnaz Aghanouri, Hamid Moradi, and Alireza Mirbagheri. "Dynamic modeling of the surgery arm in Sina*flex* robotic telesurgery system", submitted to The International Journal of Robotics and Computer Assisted Surgery, 21, no. 4 (2025): e70093.

- Mashallah Torabi, Mehrnaz Aghanouri, Fatemeh Hadavandsiri, and Maryam Goodarzi. "Comprehensive comparison of features of robotic surgery systems in the field of abdominal surgeries: A narrative review", submitted to The International Journal of Robotics and Computer Assisted Surgery. Under revision

- Aghanouri, Mehrnaz, Arab Alibek, Hossein, and Alireza Mirbagheri. "Workspace and Dexterity Analysis of the Hybrid Mechanism Master Robot in Sina*flex* Robotic Telesurgery System: An in Vivo Experiment." The International Journal of Robotics and Computer Assisted Surgery, 20, no. 1 (2024): e2608.

- Aghanouri, Mehrnaz, Alireza Mirbagheri, Mohammadreza Keramati, and Mahroo Rezaeinejad. "Investigating the Learning Curve Through Residency Training Using a Newly Developed VR-Based Laparoscopic Surgery Simulator." In 2023 30th National and 8th International Iranian Conference on Biomedical Engineering (ICBME), pp. 355-359. IEEE, 2023.

- Mohandesi, Fatemeh, Alireza Mirbagheri, Hamid Khabiri, Mohammad M. Mirbagheri, Noureddin N. Ansari, Maryam Norouzi, Rouzbeh Kazemi, and Mehrnaz Aghanouri. "Design and Development of a Robotic System for Hand's Wrist-Fingers Rehabilitation." *Scientia Iranica* (2023).

- Mirbagheri, Alireza, and Aghanouri, Mehrnaz. "Robotic Surgery Advantages and Challenges." Frontiers in Biomedical Technologies 9, no. 1 (2022): 1-3.

- Aghanouri, Mehrnaz, Nasim Dadashi Serej, Hossein Rabbani, and Peyman Adibi. "Automatic esophagus Z-line delineation in endoscopic images using a new boundary linking method." IET Image Processing 16, no. 14 (2022): 3842-3853.

- Aghanouri, Mehrnaz, Pejhman Kheradmand, Milad Mousavi, Hamid Moradi, and Alireza Mirbagheri. "Kinematic and Workspace Analysis of the Master Robot in the Sina flex Robotic Telesurgery System." In 2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), pp. 4777-4780. IEEE, 2021.

- Aghanouri, Mehrnaz, Ali Ghaffari, and Nasim Dadashi Serej. "Image based high-level control system design for steering and controlling of an active capsule endoscope." Journal of Intelligent & Robotic Systems 94, no. 1 (2019): 115-134.

- Aghanouri, Mehrnaz, Ali Ghaffari, Nasim Dadashi Serej, Hossein Rabbani, and Peyman Adibi. "New image-guided method for localisation of an active capsule endoscope in the stomach." IET Image Processing 13, no. 12 (2019): 2321-2327.

- Mehrnaz Aghanouri, Ali Ghaffari, Nasim Dadashi, "Image-based localization of the active wireless capsule endoscope inside the stomach", Proceedings of The IEEE EMBS International Conference on Biomedical & Health Informatics (BHI), Orlando, Florida, USA, pp. 13-16, 16-19 February, 2017.

- Ali Esmaeili, Mehrnaz Aghanouri Kupaei, Hamed Faghihian, Hamid Reza Mirdamadi, "An adaptable broadband MEMS vibratory gyroscope by simultaneous optimization of robustness and sensitivity parameters", *Sensors and Actuators A: Physical*, Volume 206, 1 February 2014, Pages 132-137, ISSN 0924-4247.

- Aghanouri, M.; Habibollahi, A.; Esmaeili, A.; Faghihian, H.; Koloushani, M., "Optimization of robotic manipulators parameters modeled with integrated equations of actuators and links", 3rd International Students Conference on Electrodynamics and Mechatronics (SCE III), pp. 31- 36, Poland, 6-8 Oct. 2011.

- Mehrnaz Aghanouri Kupaei, Ali Esmaeili, Saeed Behbahani, "A new bond graph model for op amp", 2015 IEEE International Conference on Mechatronics and Automation (ICMA), Beijing, pp. 254-258, 2015.

Languages

- Farsi (Native)
- English
- Arabic (Intermediate)

Selected Experiences

- Postdoctoral researcher under the Technological Oriented Postdoc (TOP) program, 2025
- Collaborated on 10 research projects and 1 technology-focused project, since 2017.
- Research assistance, Research Center for Biomedical Technologies and Robotics (RCBTR), Advanced Medical Technologies and Equipment Institute (AMTEI), Tehran University of Medical Sciences (TUMS), Tehran, Iran, since 2020.
- Researcher, as a member of the project entitled "Feasibility, design and construction of a virtual simulator of knee arthroscopy surgery and the evaluation of the effect of using this simulator in improving the skill level of orthopedic assistants", School of Medicine, Tehran University of Medical Sciences, since 2022.
- Researcher, Center for Orthopedic Trans-disciplinary Applied Research (COTAR), since 2022.
- Researcher, Medical Image and Signal Processing Research Center (MISP), Isfahan University of Medical Sciences, 2016-2022.
- Researcher, as a member of the project entitled "Design and implementation of a guidance and encouragement software for post stroke patients in hand's wrist and fingers robotic rehabilitation system", Department of Medical Physics and Biomedical Engineering, School of Medicine, Tehran University of Medical Sciences, 2020-2021.
- Teaching assistance of "Introduction to robotics", PhD course, under supervision of Dr. Alireza Mirbagheri, Tehran University of Medical Sciences, Fall 2019.
- Researcher, as a member of the project entitled "Building a mobile automatic support to help people with lower paralysis", The fourth period of Ahmadi Roshan plan, National Elite Foundation, Tehran, Iran, 2019-2020.
- Researcher, as a member of the project entitled "Construction of arthroplasty simulator", The fifth period of Ahmadi Roshan plan, National Elite Foundation, Tehran, Iran, 2020-2021.
- Invited reviewer for various conferences and Journals, since 2016.
- Teaching assistant of "Advanced Control Systems I", under supervision of Prof. Ali Ghaffari, M.Sc. Course, KNTU, Fall 2015.
- "Designing a fuzzy controller for a Segway", as the final project of Fuzzy logic and neural networks course; Dr. A. Ghaffari, Mechanical Engineering Department, Fall 2015.
- "Designing LQR and LQG controllers for an active suspension system", as the final project of Advanced control II course; Dr. A. Ghaffari, Mechanical Engineering Department, Fall 2015.
- "Designing and implementation of the head angle tracking system for the Head-mounted display", as the final project of Mechatronic course, Dr A. Nahvi, Mechanical Engineering Department, Spring 2015.
- "Designing the mechanical, electrical, and control components of 3 level elevators", as the final project of the Mechatronics Lab II; Dr. M. Sadigh, Mechanical Engineering Department, Spring 2011.
- "System identification of Ball and beam and DC motor", as the final project of the Mechatronics Lab I; Dr. S. Behbahani, Mechanical Engineering Department, Fall 2010.
- "Programming a driver for a stepper motor by using AVR microcontroller", as the final project of the Processing in mechatronic systems course; Dr. M. Danesh, Mechanical Engineering Department, Spring 2010.
- "Path planning and analyzing walking of a 7-DOF biped robot by using MATLAB®", as the final project of the Robotics course; Dr. M. Sadigh, Mechanical Engineering Department, Spring 2010.
- Leader of Robotics and Control research ring, Isfahan Mathematics House (IMH: It is an institute for studying and teaching mathematics and other sciences), 2009-2013.

- The head of "Research Ring", Isfahan Mathematics House", 2010-2013.
- Member of Geometry research group, Isfahan Mathematics House (IMH), 2003-2014.
- Taking part in assessment of Iran's selected papers and executive activities of holding A-lympiad (an international real world mathematics team competition with open ended assignments) in Isfahan, IMH, 2008, 2009, and 2011.
- Taking part in assessment of Tournament of Towns (an international mathematics problem solving competition in which towns throughout the world can participate on an equal basis) in Isfahan, IMH, 2008-2017.

Computer Skills

- **Programming**: C in windows, PLC programming, Visual studio, Python
- **Engineering software:** MATLAB® & Simulink, Solid works
- **Misc.:** Mircosoft Office

References

- Dr. Alireza Mirbagheri
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  Tehran University of Medical Sciences
  Email: a-mirbagheri@tums.ac.ir
- Dr. Ali ghaffari
  Faculty of Mechanical Engineering Department
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