Resume
Hamid D. Taghirad
Professor

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Education:		
	Ph.D. in Electrical Engineering (Control – Robotics)	1997
	McGill University, Montreal, Canada. Supervisors: Prof. P. Belanger and Prof. G. Zames	
	Thesis title: Robust torque control of harmonic drive systems, GPA 4/4.	
	M.Sc. in Mechanical Engineering (Mechatronics)	1993
	McGill University, Montreal, Canada. Supervisor: Martin Buehler,	
	Thesis title: Implementation and control of a hopping robot, GPA 4/4.	
	B.Sc. in Mechanical Engineering	1989
	Sharif University of Technology, Tehran, Iran.	
	The second-best student (2/45) in the department, GPA 3.75/4.	

Research Experience:

Industrial Contracts @ Advanced Robotics and Automated Systems (ARAS)

- 4DOF piston-casting industrial robot (D&A 101).   Grant 22 K$
- Automatic radial welding robot for pipes (D&A 110).   Grant 150K$
- Climbing robot for automatic washing of road lights (D&A 120).   Grant 25 K$
- Automatic casting machine (D&A 201).   Grant 320K$
- Semi-automatic light guided assembly table for electronic boards. (D&A 301)   Grant 110K$
- Automated quality control line for piston pins (D&A 310);   Grant 205K$
- Development of Statistical Process Control (SPC) software (D&A 320).   Grant 75 K$
- Automatic robotic cell: (D&A 401);   Grant 115K$
- Revamping of Nekka Power Plant control logic (D&A 410).   Grant 138K$
- Nasir Spider-Cam: A Cable-Driven Parallel Manipulator   Grant 102K$
- Gas industry High resolution MFL, TFI and EGP intelligent pigs (Intelligent PIG). Grant 780K$
- Object detection and tracking on ARAS Driver-less Car   Grant 175K$
- NIMAD Grant Prime Investigator on ARAS Haptic System for EYE Surgery Training   Grant 255K$
- INSF Prime Investigator Synergy Grant (ARASH:ASiST)   Grant 200K$
- NIMAD-INSF Grant Prime Investigator on Capsulorhexis Video Dataset   Grant 160K$

Current Projects @ Advanced Robotics and Automated Systems (ARAS)

- **AI and VR in Medical Applications**   2017-Today
  Development of high-fidelity force feedback eye surgery robot (Diamond), and ARAS Haptic System for Eye Surgery Training: ARASH-ASiST.
- **Surgical Robotics**   2008-Today
  Development of high-fidelity force feedback eye surgery robot (Diamond), and ARAS Haptic System for Eye Surgery Training: ARASH-ASiST.
- **Mixed Reality in Surgery**   2019-Today
  Development of high-resolution intraocular eye surgery Simulator for Cataract and Vitrectomy.
- **Dynamical Systems Analysis and Control**   2002-Today
  Robust and Nonlinear observation and control implemented on robotic systems, Brain Computer Interface (BCI), Multi-agent coverage control, EEG signal classification.
- **Autonomous Robotics**   2006-Today
  Development of autonomous ground and aerial robots, implementation of SLAM, Fast SLAM, iSam, G2O, 3D visual navigation, deep learning methods on object detection and tracking, driver assistive software development.
- **Cable and Parallel Robotics**   2005-Today
  Analysis, Design and implementation of parallel robots and haptic interfaces based on Delta and 2RT structures and over-constrained and suspended cable driven manipulators, cable robotics in Art.

Teaching Experience:

Undergraduate Courses: 1997- Today
Introduction to EE, Signals and systems, linear control, modern control, industrial control, instrumentations, digital control, principles of nonlinear control at K.N. Toosi U. of Tech, control engineering at McGill University (1996)

Graduate Courses: 1997- Today
Nonlinear control, robust H∞ control, robotics, parallel robots, digital control, linear system theory, advanced industrial control, advanced dynamics at K.N. Toosi U. of Tech, and robotics at McGill University (2005).

Student Mentorship & Supervision:

11 Ph.D. graduates, and 4 Ph.D. students	2000- Today
108 M.Sc. graduates, and 15 M.C. students	1997- Today
101 B.Sc. graduates, and 3 B.Sc. students	1997- Today

Workshops, Invited and Keynote Speeches:

Invites Speech by CeRVIM, Laval University	2022
Artificial Intelligence and Haptic Technology in Intraocular Surgery Training (IFEES)	2021
Artificial Intelligence in Autonomous and Surgical Robotics (ICCIA Keynote Speech)	2021
10th Translational Ophthalmology Research Center Seminar	2020
ARAS Public Webinars	2020- Today
Deep Learning for Self Driving Cars, ICRoM'17, Tehran University	2017
Robotics Workshop: How to build flying robots, Khazar University, Baku, Azerbayjan	2015
Summer school on Parallel Robots: Dynamics and Control, University of Tehran	2015
Robotic Equipment in Eye Surgery: Opthalmic Engineering, Farabi Annual Meeting, Tehran U of Medical Science	2015
KNTU CDRPM, from need to implementation, McGill University, Montreal	2010
Mobile Robot design as a Mechatronic Product, ICCE'08, Tehran	2008

Conference and Editorial Positions,

Associate Editor, IEEE Transactions on Medical Robotics and Bionics,	2022- Today
Associate Editor, Frontiers in Robotics and AI – Biomedical Robotics	2021- Today
Editorial Board, International Journal of Advanced Robotic Systems	2011-2018
Editorial Borad, International Journal of Robotics, Theory and Applications	2009- Today
IEEE Conference Committee Chair, Iran Section	2021- Today
IEEE Control System Group Chair, Iran Section	2013-2019
IEEE Senior member of Control System, and Robotics and Automation Societies	2012- Today
Program Chair, 10th RSI International Conference on Robotics and Mechatronics,	2022
Executive Chair, RSI International Conference on Robotics and Mechatronics,	2013-2021
Member of Steering and Scientific Committees, RSI International Conference on Robotics and Mechatronics,	2013- Today
Robotics Society of Iran, Tehran, Member of the board	2011-2017

Selected Positions and Occupations:

Robotics Society of Iran (RSI), Chair	2023-Today
University of Alberta, Canada; Visiting Professor	2021-2022
IEEE Conference Committee Chair, Iran Section	2021-today
K. N. Toosi U. of Tech., Vice-Chancellor for Global Strategies and International Affairs	2018-2021
Concordia University, Canada, Visiting Professor	Summer 2017
K. N. Toosi U. of Tech., Member of Auditorial Board	2014-today
Faculty of Electrical Engineering, Dean	2013-2018
Ministry of SRT, Department of Educational Planning, Head of Multidisciplinary Group	2014-2016
Industrial Control Center of Excellence, K. N. Toosi U. of Tech. Member of the board	2011-2019
ETS University, Control and Robotics Lab, Canada, Visiting Professor	Summer 2010
Iranian Society of Mechatronics, Tehran, Vice President and member of the board	2003-2011
K.N. Toosi U. of Tech, Tehran, Director of the Office of International Scientific Cooperation (OISC)	2007-2010
McGill University, Center for Intelligent Machines, Montreal, Visiting Professor	2005-2006
K.N. Toosi U. of Tech, Tehran, Director of the Department of Systems and Control	2003-2005
Advanced Robotics and Automated Systems (ARAS), Director of Electrical Engineering Dept.	1997- today

Awards:

Among top 2% of highly cited authors (Stanford University Rating)	2022
Best university professor teaching award	2002, 2010 and 2016
Best university professor research award, and author of books	2001, 2013 and 2014
Quebec Merit Fellowship	2005
J.C. McConnell Memorial McGill Major Fellowship	1995-97
The most prestigious award offered only to top 5% of the students in each department; for 3 years.	
David Stewart Memorial McGill Major Fellowship, one-year	1993
Faculty of Graduate Studies, McGill University, Four tuition fee waivers.	1992-94
Ministry of Culture and Higher Education Scholarship	1991
The third-best/600 student in competitive examination for continuing education abroad; six-year scholarship	

References:

Mahdi Tavakoli, Professor, University of Alberta,　　Co-PI in current Medical Robotics collaborative Research
Department of Electrical and Computer Engineering,　　mahdi.tavakoli@ualberta.ca

Ali Khaki Sedigh, Professor, K. N. Toosi University of Technology　　Former University Chancellor
Department of Electrical Engineering,　　sedigh@kntu.ac.ir

S. Ali A. Moosavian, Professor, K. N. Toosi University of Technology　　International Journal of Robotics Chief Editor
Department of Mechanical Engineering,　　moosavian@kntu.ac.ir

Publications:

7 books, and over **300** peer-reviewed publications. Visit https://aras.kntu.ac.ir/publications/

Books:

1. Hamid D. Taghirad, An introduction to Robotics, with Matlab and Python Case Studies, CRC Press, Taylor and Francis LLC, Under publication, 2024.
2. Hamid D. Taghirad, Parallel Robots: Mechanics and Control, CRC press, Taylor and Francis LLC, 2013.
3. Hamid D. Taghirad and Mohammad A. Khosravi, An Introduction to Robotics, K.N. Toosi University Publication, 2023 (In Persian)
4. Hamid D. Taghirad, Mohammad Fathi and Farina Zamani Osgouei, Robust H_∞ Control, K.N. Toosi University Publication, 2019 (In Persian)
5. Hamid D. Taghirad and S. Ali Salamati, Fundamentals of Measurements in Instrumentation, K.N. Toosi University Publication, 2nd Edition, 2021 (In Persian).
6. H.D. Taghirad An Introduction to Modern Control, K.N. Toosi University of Technology Publication, 3rd Edition, 2019 (In Persian).
7. H.D. Taghirad, An Introduction to Industrial Automation and Process Control, with Presentation of Siemens Step7 PLC, 2nd Edition, K.N. Toosi University of Technology Publication, 2018 (In Persian).

Selected and Recent Journal Papers:

1. Stabilization of a class of underactuated parallel robots via energy shaping: Application to cable driven manipulators, M Reza J Harandi, Hamid D Taghirad, Automatica, 2023.
2. Reformulation of matching equation in potential energy shaping, M Reza J Harandi, Hamid D Taghirad, IEEE Transactions on Automatic Control, 2023
3. A dual robust control architecture with variable stiffness and damping parameters for switching task dominance in collaborative haptic systems, M Motaharifar, I Sharifi, H Sadeghi, HD Taghirad, IET Control Theory & Applications, 2023.
4. Object localization through a single multiple-model switching CNN and a superpixel training approach, F Lotfi, F Faraji, HD Taghirad. Applied Soft Computing, 2022.
5. Robust -based control of ARAS-diamond: A vitrectomy eye surgery robot, Abbas Bataleblu, Rohollah Khorrambakht, Hamid D Taghirad, Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science, 2021.
6. Applications of Haptic Technology, Virtual Reality, and Artificial Intelligence in Medical Training During the COVID-19 Pandemic, Mohammad Motaharifar, Alireza Norouzzadeh, Parisa Abdi, Arash Iranfar, Faraz Lotfi, Behzad Moshiri, Alireza Lashay, Seyed Farzad Mohammadi, Hamid D Taghirad, Frontiers in Robotics and AI, 2021
7. A force reflection robust control scheme with online authority adjustment for dual user haptic system, M Motaharifar, HD Taghirad, Mechanical Systems and Signal Processing 135, 2020.
8. Control synthesis and ISS stability analysis of a dual-user haptic training system based on S-shaped function, M Motaharifar, HD Taghirad, K Hashtrudi-Zaad, SF Mohammadi, IEEE/ASME Transactions on Mechatronics 24 (4), 1553-1564, 2019.
9. Control of dual-user haptic training system with online authority adjustment: An observer-based adaptive robust scheme, M Motaharifar, HD Taghirad, K Hashtrudi-Zaad, SF Mohammadi, IEEE Transactions on Control Systems Technology 28 (6), 2019.
10. problem Multi-goal motion planning using traveling salesman in belief space, A Noormohammadi-Asl, HD Taghirad, Information Sciences 471, 164-184, 2019.

Selected Conference Publications:

1. A Consistency-Based Loss for Deep Odometry Through Uncertainty Propagation, Hamed Damirchi, Roohollah Khorrambakht, Hamid D Taghirad, Behzad Moshiri, 2023 IEEE International Conference on Robotics and Automation (ICRA), 2023.
2. Neural Network Learning of Robot Dynamic Uncertainties and Observer-based External Disturbance Estimation for Impedance Control, Teng Li, Armin Badre, Hamid D Taghirad, Mahdi Tavakoli, IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), 2023.
3. EMG-based Hybrid Impedance-Force Control for Human-Robot Collaboration on Ultrasound Imaging, Teng Li, Hongjun Xing, Hamid D Taghirad, Mahdi Tavakoli, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2022.
4. An Observer-Based Responsive Variable Impedance Control for Dual-User Haptic Training System, A Rashvand, R Heidari, M Motaharifar, A Hassani, MR Dindarloo, MJ Ahmadi, K Hashtrudi-Zaad, M Tavakoli, HD Taghirad, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2022.
5. Multi objective optimization of a cable-driven robot with parallelogram links, Nasrollah Khodadadi, Mohammad Isaac Hosseini, S Ahmad Khalilpour, Hamid D Taghirad, Philippe Cardou, International Conference on Cable-Driven Parallel Robots
6. ARC-Net: Activity Recognition Through Capsules, H Damirchi, R Khorrambakht, HD Taghirad, 19th IEEE International Conference on Machine Learning and Applications, 2020.
7. Surgical Instrument Tracking for Vitreo-retinal Eye Surgical Procedures Using ARAS-EYE Dataset, F Lotfi, P Hasani, F Faraji, M Motaharifar, HD Taghirad, SF Mohammadi, 28th Iranian Conference on Electrical Engineering (ICEE)
8. Skill Assessment Using Kinematic Signatures: Geomagic Touch Haptic Device, N. S. Hojati, M. Motaharifar, H. D. Taghirad, A. Malekzadeh, International Conference on Robotics and Mechatronics, ICRoM 2019
9. Skill Assessment Using Kinematic Signatures: Geomagic Touch Haptic Device, N. S. Hojati, M. Motaharifar, H. D. Taghirad, A. Malekzadeh, International Conference on Robotics and Mechatronics
10. Autonomous flight and obstacle avoidance of a quadrotor by monocular SLAM, O Esrafilian, HD Taghirad, 2016 4th International Conference on Robotics and Mechatronics (ICROM), 240-245.