

**Resume**  
**Hamid D. Taghirad**  
**Professor**

[Faculty of Electrical Engineering](#)  
[Department of Systems and Control](#)  
[K.N. Toosi University of Technology](#)  
Email: [taghirad@kntu.ac.ir](mailto:taghirad@kntu.ac.ir), <http://saba.kntu.ac.ir/eecd/taghirad>

Seyed Khandan Campus, Room 321  
Tehran, Iran, 16314  
Tel: (+98 21) 8406 2321  
Fax: (+98 21) 8846 2066



- Education:**
- Ph.D. in Electrical Engineering** 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** 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)**

- Design and implementation of a 4DOF piston-casting industrial robot ([D&A 101](#)). Grant 22 K\$
- Design and implementation of an automatic radial welding robot for pipes ([D&A 110](#)). Grant 150K\$
- Design of climbing robot for automatic washing of road lights ([D&A 120](#)). Grant 25 K\$
- Design and implementation of an automatic casting machine ([D&A 201](#)). Grant 320K\$
- Design and implementation of a semi-automatic light guided assembly table for electronic boards. ([D&A 301](#)) Grant 110K\$
- Design and implementation of an automated quality control system for piston pins ([D&A 310](#)); including ultrasonic, Eddy current flaw detection units and dimension testing with sub-micron accuracy. Grant 205K\$
- Development of Statistical Process Control (SPC) software ([D&A 320](#)). Grant 75 K\$
- Design and implementation of an automatic robotic cell: ([D&A 401](#)); including a 4DOF servo robot, a 5DOF robot, an indexing table and a quality control unit. Grant 115K\$
- Analysis and design of Nekka Power Plant control logic ([D&A 410](#)). Grant 138K\$
- Design and Implementation of a planar cable-driven parallel redundant manipulator Grant 102K\$
- Gas industry supervisor on the project of the design and implementation of High resolution MFL, TFI and EGP intelligent pigs. Grant 310K\$

**Current Projects @ Robotics Lab**, K. N. Toosi U. of Tech.

- [Cable Driven Redundant Parallel Manipulator](#) 2005-Current  
Analysis, Design and implementation of a over-constrained and suspended cable driven robots
- [Mobile Robotics](#) 2006-Current  
Development of autonomous ground and aerial robots for unstructured environments, by performing SLAM, Fast SLAM, iSam, G2O, 3D visual mapping, and navigation.
- [Visual Servoing](#) 2007-Current  
Development of vision guided industrial robots to track unmarked objects in space.
- [Telesurgery robots](#) 2008-Current  
Development of high-fidelity force feedback master-slave telesurgery robots, by using a 6DOF Haptic device, and a 2RT custom made haptic device and special parallel robot for this purpose.
- [Parallel Robot and Haptics](#) 2013-Current  
Analysis design and implementation of parallel robots and haptic interfaces based on Delta and 2RT structures.
- [Multi Agent Systems](#) 2014-Current  
Analysis and control of robotic multi agent systems by optimal graph based topology design, and stable robust control synthesis for consensus and formation objectives.
- [BCI](#) and Robot control 2015-Current  
Motion control of robotic manipulators using [Brain Computer Interface \(BCI\)](#) by brain EEG signals.

**Other Projects @ Robotics Lab**, K. N. Toosi U. of Tech.

- [Adaptive Robust Control of Hard Disk Drives](#) 2003-2010  
Design of extra precision adaptive robust controllers for single- and dual-stage HDD
- [Flexible Joint Robots](#) 1993-2007  
Design and implementation of composite  $H_{\infty}$ , composite QFT, Nonlinear  $H_{\infty}$ , and supervisory control schemes on FJR to avoid actuator saturation.
- [High Precision Parallel Shoulder Manipulator](#) 2001-2006

This mechanism is designed based on biological structure of human shoulder, and is a 3 DOF redundant parallel manipulator. Kinematics analysis and controller synthesis is implemented on this manipulator.

- [Cybernetics Robotics](#) 2003-2008  
Modeling and Control of artificial arm prosthesis based on acquired and classified neuro-cybernetic signals (EMG).
  - [Intelligent Pigs](#) 2001-2005  
Analysis of MFL and UT methods used in Pipeline Inspection Gauges (PIG).
- Robotics Lab**, Center for Intelligent Machines ([CIM](#)), [McGill](#). 1993-1997  
Implementation of [robust  \$H\_{\infty}\$  torque control of harmonic drive systems](#) through [intelligent built-in torque sensor developed for harmonic drives](#).
- International Submarine Engineering Ltd**, BC, Canada 1995-1996  
Subcontract to STEAR project; [modeling, parameter identification and robust torque control of a robot joint actuated with harmonic drive](#).
- Ambulatory Robotics Lab**, [CIM](#), [McGill](#) 1991-1993  
Design and implementation of an [under-actuated one-legged hopping robot](#) and developing stabilizing control strategies implemented on the robot.

### Teaching Experience:

- Undergraduate Courses:** 1997-current  
[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-current  
[Nonlinear control](#), [robust  \$H\_{\infty}\$  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).

### Supervising Experience:

- [6 Ph.D. Graduates, and 5 Ph.D. Students](#) 2000-current  
[86 M.Sc. graduates, and 8 M.C. students](#) 1997- current  
[72 B.Sc. graduates, and 4 B.Sc. students](#) 1997- current

### Workshops and Summer Schools:

- [Robotics Workshop, Khazar University, Baku, Azerbaijan](#) 2015  
[Summer school on Parallel Robots: Dynamics and Control, University of Tehran](#) 2015  
[Robotic Equipment in Eye Surgery: Ophthalmic Engineering, Farabi Annual Meeting, Tehran U of Medical Science](#) 2015  
[Autonomous Mobile Robots: SLAM, ICROM'13, Sharif University, Tehran](#) 2013  
[KNTU CDRPM, from need to implementation, McGill University, Montreal](#) 2010  
[Mobile Robot design as a Mechatronic Product, ICCE'08, Tehran](#) 2008  
[Mechatronic design of a dual stage hard disk drive, ICME'06, Tehran](#) 2006  
[Analysis and design of  \$H\_{\infty}\$  and QFT control, ICEE'98, Tehran](#) 1998  
[Robot evolution, the development of Antrobotics, Zahedan, Iran](#) 1997  
 [\$H\_{\infty}\$  control in practice; McGill University, Montreal](#) 1995

### Positions and Occupations:

- [Ministry of SRT](#), Department of Educational Planning , Head of Multidisciplinary Group 2014-current  
[K. N. Toosi U. of Tech.](#), Member of Auditorial Board 2014-current  
[Faculty of Electrical Engineering](#), Dean 2013-current  
[International Conference on Robotics and Mechatronics](#), Member of the steering committee 2013-current  
[IEEE Control System Group](#) Chair, [Iran Section](#) 2013-current  
[IEEE](#) Senior member of [Control System](#), and [Robotics and Automation](#) Societies 2012-current  
Industrial Control Center of Excellence, K. N. Toosi U. of Tech. Member of the board 2011-current  
[Robotics Society of Iran](#), Tehran, Member of the board 2011-current  
[International Journal of Robotics](#), Editorial board 2010-current  
[Mechatronics Magazine](#), Editor in Chief 2011-2015  
[ETS University](#), [Control and Robotics Lab](#), Montreal, Visiting Professor Summer 2010  
[Iranian Society of Mechatronics](#), Tehran, Vice President and member of the board 2007-2011  
[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  
[Iranian Society of Mechatronics](#), Tehran, Member of the board 2004-2007  
[IEEE](#) member, [Control System](#), and [Robotics and Automation](#) Societies 1995-2012  
K.N. Toosi U. of Tech, Tehran, Director of the Department of Systems and Control 2003-2005  
K.N. Toosi U. of Tech, Tehran, Professor. 2010-current  
K.N. Toosi U. of Tech, Tehran, Faculty of ECE, Dean of Research. 1999-2001  
K.N. Toosi U. of Tech, Tehran, Faculty of ECE, Director of [Industrial Control Lab and Robotics Lab](#) 1997- current  
[Advanced Robotics and Automated Systems \(ARAS\)](#), Director of Electrical Engineering Dept. 1997- current

## Awards:

Best university professor prize, teaching	2016
Best university professor prize, author of books	2014
Best university professor prize, research	2013
Best university professor prize, teaching	2010
Quebec Merit Fellowship	2005
Best university professor prize, teaching	2002
Best university professor prize, research	2001
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	

## Publications:

5 books, and over 200 peer-reviewed publications. See <http://saba.kntu.ac.ir/eecd/aras/publications.htm>.

## Books:

1. Hamid D. Taghirad, [\*Parallel Robots: Mechanics and Control\*](#), CRC press, Taylor and Francis LLC, 2013.
2. Hamid D. Taghirad, Mohammad Fathi and Farina Zamani Osgouei, [\*Robust H<sub>∞</sub> Control\*](#), K.N. Toosi University Publication, 2014 (In Persian)
3. Hamid D. Taghirad and S. Ali Salamaty, [\*Fundamentals of Measurements in Instrumentation\*](#), K.N. Toosi University Publication, 2<sup>nd</sup> Edition, 2014 (In Persian).
4. H.D. Taghirad [\*An Introduction to Modern Control\*](#), K.N. Toosi University of Technology Publication, 3<sup>rd</sup> Edition, 2013 (In Persian).
5. H.D. Taghirad, [\*An Introduction to Industrial Automation and Process Control, with Presentation of Siemens Step7 PLC, 2<sup>nd</sup> Edition\*](#), K.N. Toosi University of Technology Publication, 2012 (In Persian).

## Selected Journal Papers:

1. R. Babaghasabha, M. A. Khosravi and H.D. Taghirad, [\*Adaptive robust control of fully-constrained cable driven parallel robots\*](#), *Mechatronics*, 25, pp 27-36, Feb. 2015.
2. M. A. Khosravi and H. D. Taghirad, [\*Dynamic Modeling and Control of Parallel Robots With Elastic Cables: Singular Perturbation Approach\*](#), in *IEEE Transactions on Robotics*, July. 2014.
3. A. Norouzzadeh Ravari and H.D. Taghirad, [\*3D Scene and Object Classification Based on Information Complexity of Depth Data\*](#), *International Journal of Robotics: Theory and Applications*, 4(2) 28-35, Sept. (2015).
4. M. Parsapour and H.D. Taghirad, [\*Kernel-based sliding mode control for visual servoing system\*](#), *IET Computer Vision*, 9(3)Iss. 3, pp. 309–320, Sept. 2015.
5. H. D. Taghirad and Y.B. Bedoustani, [\*An Analytic-Iterative Redundancy Resolution Scheme for Cable-Driven Redundant Parallel Manipulators\*](#), in *IEEE Transactions on Robotics*, Dec. 2011.
6. N. Poursafar, H.D. Taghirad, and M. Haeri, [\*Model predictive control of nonlinear discrete time systems: An LMI approach\*](#), *IET Control Theory and Applications*, Vol. 4, No. 10, pp. 1922-32, 2010.
7. S. Ozgoli and H.D. Taghirad, [\*A Survey on the Control of Flexible Joint Robots\*](#), *Asian Journal of Control*, Vol. 8, No. 4, pp. 1-15, December 2006.
8. H.D. Taghirad and P.R. Belanger, [\*Intelligent built-in torque sensor of harmonic drive systems\*](#), *IEEE Transactions on Instrumentation and Measurements*, Vol. 48, No. 6, pp 1201-1207, Dec 1999.

## Selected Conference Publications:

1. A. Khorasani, S. Gholami and H. D. Taghirad, [\*Optimization of KNTU Delta robot for pick and place application\*](#), in the proceedings of the Third RSI International Conference on Robotics and Mechatronics (ICRoM 2015), Tarbiat Modares University. Tehran, Oct. 2015.
2. R. Talaei Shahir and H. D. Taghirad, [\*An Improved Optimization Method for iSAM2\*](#), in the proceedings of the Second RSI International Conference on Robotics and Mechatronics (ICRoM 2014), K. N. Toosi U. of Tech. Tehran, Oct. 2014.
3. M. A. Khosravi and H.D. Taghirad, [\*Dynamic Analysis and Control of Fully-Constrained Cable Robots with Elastic Cables: Variable Stiffness Formulation in Cable Driven Parallel Robots\*](#), Springer, the proceedings of the Second International Conference on Cable Robots, Stuttgart, Germany, pp 160-177, Sept. 2014.
4. N. Marhemati, H. Taghirad and K. Khossousi, [\*Monte Carlo Sampling of Non-Gaussian Proposal Distribution in Feature-Based RBPf-SLAM\*](#), in the proceedings of Australasian Conference on Robotics and Automation ACRA'12, Wellington, New Zealand, Dec. 2012.
5. M. A. Khosravi and H.D. Taghirad, [\*Experimental Performance of Robust PID Controller on a Planar Cable Robot\*](#), in *Cable Driven Parallel Robots*, Springer, the proceedings of the First International Conference on Cable Robot, Stuttgart, Germany, pp 337-352, Sept. 2012.