Roshdy F. Abo-Shanab, Ph.D.

Assistant Professor
Department of Mechanical Engineering
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Salman Bin Abdul-Aziz University,
Alkharj, Kingdom of Saudi Arabia
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Personal Data:

Nationality: Egyptian
Date of Birth: Dec. 19, 1968.
Marital status: Married, three children.

Education:

Ph.D. Mechanical Engineering (*Oct. 2003*).

Department of Mechanical and Industrial Engineering, Faculty of Graduate Studies, the University of Manitoba, Canada.
Thesis title: "***Dynamic Modeling and Stability Analysis of Mobile Manipulators with application to Heavy Duty Hydraulic Machines***".

M. Sc. Mechanical Engineering (*June 1997*).

Faculty of Engineering, Assiut University, Egypt.
Thesis topic: "***Dynamic Modeling of Robot Manipulators: A Comparative Study***".

B. Sc. Mechanical Engineering (*Very good with honor, June 1991*).

Mansoura University, El-Mansoura, Egypt.
Graduation project: "***Air Conditioning of a Four Floor Building***".

Research Interests:

- Modeling and Simulation of Parallel Manipulators.
- Dynamic Modeling, Simulation, and Stability Analysis of mobile Manipulators.
- Dynamic Analysis of Robot manipulators.
- Nonlinear Systems Analysis.
- Friction Modeling in Mechanical Systems.
- Applications of Nonstandard Finite Difference Methods to Robotic Systems.

Awards and Scholarships:

- 2003-2004 Postdoctoral Fellowship, University of Manitoba.
- 2000-2003 University of Manitoba Graduate Fellowship.
- 2002 Edward R. Toporeck Graduate Fellowship in Engineering.
- 2002 Faculty of Graduate Studies Travel Award, The University of Manitoba.
- 2001 Edward R. Toporeck Graduate Fellowship in Engineering.
- 2000 UMSU Scholarship for Excellence in academic achievement.
- 1999-2000 University of Manitoba Graduate Scholarship.

Publications:

Book Chapter:

- **R.F. Abo-Shanab**, N. Sepehri, and C. Q. Wu, 2005 "*Application of Nonstandard Finite Difference Schemes to the Simulation Studies of Robotic Systems*" in Ronald E. Mickens' (Editor) "***Advances in the Applications of Nonstandard Finite Difference Schemes*",** World Scientific, Singapore.

Refereed Journal Papers:

1. **R.F. Abo-Shanab**, 2014, "Effect of changing the position of tool point on the moving platform on the kinematics of a 3RRR Planar Parallel Manipulator," Journal of Applied Mechanics and Materials, in press.
2. **R.F. Abo-Shanab**, 2014, "An Efficient Method for Solving the Direct Kinematics of Parallel Manipulators Following a Trajectory," Journal of Automation and Control Engineering, Vol. 2, No. 3, pp. 228-233, doi: 10.12720/joace.2.3.228-233.
3. A.R. Ahmed, **R.F. Abo-Shanab**, and M.G. Mohamed, 2012, "Designing a parallel-Kinematic High-Speed Machine Tool," *Minia Journal of Engineering and Technology*, 31(2) 171-180.
4. **R.F. Abo-Shanab** and N. Sepehri, 2006, "Tip-over Responses of Hydraulic Mobile Cranes," *Transactions of the Canadian Society of Mechanical Engineers (CSME)*, Vol. 30, No. 3, pp 391-412.
5. **R.F. Abo-Shanab** and N. Sepehri, 2005, "Tip-over Stability of Manipulator-Like Mobile Hydraulic Machines," *ASME Journal of Dynamic systems, Measurements, and Contro*l, Vol.127(2), pp. 295-301.
6. **R.F. Abo-Shanab** and N. Sepehri, 2005, "Dynamic Modeling of Tip-over Stability of Mobile Manipulators Considering the Friction Effects," *Robotica; Journal of the International Federation of Robotics*, Vol. 23, pp. 189-196.

7. **R.F. Abo-Shanab** and N. Sepehri, 2002, "The Effect of Base Compliance on the Dynamic Stability of Mobile Manipulators," *Robotica; Journal of the International Federation of Robotics*, Vol. 20, pp. 607-613.
8. **R.F. Abo-Shanab,** and N. Sepehri, 2001, "On Dynamic Stability of Manipulators Mounted on Mobile Platforms," *Robotica; Journal of the International Federation of Robotics*, Vol. 19, pp. 439-449.

Refereed Conference papers:

1. **R.F. Abo-Shanab** "An Efficient Method for Solving the Direct Kinematics of Parallel Manipulators Following a Trajectory" *Proceedings of the 2nd International Conference on Control, Robotics, and Informatics* (ICCRI 2013), Kuala Lumpur, Malaysia. Dec. 29-30, 2013 (repeated).
2. **R.F. Abo-Shanab**, 2010, "Optimization of the Workspace of a 3R Planar Parallel Manipulator," *Proceedings of the 2nd International Conference on Mechanical and Electronics Engineering* (ICMEE 2010), Kyoto, Japan. August 1-3, Vol. 2, paper number M823.
3. **R.F. Abo-Shanab** and N. Sepehri, 2002, "Dynamic Stability of Mobile Manipulators Considering Suspension Characteristics," *Proceedings of ASME Design Engineering Technical Conferences*, Montreal, Canada, Sept. 29-Oct. 2, paper number DETC2002/MECH-34227.
4. **R.F. Abo-Shanab**, N. Sepehri, and Q. Wu, 2002, "On Dynamic Modelling of Robot Manipulators: the method of Virtual Links," *Proceedings of ASME Design Engineering Technical Conference*, Montreal, Canada, Sept. 29-Oct. 2, paper number DETC2002/MECH-34225.
5. **R.F. Abo-Shanab,** and N. Sepehri, 2001, "On Dynamic Stability of Manipulators Mounted on Moveable Platforms," *Proceedings of* the *IEEE International Symposium on Computational Intelligence in Robotics and Automation*, Banff, Alberta, Canada, pp. 479-485.
6. **R.F. Abo-Shanab,** Q. Wu, and N. Sepehri, 2001, "On Derivation of Constrained Multiple Rigid Body Dynamic Equations," *Proceedings of the American Control Conference*, Arlington, VA, USA, pp. 3565-3569.
7. Q. Wu, P. Sekhavat, S. Peles, **R.F. Abo-Shanab,** and N. Sepehri, 2001, "An Improved Design Procedures of Lyapunov's Feedback Control," *Proceedings of* the *IEEE International Symposium on Computational Intelligence in Robotics and Automation*, Banff, Alberta, Canada, pp. 486-491.
8. Mohamed M. Sallam, **R.F. Abo-Shanab**, and Abo-Bakr A. Nassr, 1998, "Modified Methods for Dynamic Modeling of Robot Manipulators" *Proceedings of ASME Design Engineering Technical Conference*, Atlanta, GA, Sept.13-16, paper number DETC98/MECH-5860

Thesis supervised:

Ahmed Rashed Abed El-Naim "Designing a parallel-kinematic high-speed machine tool," M.Sc., Jan. 2012.

Work Experience:

Teaching

- September 2014 – present: ***Assistant Professor,*** Department of Mechanical Engineering, ***Kafrelsheikh University,*** Kafrelsheikh, Egypt.

  Teaching the following courses:

  Mechanics I, Mechanics II, Pneumatic Power Systems, Theory of Machines, and Theory of Vibration.

  In addition, I was involved in preparing the curriculum and the Bylaw for the Department of the Mechatronic Systems Engineering.

- *September 2010 – September 2014*: ***Assistant Professor***, Department of Mechanical Engineering, ***Salman Bin Abdul-Aziz University***, Alkharj, Kingdom of Saudi Arabia.

  Teaching the following courses:

  ME 4641 Robotics and Automation, ME 4621 Mechatronics, ME 3601 System Dynamics and Control, and ME 3651 Mechanics of Machines.

- *September 2008 – September 2010*: ***Assistant Professor***, Department of Mechanical Engineering, ***King Saud University***, Alkharj, Kingdom of Saudi Arabia.

  Teaching the following courses:

  ME 3601 System Dynamics and Control, ME 3621 Dynamics and Control Laboratory, ME 3651 Mechanics of Machines, GE 2020: Dynamics, GE 2010: Statics, GE 210: Engineering Mechanics, GE1021 Engineering Drawing and Graphics, and GE 104: Principles of Engineering Drawing.

  I am also establishing the following laboratories:
  Mechatronics, Dynamics and Control, and Mechanics of Machines.

- *August 2007 - September 2008*: ***Assistant Professor,*** Department of Mechanical Engineering, ***Kafrelsheikh University,*** Kafrelsheikh, Egypt.

  Teaching the following courses:

  Automatic Control, Hydraulic Circuits, Applied Mechanics, Engineering Mechanics.

  In addition, I was involved in preparing the technical specifications for the mechanical engineering laboratories.

- *November 2004- July 2007*: ***Assistant Professor at Assiut University*** teaching the following courses:

  1. Undergraduate level:

Robotics and Automation
Electro-hydraulic systems
Modeling and simulation of dynamic systems
Mechatronics Laboratories
Co-supervising graduation projects (for Mechatronics option students)

2. ***Graduate level:***
Advanced topics in robotics
Advanced topics in modeling and simulation of dynamic systems

In addition, I was involved in the following activities:
- developing "mechatronic" and "Modeling and simulation of dynamic systems" courses.
- Preparing the mechtronics laboratories

- *September 2003 – December 2003*: ***Instructor*** "25.212 Mechanics of Machines" at the Department of Mechanical and Industrial Engineering, the ***University of Manitoba***, Canada.
- *September 1999- 2003: Teaching* ***Assistant*** for the following courses at the ***University of Manitoba***, Canada: "25.343 Measurements and Control" and "25.212 Mechanics of Machines".
- *September 1993- April 1999*: ***Teaching Assistant*** for the following courses at ***Assiut University***, Egypt: "Mechanical Vibrations", "Mechanics of Machines I", "Mechanics of Machines II", "Machines Construction", and "Fluid Mechanics".

Workshops

- "*Teaching Assistance Workshop*", ***University of Manitoba***, Winnipeg, Canada, 1999.
- "*Effective Teaching Workshop*", ***Assiut University***, Egypt, 2004.
- "*International Workshop on Mechatronics Education*" Assuit University, Feb. 2006.
- *"Planning and Implementation of self study for programme Accreditation" British Council, Salman Bin Abdulaziz University, Feb. 19-20, 2011.*

Research

- *August 20014- present*: ***Assistant Professor***, Department of Mechanical Engineering, ***Kafrelsheikh University.***
  Main responsibilities include conducting research in the area of parallel robot dynamics.
- *September 2010 – present*: ***Assistant Professor***, Department of Mechanical Engineering, ***Salamn Bin Abdul-Aziz University***, Alkharj, Kingdom of Saudi Arabia
  Conducting research in the area of parallel Manipulators.
- *September 2008 – September 2010*: ***Assistant Professor***, Department of Mechanical Engineering, ***King Saud University***, Alkharj, Kingdom of Saudi Arabia

Conducting research in the area of parallel Manipulators.

- *August 2007- September 2008*: ***Assistant Professor***, Department of Mechanical Engineering, ***Kafrelsheikh University.***

  Main responsibilities include:
  - Conducting research in the area of mobile robots, biped robots and Nonlinear Systems Analysis.
  - Preparing the department bylaw for the graduate studies.
  - Preparing the technical specifications for different experiments required for the department laboratories.
- *November 2004 – July 2007*: ***Assistant Professor*** at the Department of Mechanical Engineering, ***Assiut University***.

  Main responsibilities included conducting research in the area of mobile robots, biped robots, Nonlinear Systems Analysis, and the applications of nonstandard finite difference schemes to the simualtion studies of robotic systems

- *August 2003- October 2004*: **Postdoctoral Fellow** at the University of Manitoba funded by Manitoba Hydro and National Sciences and Engineering Council of Canada (NSERC).

  Main responsibilities include conducting research in the following topics:
  - Modeling and Simulation of tipping over of mobile cranes in collaboration with Manitoba Hydro.
  - Applications of nonstandard finite difference schemes to the simualtion studies of robotic systems.
- *(May 2000 – July 2004)* **Graduate Research Fellow**, Department of Mechanical and Industrial Engineering, University of Manitoba, Canada.
- *(May 1999 - May 2000)* **Research Assistant**, Department of Mechanical and Industrial Engineering, University of Manitoba, Canada.
- *(May 1993 - April 1999)* **Research Assistant**, Department of Mechanical Engineering, Assiut University, Egypt.
- *(January 1992 – April 1993)* **Maintenance Engineer**, Cairo, Egypt.

Administrative work:

Member of the following committees (2011 – present):

- Academic accreditation committee:

  I have shared in preparing the self-study report for the department of Mechanical Engineering, the report is submitted to the international academic accreditation board (ABET).
- Quality unit (coordinator for Mechanical Engineering Department).
- Summer training committee (coordinator).

Reviewer:

Robotica; Journal of the International Federation of Robotics.
International Journal of Modelling and Simulation, ACTA Press / IASTED.
Journal of Safety Science, Elsevier.
Journal of Mechanical Engineering Science.

Computer skills:

Good knowledge of the following software and programming languages:
Software: Matlab, Maple, AutoCAD.
Programming Languages: C, C++, Fortran.

Others:

Member

Egyptian Syndicate of Engineers, Egypt.
International Association of Computer Science and Information Technology (IACSIT).
Egyptian Student Association (1999-2004), Manitoba, Canada.
Muslim Student Association (1999-2004), Manitoba, Canada.

President elected

Egyptian Student Association, (ESA), University of Manitoba, 2001-2002.

References:

Prof. N. Sepehri

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University of Manitoba,
Winnipeg, MB, Canada, R3T 5V6
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Prof. Q. Wu

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Phone (+1) 204-474-8843, Fax. (+1) 204-275-7507
E-mail: cwu@cc.umanitoba.ca

Prof. A. B. Gumel

Department of Mathematics,

University of Manitoba,
Winnipeg, MB, Canada, R3T 2N2
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Prof. M. Sallam

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Assiut University,
Assiut, Egypt.
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E-mail: m-sallam@aun.edu.eg