

CURRICULUM VITAE

of

MOHAMED SAMIR HEFZY, Ph.D., P.E.
ASME FELLOW

**Professor and Associate Dean of Graduate Studies and Research
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BIOGRAPHY

Mohamed Samir Hefzy, Ph.D., P.E.

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Biography

Mohamed Samir Hefzy has been serving as Associate Dean of Graduate Studies and Research Administration of the College of Engineering (COE) at The University of Toledo (UT), Toledo, Ohio since 2004. He is a tenured Professor of Mechanical, Industrial and Manufacturing Engineering (MIME) and served as Graduate Program Director of the MIME department from 2000 to 2007, and also was the first to hold that position during the 1994-95 academic year. Additionally, he serves as the Director of the COE Biomechanics and Assistive Technology Laboratory at UT. He has been on the faculty of The UT since 1987. He graduated from Cairo University, Egypt, with a B.E. (Honors) in Civil Engineering in 1972, and a B.Sc. in Mathematics from Ain-Shams University in 1974. He earned his M.S. in Aerospace Engineering in 1977 and his Ph.D. in Applied Mechanics in 1981, both from The University of Cincinnati. He then received training as a Postdoctoral Research Associate for two years in the Department of Orthopedic Surgery at The University of Cincinnati's College of Medicine. In 1983, Dr. Hefzy joined the faculty of Grand Valley State University in Allendale, Michigan as their first engineering faculty. He then returned to the University of Cincinnati as a Research Assistant Professor in 1985.

In December 2003, Dr. Hefzy was elevated to the Grade of American Society of Mechanical Engineers (ASME) Fellow in recognition of his outstanding contributions to research and development, to education and leadership in the Engineering Profession. Dr. Hefzy has published with his students more than 35 peer reviewed journal papers and 100 peer reviewed national and international conference papers, and co-authored more than 19 book chapters in his research areas: Orthopedic Biomechanics and Assistive Technology. Dr. Hefzy has secured more than \$6.9 million in funding as a PI, CO-PI, and CI to support his research program, with sponsors including the OBOR, the NSF and the NIH. He has supervised two postdoctoral fellows and has served as primary graduate advisor to 30 masters and doctoral students. In addition, he has supervised more than 130 undergraduate senior design projects at UT.

Dr. Hefzy is the recipient of many awards, including the 2011 Distinguished Service Award from the ASME, the Edith Rathbun Award for Excellence in Outreach and Engagement from The University of Toledo in 2006, the University of Toledo Outstanding Faculty Research Award in 2004 and the College of Engineering's Outstanding Teacher Award and the Outstanding Undergraduate Research Mentoring Award in 1999 and 2001, respectively. His engineering experience and familiarity with recent educational practices led to his selection by the ASME as a Mechanical Engineering Evaluator for the Accreditation Board for Engineering and Technology (ABET). At UT, he continues to serve on many committees, including the Graduate Council. He has served on the Research Council and on many other committees including the University Committee for Academic Personnel whose duties include reviewing all UT tenure and promotion applications. He has also served on the faculty senate (as well as the senate's executive committee), the MIME Department Personnel Committee, and the College of Engineering Constitution and By-Laws Committee. On a national level, Dr. Hefzy has served two consecutive three-year terms as the Treasurer and member the ASME's Executive Committee of the Bioengineering Division (BED) (2010-2013 and 2007-2010). He has also served as a member at large on the ASME's Executive Committee of the BED from 1999 to 2002 and as Chair of the BioSolids Technical Committee of the BED from 2004-2007. He has also served a two-year term on the basic Engineering Group Operating Board (BEGOB) as a representative to the Committee on Administration and Finance of the ASME (2011-2013) and a two-year term (2013-2015) on BEGOB as a rep. to the strategic planning committee. He has been serving on the ASME Scholarship Committee since March 2016.

PERSONAL INFORMATION & PROFESSIONAL EXPERIENCE

Citizenship: US Citizen

Degrees, with field, institution and date:

B.Sc. (with Honors)	Civil Eng.	Cairo University, Cairo, Egypt, July 1972
B.Sc.	Mathematics	AinShams University, Cairo, Egypt, 1974
M.S.	Aerospace Eng.	Univ. of Cincinnati, August 1977
Ph.D.	Applied Mechanics	Univ. of Cincinnati, August 1981
Postdoctoral training	Orthopaedic Biomechanics	Univ. of Cincinnati, 1981-1983

Professional Registration:

Registered Professional Engineer (PE), State of Ohio, USA; License No. E-53287.

Number of years served on The University of Toledo Faculty (3 years):

Professor and Associate Dean of Graduate Studies and Research Administration, College of Engineering	March 2007 - present
Professor and Interim Associate Dean of Graduate Studies, College of Engineering	February 2004 – February 2007
Professor and Graduate Program Director of Mechanical Industrial and Manufacturing Engineering	Nov. 2000 – May 2007
Professor of Mechanical Eng. and Director, Biomechanics Lab.	Sept. 1993 – present
Associate Professor of Mechanical Engineering	Sept. 1987 – August 1993

Other related experience – teaching, research

2/95 – 6/2007	Adjunct Prof., Dept. of Orthopedic Surgery, Medical College of Ohio, Toledo
11/95 – 08/97	Senior Scientist, Biomechanics Laboratory (Sabbatical Leave) King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia
09/96 – 08/97	Visiting Professor (Sabbatical Leave) Dept. of Mechanical Eng., King Saud University, Riyadh, Saudi Arabia
10/87 – 01/95	Adjunct Associate Prof., Dept. of Orthopaedic Surgery, Medical College of Ohio
01/85 – 09/87	Research Assistant Professor, University of Cincinnati, Cincinnati, Ohio
01/86 – 09/87	Lecturer, Evening College, University of Cincinnati, Cincinnati, Ohio
09/83 – 12/84	Assistant Professor, Grand Valley State University, Allendale, Michigan
09/81 – 09/83	Lecturer, Evening College, University of Cincinnati, Cincinnati, Ohio
09/81 – 09/83	Postdoctoral Research Associate, Dept. of Orthopaedic Surgery, Univ. of Cincinnati
09/76 – 08/81	Teaching and Research Assistant, Dept. of Aerospace Eng. & Applied Mechanics, University of Cincinnati, Cincinnati, Ohio
09/72 – 08/76	Instructor, Dept. of Mathematical & Physical Sciences, Cairo Univ., Cairo, Egypt

AWARDS & RECOGNITION

Honors and Awards in Instruction and Teaching:

- Selected to by the American Society of Mechanical Engineers (ASME) to serve as a program evaluator for the accreditation board for engineering and technology, Inc., 2000 – present
- Outstanding Teacher Award, College of Engineering, The University of Toledo, May 1999.

Honors and Awards in Research and Professional Activities:

- University of Toledo Outstanding Faculty Research Award, April 2004.
- Fellow of American Society of Mechanical Engineers, December 2003.
- Outstanding Undergraduate Research Mentorship Award, College of Eng., Univ. of Toledo, May 2001.
- 1988 O'Donoghue Sports Injury Research Award from the American Orthopaedic Society of Sports Medicine, June 1988.

Honors and Awards in Service and Engagement:

- 2011 American Society of Mechanical Engineers (ASME) Dedicated and Distinguished Service Award, Society level award
- Edith Rathbun Award for Excellence in Outreach and Engagement in recognition for exceptional community outreach and engaged scholarship, The University of Toledo, April 2006.

ADMINISTRATIVE EXPERIENCE

2007-present Associate Dean of Graduate Studies and Research Administration, College of Engineering, Univ. of Toledo

2004-2007 Interim Associate Dean of Graduate Studies, College of Eng., Univ. of Toledo

Strategic Planning:

- Worked with faculty from the main campus and the health science campus to develop a joint Ph.D. degree between the colleges of medicine and engineering in biomedical engineering.
- Worked with faculty from the college of engineering and an engineering task force of industry and academic professionals to develop a practice-oriented energy engineering program.
- Working with the department chairs in developing and implementing different initiatives, policies and procedures to achieve short and long-term goals of recruitment, retention and promotion of the eight master's degree programs and two doctoral degree programs offered by the COE.

Graduate Program Issues:

- Worked with the faculty in the College of Engineering to achieve a national ranking for some of our graduate programs (the practice oriented Master of Science in engineering has been ranked among the top 50 in the nation from 2012 - 2015).
- Worked with the VP for Health Science Affairs and University Accreditation at UT (and the former Senior Associate Dean of the COGS) in managing the joint (medicine and engineering) doctoral degree in biomedical engineering.
- Developed a tracking system for the College of Engineering Graduate Students to include admission, funding and graduation rate which allows for enrollment and funding projections.

- Prepare and submit national surveys to the US News and World Report and to the American Society of Engineering Education (ASEE) about the different graduate programs in the College of Engineering.
- Placed an emphasis on scholarly work and an increased focus on Ph.D students.
- Serve as a liaison with the graduate School on all graduate student issues
- Organized the semi-annual College of Engineering master's student poster presentation for 6 years to promote the research work of our graduate students and to give them an opportunity to present their research in a conference like-environment.

Budget oversight:

- Manage the College of Engineering Graduate Budget (~ 5.5 M) for about 375 graduate students.
- Developed a graduate student budget database that allows the dynamic tracking of all graduate assistantships and tuition expenditures in the College of Engineering.

Student Success:

- Timely processing of forms and good record keeping.
- Adopting an open door policy for graduate students and faculty.
- Responding quickly to graduate student needs.
- Established clearly defined processes to insure good communication among staff.

2000-2007 Graduate Programs Director for the MIME Department, College of Eng., UT
1994-1995 Inaugural Graduate Programs Director for the MIME Department, College of Eng., UT

Graduate program Issues:

- As the inaugural graduate director of the newly formed MIME department due to the merging of the Mechanical and Industrial Engineering departments in 1994, I helped in defining the role of the graduate director in the new MIME department. I worked with my colleagues and the college administration in developing a homogeneous and coherent graduate program in three focus areas. This program was organized around the faculty expertise and research interests.
- Leading my colleagues, and working with the Department Chair, in planning and achieving short and long-term goals of recruitment, retention and promotion of the different graduate programs of the mechanical, industrial and manufacturing engineering (MIME) department.
- Recruiting outstanding students.
- Advising graduate students on academic and research goals.
- Administering the PhD qualifying exams.
- Reviewing the plans of study of all MIME graduate students.
- Coordinating the department seminar series.
- Chairing the Engineering Mechanics Area Doctoral Committee of the College of Eng. (1993-1995). This was one of the four area committees responsible for organizing the doctoral program at that time in the College of Engineering. In this capacity, I worked closely with faculty from both Mechanical and Civil Engineering toward the successful management of this doctoral program.

Budget oversight:

- Managed strategically the MIME department graduate budget in full consultation with the College administration and the graduate school.
- Managed headcount and student credit hours to resolve a significant budget shortfall of approximately \$1.5M in 2000 that was attributed to the College of Engineering graduate programs.

Knowledge and experience in working with senior administration at the University of Toledo

Below is not a complete list, rather, some examples to demonstrate my experience and knowledge in working with senior administration at the University of Toledo at different levels:

- As the Associate Dean of Graduate Studies for the past 12 years, I have maintained an open and effective working relationship with the College of Graduate Studies and its last four deans to effectively manage the graduate programs in our college of engineering
- As a member of the Strategic Planning Committee (2002-2003), I worked closely and almost on a weekly basis with the Interim Provost for Academic Affairs, Main Campus, and acted as the scribe in one of the focus groups. I believe that my activities and interactions within this committee have provided me with a valuable experience in university planning from an administrative perspective.
- As a member of the Research Council (2000-2003), I have worked closely with the Vice Provost for Research and Economic Development on different initiatives. In this capacity, I participated in conducting a holistic assessment of all process and infrastructure issues related to externally sponsored research at our University. Based on this re-engineering analysis, recommendations for optimum infrastructure and procedures were made to encourage research excellence at UT.

Governance experience and knowledge with issues related to UT operations:

I have served on a number of university and college committees, including:

- Graduate Council (2004-present)
- Executive Committee of the Graduate Council (2006-2007) [elected]
- Faculty Senate (2000-2003).
- Executive Committee of the Faculty Senate (2002-2003) [elected].
- Union faculty representative for the MIME Department (2001-2003).
- University Committee on Academic Personnel (2002-2004) [This is the committee responsible for evaluating all promotion and tenure cases for the University of Toledo].
- University Committee on Sabbaticals (2001-2004).
- Faculty representative to the College of Engineering Constitution and By-Laws Committee (1993-1995) and (1998-2001).
- Member of the Department Personnel Committee for the MIME Department (2000-2002, 1999-2000, 1997-1998 and 1994-1995) and for the ME department (1993-1994).

GRANTS AWARDED

EXTERNAL GRANTS:

Dr. Hefzy secured more than \$6.9 million in funding as PI/Co-PI, and CI to support his research programs, with sponsors including the National Institute of Health, the National Science Foundation and the Whitaker Foundation. He is the 1st engineering faculty at the University of Toledo to receive a NIH grant (Area grant in 1992-1995). The following is a listing of some of these external grants:

- | | |
|-----------|---|
| 2009-2016 | Engineering Senior Design Projects for the Disabled. NSF. PI with M. Pourazady. \$125,000 |
| 2008-2015 | Research Cluster for Development and Evaluation of Spinal Implants. OBOR. CI with Dr. V. Goel as PI. \$1.625 M. (I developed the Human Motion Analysis Lab of the College of Engineering using funds from this grant) |

- 2008-2015 Choose Ohio First for Engineering Entrepreneurship (COFEE) Scholarship. OBOR. CI with Dr. B. Randolph as PI. \$3,941,800
- 2008-2011 Shape Memory Alloy Actuated Active Ankle Foot Orthosis. NSF. Co-PI with Dr. Elahinia and Dr. Armstrong (from Kinesiology). \$247,995
- 2008-2009 Effects of Liners on the Dispersion of Backboard Interface Skin Pressures. Metro-Health System, Cleveland, PI, \$10,000
- 2006-2009 Engineering Senior Design Projects for the Disabled. NSF. PI with Dr. M. Pourazady. \$75,000
- 2004-2006 Small Grant for Exploratory Research: 3-D behavior of the Human Knee Joint in Deep Flexion. NSF. PI. \$50,000.
- 2000-2006 Engineering Senior Design Projects for the Disabled. NSF. PI with Dr. Naganathan. \$94,988
- 2000-2002 Supplement-"Analysis, Modeling and Experimental Validation of the 3-Dimensional Dynamic Response of the Human Knee Joint. NSF. PI with Dr. Naganathan, \$10,000
- 1998-2002 Analysis, Modeling and Experimental Validation of the 3-Dimensional Dynamic Response of the Human Knee Joint. NSF. PI with Dr. Naganathan. \$263,801
- 1993-1999 Engineering Senior Design Projects for the Disabled. NSF. PI with Dr. R. Irey. \$49,050
- 1992-1995 Three Dimensional Dynamic Modeling of the Human Knee Joint. NSF. PI. \$128,183
- 1992-1995 Patello-Femoral Mechanics in PCL Deficient Knees. NIH. PI. \$157,765
- 1992-1993 Integrated Human Motion Measurement System. NSF. CO-PI with Dr. Jackson (from Orthopaedics) and Dr. Armstrong (from Kinesiology). \$100,000
- 1990 Research in Orthopaedic Biomechanics. OBOR. CO-PI with Dr. Raftopoulos as PI. \$29,108
- 1987-1999 Modeling the 3-D Kinetics of the Human Knee Joint During the Clinical Laxity Examination. The Whitaker Foundation. PI. \$30,402

INTERNAL GRANTS: (funding totalling ~ \$87,000 as Pi and Co-PI)

- 1998-1999 A Total Knee Replacement that Allows for maximum Flexion: A Pilot Study. Office of Research at the Univ. of Toledo. PI. \$19,989
- 1993-1994 Determination of the Contact Characteristics of the Wrist Joint. The DeArce Memorial Fund, The Univ. of Toledo. PI. \$8,365
- 1993-1994 Research in Orthopaedic Biomechanics. The Medical College of Ohio. Co-PI with Dr. R. Irey as PI. \$19,665
- 1992-1993 Human Wrist Kinematics. The Medical College of Ohio. PI. \$7,250
- 1990-1991 Determination of Cross Sectional Areas of Soft Tissues. Undergraduate Minority Research Scholars program as the Univ. of Toledo. PI. \$1,000
- 1990-1991 Kinematics of the Human Wrist Joint. The DeArce Memorial Fund, The Univ. of Toledo. PI with Dr. Jackson (from Orthopaedics) as CO-PI. \$6,500
- 1989-1990 3-Dimensional Modeling of the Human Knee Joint. FRAFP, The Univ. of Toledo. PI. \$6,435
- 1989-1990 Determination of the Patello-Femoral Contact Stresses. The DeArce Memorial Fund, The Univ. of Toledo. PI. \$11,150
- 1998 Enhancement of the Biomechanics Lab. at the Univ. of Toledo. Univ. of Toledo. PI. \$6,500

PUBLICATIONS AND PRESENTATIONS

Dr. Hefzy has authored and co-authored more than 35 full-length journal articles, 100 conference and proceeding papers in the area of Orthopaedic Knee Biomechanics and Assistive Technology. All of Dr. Hefzy's journal articles and conference/proceedings papers are peer-reviewed publications. In addition, Dr. Hefzy has written 19 book chapters (3 on knee biomechanics and 16 on assistive devices). The following is a listing of Dr. Hefzy's publications in the past eight years:

Peer-Reviewed Journal and Conference Papers During the past Eight Years: (blue indicates peer-reviewed journal publications)

1. J. Fox, M.S. Hefzy and C.W. Armstrong, "Knee and Ankle Biomechanics During Squatting with Heels on and off the Ground, with and without Body Weight Shifting", (2016), Proceedings of the Summer Biomechanics, Bioengineering and Biotransport Conference, June 29-July 2, National harbor, MD, USA.
2. A. M. Green, T. L. Breitenbach,, J.M. Forstat, (3 undergraduate students), J. Fox and M.S. Hefzy, "Biomechanical Analysis of Kicks in Soccer and Kicks in Football", (2016), Proceedings of the Summer Biomechanics, Bioengineering and Biotransport Conference, June 29-July 2, National harbor, MD, USA.
3. F. Tian, M.S. Hefzy and M. Elahinia, (2016), "A Biologically Inspired Knee Actuator for a KAFO", Transactions of the ASME: Journal of Medical Devices, December 2016, Vol. 10, 045001 (8 pages) Paper No: MED-15-1258; doi: 10.1115/1.4033009.
4. G. Nemunaitis, M. J. Roach, M.S. Hefzy and M. Mejia, (2016), "Redesign of a Spine Board: proof of Concept Evaluation", Assistive Technology, The Official Journal of RESNA, DOI:10.1080/10400435.2015.1131759, Accepted author version posted online: 06 Feb 2016.
5. F. Tian, M.S. Hefzy and M. Elahinia, "State of the Art Review of Knee-Ankle-Foot Orthoses", Annals of Biomedical Engineering, Vol. 43, No. 2, February 2015, pp. 427-441.
6. G. Nemunaitis, M. J. Roach, M. Boulet, J. Ann Nagu, B. Kaufman, M. Mejia and M.S. Hefzy, (2015), "The Effect of a Liner on the Dispersion of Sacral Interface Pressures During Spinal Immobilization", Assistive Technology; The Official Journal of RESNA, 27:1, 9-17, DOI:10.1080/10400435.2014.940473
7. F. Tian, M. Elahinia, and M.S. Hefzy, "Storing and Releasing Energy with Superelastic NiTi in a Knee-Ankle-Foot Orthosis", Proceedings of the 2015 Midwest American Society of Biomechanics Regional Meeting, February 17-18, 2015, Akron, Ohio, pp. 23.
8. F. Tian, M.S. Hefzy, and M. Elahinia, "Development of a Dynamic Knee Actuator for a Knee-Ankle-Foot-Orthosis Using Superelastic Alloys", IMECE2014-40431, Proceedings of the ASME 2014 International Mechanical Engineering Congress and Exposition (IMECE), November 14-20, 2014, Montreal, Canada
9. F. Tian, M. Elahinia and M.S. Hefzy, "Design and Evaluation of a Knee Actuator for a Dynamic KAFO", paper SMASIS2014-7605, Proc. of 2014 ASME Smart Materials, Adaptive Structures and Intelligent Systems Conference, SMASIS 2014, Sept. 8-10, 2014, Newport, Rhode Island, USA.
10. C. Maag, M.S. Hefzy, and V. Kaul, "A User Subroutine to be used with Abaqus to Solve Biphasic Contact Problems", Proceedings of the 7th World Congress of Biomechanics, July 6-11, 2014, Boston, Massachusetts.
11. F. Metelues, M.S. Hefzy, and C. Armstrong, "Biomechanics of Prolong Squatting with Body Shifting", Proceedings of the 7th World Congress of Biomechanics, July 6-11, 2014, Boston, Massachusetts.
12. F. Tian, M. Elahinia, and M.S. Hefzy, "Development of a Knee Actuator for a Dynamic Knee-Ankle-Foot-Orthosis", Proceedings of the 2014 Midwest Am. Society of Biomechanics Regional Meeting, March 4-5, 2014, Akron, Ohio.
13. F. Metelues, M.S. Hefzy, and C. Armstrong, "Effects of Heels Up and Down and Body Shifting on Squatting", Proceedings of the 2014 Midwest Am. Society of Biomechanics Regional Meeting, March 4-5, 2014, Akron, Ohio.

14. F. Tian, M. Elahinia and M.S. Hefzy, "A Dynamic Knee-Ankle-Foot-Orthosis with Smart Material Actuators", paper SMASIS2013-3044, Proceedings of the ASME 2013 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, SMASIS 2013, September 16-18, 2013, Snowbird, Utah.
15. X. Li, A. Kirgesner, A. Stephens, M. Cramer, M.S. Hefzy and M. Pourazady, "Device to Assist Individuals in Dressing Themselves", Paper SBC2013-14373, Proceedings of the ASME 2013 Summer Bioengineering Conference, SBC 2013, June 26-29, Sunriver, Oregon (also won 1st place in the 2013 Undergraduate Design Project Competition in Rehabilitation and Assistive Devices sponsored by the NSF and organized by the Bioengineering Division of the ASME).
16. S. Anderson, B. Goede, D. Kramer, M. Leupp, G. Nemunaitis, M.S. Hefzy and M. Pourazady, "Correlating Air Cushion Pressure to Maximum Interface Pressure on the Buttocks", Paper ID 94, Proceedings of the 2013 annual RESNA Conference, June 20-24, 2013, Seattle, Washington.
17. M. Franchetti, M.S. Hefzy, M. Pourazady and C. Smallman, "Framework for Implementing Engineering Senior Design Capstone Courses and Design Clinics", *Journal of STEM Education*, Volume 13, issue 3, May – June 2012, pp. 25 – 40.
18. M. Rivet, N. Peatee, M. Payne, M.S. Hefzy and M. Pourazady, "Development of a Device to Assist in packing and Unpacking Bags: Hanging Bag Assistant", Proceedings of the 2012 RESNA (Rehabilitation Engineering Society of North America) Annual Conference, CD Publication, June 28 – July 3, 2012, Baltimore, Maryland.
19. M. Peterson, N. Gates, J. Sander, M.S. Hefzy and M. Pourazady, "Adaptation of a Power Scooter for Use on a Golf Course", Proceedings of the 2012 RESNA (Rehabilitation Engineering Society of North America) Annual Conference, CD Publication, June 28 – July 3, 2012, Baltimore, Maryland.
20. T. Brakefield, T. Burkhardt, A. Meehan, G. Nemunaitis, M.S. Hefzy, and M. Pourazady, "Gurney Mattress Redesign", paper SBC2012-80036, Proceedings of the ASME 2012 Summer Bioengineering Conference, June 20-23, 2012, Fajardo, Puerto Rico.
21. R.M. Patterson, M.S. Hefzy and J. Weisman, "2011 Results from the Summit on Rehabilitation Engineering", paper SBC2012-80006, Proceedings of the ASME 2012 Summer Bioengineering Conference, June 20-23, 2012, Fajardo, Puerto Rico.
22. J. Thomas, A. Doughty, D. Perkins, E. Wells, M. Pourazady and M.S. Hefzy, "Device to Lift a Person from the Ground to Wheelchair Height", paper SBC 2011-53175, Proceedings of the ASME 2011 Summer Bioengineering Conference, June 22-25, 2011 in Nemaquin Woodlands Resort, Farmington, Pennsylvania,
23. Bhadane, M., Elahinia, M., Armstrong, C. and M.S. Hefzy, "A Variable Stiffness Ankle Foot Orthosis Based on SMA Wires", Proceedings of the 2010 Biomedical Engineering Society Annual Meeting, October 6-9, 2010, Austin, Texas.
24. M. Nungester, D. Hetrick, K. Brasher (three undergraduate students), M. Pourazady and M.S. Hefzy, "Development of a Collapsible Wheelchair with Detachable Components", Proceedings of the 2010 RESNA (Rehabilitation Engineering Society of North America) Annual Conference, CD Publication, June 26-30, 2010, Las Vegas, Nevada. Also, one of the five winning papers of the 2010 RESNA Student Scientific Paper Competition.
25. A. Smith, P. Nowicki, M.S. Hefzy, M. Dennis and A. Mustapha, "The Effects of Radial Core Decompression on Lunate Kinematics", paper SBC2010-19127, Proceedings of the ASME 2010 Summer Bioengineering Conference (SBC), June 16-19, 2010 in Naples, Florida.
26. E. Hauser, M.S. Hefzy and B. Ballinger, "Determination of the Contact Areas in the Patello-Femoral and Tibio-Femoral Joints during Deep Knee Flexion", Paper SBC2009-206703, Proc. of the 2009 Summer Bioengineering Conference, June 17-21, 2009, Lake Tahoe, California.
27. M. Henschen, A. Kusters, J. Harvey (three undergraduate students), G. Nemunaitis, M. Pourazady and M.S. Hefzy, "Emergency Medical Services Backboard with a Pressure Dispersion Liner", paper

SBC2009-206399, Proc. of the 2009 Summer Bioengineering Conference, June 17-21, 2009, Lake Tahoe, California.

28. E. Tarkesh, M. Elahinia, M.S. Hefzy, and C. Armstrong, "Shape Memory Alloys, as Alternative Actuation Method for Orthosis Devices", Proceedings of the 2008 North American Congress on Biomechanics, August 5 – 9, 2008, Ann Arbor, Michigan.
29. A. Dauster, M.S. Hefzy, E. Hauser and P. Nowicki, "Development of a Dynamic Knee Simulator", Paper SBC2008-193033, Proc. of the ASME 2008 Summer Bioengineering Conference, June 25-29, 2008, Marco Island, Florida (CD Publications).
30. M.S. Hefzy, M. Pourazady, and A.A. Afjeh, "Engineering Senior Design Projects to Aid Individuals with Disabilities", Proceedings of the 2008 American Society for Engineering Education Annual Conference & Exposition, CD Publication, 2008, paper AC 2008-961, pp. 1-17..

Book Chapters During the past 8 years:

1. "The University of Toledo Projects", IN: NSF 2012 Engineering Senior Design Projects to Aid the Disabled, by Hefzy and Pourazady, Chapter 21, Edited by John Enderle, Copyright © 2015 by Creative Learning Press, Inc., by Hefzy and Pourazady, pp. 329-348.
2. "The University of Toledo Projects", IN: NSF 2011 Engineering Senior Design Projects to Aid the Disabled, Chapter 20, Edited by John Enderle, Copyright © 2013 by Creative Learning Press, Inc., by Hefzy & Pourazady, pp. 301-318.
3. "The University of Toledo Projects", IN: NSF 2010 Engineering Senior Design Projects to Aid the Disabled, Chapter 19, Edited by John Enderle, Copyright © 2012 by Creative Learning Press, Inc., by Hefzy and Pourazady, pp. 351-370.
4. "The University of Toledo Projects", IN: NSF 2009 Engineering Senior Design Projects to Aid the Disabled, Chapter 21, Edited by John Enderle, Copyright © 2011 by Creative Learning Press, Inc., by Hefzy and Pourazady, pp. 341-360.
5. "The University of Toledo Projects", IN: NSF 2008 Engineering Senior Design Projects to Aid the Disabled, Chapter 14, Edited by John Enderle, Copyright © 2011 by Creative Learning Press, Inc., by Hefzy and Pourazady, pp. 259-282.

Presentations at Regional, National and International Meetings and Conferences

Dr. Hefzy has made more than 75 presentations at regional, national and international meetings. The following presentations were made by Dr. Hefzy during the past eight years:

1. "On the Kinematics of the Human Lumbar Spine During Squatting with Heels On and Off the Ground", Accepted for presentation at the ASME 2017 International Mechanical Engineering Congress and Exposition (IMECE), Nov. 3-9, 2017, Tampa, Florida Imece2017 paper IMECE2017-72883.
2. "A Biologically Inspired Knee Actuator for a Knee-Ankle-Foot-Orthosis", Keynote Lecture 1, given on Monday, July 28, 2015 at the International Conference and Expo on Biomechanics and Implant Design, July 27-29, 2015, Orlando, Florida.
3. "Biomechanics of the Knee Joint in Deep Flexion", Keynote Lecture 1, on Tuesday, July 29, 2015 at the International Conference and Expo on Biomechanics and Implant Design, July 27-29, 2015, Orlando, Florida.
4. "Development of a Dynamic Knee Actuator for a Knee-Ankle-Foot-Orthosis Using Superelastic Alloys", Podium presentation at the ASME 2014 International Mechanical Engineering Congress and Exposition (IMECE), November 14-20, 2014, Montreal, Canada.

5. "Gurney Mattress Redesign", Podium presentation, ASME 2012 Summer Bioengineering Conference, June 20-23, 2012, Fajardo, Puerto Rico.
6. "Device to Lift a Person from the Ground to Wheelchair Height", Poster presentation, ASME 2011 Summer Bioeng. Conference, June 22-25, 2011 in Nemaocolin Woodlands Resort, Farmington, PA
7. "The Effects of Radial Core Decompression on Lunate Kinematics", Poster presentation, ASME 2010 Summer Bioengineering Conference (SBC), June 16-19, 2010 in Naples, Florida.
8. "Determination of the Contact Areas in the Patello-Femoral and Tibio-Femoral Joints During Knee Flexion", Poster Presentation, ASME 2009 SBC, Lake Tahoe, CA, June 17-21, 2009.
9. "Development of a Dynamic Knee Simulator", Poster Presentation, ASME 2008 Summer Bioengineering Conference, Marco Island, Florida, June 25-29, 2008.
10. "Does Lift-Off Occur During Deep Squat", Poster Presentation, ASME 2007 Summer Bioengineering Conference, Keystone, Colorado, June 20-24, 2007.
11. "Development of a Successful Engineering Capstone Senior Design Course Using Service Learning", 2007 EPICS (Eng. Projects in Community Service" Conference, UCSD, San Diego, CA, May 22-24, 2007.

SUPERVISION OF DISSERTATIONS, THESES & PROJECTS

Postdoctoral Associates Supervision

Dr. Hefzy supervised and supported the following two postdoctoral fellows through his NSF grants:

- Dr. Yi-Chun Li (January 99 – January 2000) and
- Dr. Dumitru Caruntu (May 2000 – May 2003)

Graduate Students Supervised as Major Dissertation/Thesis/Project Advisor

Dr. Hefzy served as the major advisor for 30 graduate students who have completed their doctoral dissertations, masters' theses and masters' projects under his supervision including (during the past 5 years):

- MS. in Mechanical Engineering, Project advisor to Mr. Chandan Reddy Yapala, August 2017.
- MS. in Mechanical Engineering, Project advisor to Mr. Manikanta Reddy Naluvala, August 2017.
- MS. in Bioengineering Thesis advisor to Mr. Jonathan Fox, May 2016.
- PhD in Mechanical Eng. Dissertation advisor to Ms. Feng Tian, December 2015 (with Dr. M. Elahinia)
- MS in Bioengineering Thesis advisor to Chase Maag, May 2014
- MS in Bioengineering Thesis advisor to Francis Metelues, August 2013
- MS in Bioengineering Project advisor to Amey Kelkar, August 2013
- MS in Mechanical Eng. Thesis advisor to Andrew Smith, May 2012
- MS in Mechanical Eng. Thesis advisor to Andrew Dauster, May 2011

Also, Dr. Hefzy served on different student committees including (during the past 5 years):

- Daniel Semer, MS in Mechanical Engineering, MS Thesis, August 2017.
- Md Emran Hossain Bhuiyan, MS in Mechanical Engineering, MS Thesis, August 2017.
- Badr Alreshidi, PhD in Manufacturing and Technology Management, May 2017 (College of Business and Innovation)
- Fathi Amsaad, Ph.D. in Engineering (Electrical Engineering), expected May 2017
- Nicholas Gates, Ph.D. in Engineering (Mechanical Engineering), August 2016

- Mohammadreza Eftekhari, Ph.D. in Engineering (Mechanical Engineering), August 2016
- Vahid Mortazavian, Ph.D. in Engineering (Mechanical Engineering), August 2015
- Soma Shekara Sreenadh Reddy Depuru, Ph.D. in Engineering (Electrical Engineering), August 2012
- Minal Bhadane-Deshpande, Ph.D. in Biomedical Eng., May 2012
- Tesfaye Mohammed, Ph.D. in Engineering (Civil Engineering), December 2011
- Justin Lindsay , M.S. in Mechanical Engineering, December 2011
- Shuo Wang, Ph.D. in Engineering (Mechanical Engineering), May 2011

Undergraduate Senior Design Projects Supervised

Dr. Hefzy supervised more than 130 undergraduate senior design projects that were directed to aid individuals with disabilities. The aim of these projects was to improve the quality of life of these individuals by developing custom made devices to increase their functional independence. These projects were supported by the National Science Foundation for the past 20 years. Most of these projects resulted in conference publications and poster presentations by undergraduate students. Some of these projects won national awards including:

1. “Device to Assist Individuals in Dressing Themselves”, undergraduate students: X. Li, A. Kirgesner, A. Stephens, and M. Cramer, won 1st place in the 2013 Undergraduate Design Project Competition in Rehabilitation and Assistive Devices sponsored by the NSF and organized by the Bioengineering Division of the ASME, 2013 Summer Bioengineering Conference, SBC 2013, June 26-29, Sunriver, Oregon).
2. “Development of a Collapsible Wheelchair with Detachable Components”, undergraduate students: M. Nungester, D. Hetrick, and K. Brasher), one of the five winning papers of the 2010 RESNA Student Scientific Paper Competition, 2010 RESNA (Rehabilitation Engineering Society of North America) Annual Conference, June 26-30, 2010, Las Vegas, Nevada.

TEACHING

Undergraduate and Graduate Courses Taught:

Over the years, Dr. Hefzy has taught more than 23 undergraduate courses, 10 graduate courses and 6 dual level courses at the University of Toledo, Grand Valley State College, the University of Cincinnati, and King Saud University in Riyadh, Saudi Arabia. Courses taught by Dr. Hefzy in mechanical engineering include:

Mechanical Design I	Mechanical Design II	Mechanical Vibrations
Elasticity	Introduction to Finite Elements	Advanced Finite Elements
Senior Design	Dynamics of Human Movement	Introduction to Biomechanics

Short and Continuing Education Courses:

- A) at the Arab Board Orthopaedic Residency Training Program - Security Forces Hospital, Ministry of Interior, Riyadh, Saudi Arabia *Series of Lectures on Biomechanics*, November 1996.
- B) at the Continuing Medical Education Program of the Sports Medicine Hospital - General Presidency of Youth Welfare, Riyadh, Saudi Arabia *Series of Lectures on Biomechanics*, April 1996.
- C) at the Continuing Education of the University of Toledo
Review of Machine Design for the Professional Engineering Exam, Oct. 1994 and Sept. 1992
- D) at the Dept. of Orthopaedic Surgery, Medical College of Ohio, Toledo, OH, USA.
Annual series of Lectures on *Orthopaedic Biomechanics* 1988 - 1992
- E) at Dana University, Toledo, Ohio, USA
Finite Element Methods, September 28 - October 9, 1992.

Curriculum and Laboratory Development:

- Introduced and taught several new graduate and dual level courses including:
 - “Advanced Biomechanics”: dual level course for BIOE and MIME students
 - “Experimental Methods in Orthopaedic Biomechanics”: undergraduate level course for BIOE
 - Includes the development of 9 experiments (2013 through 2015)
 - "Advanced Finite Element Methods": graduate level course for MIME and CVLE students
 - "Dynamics of Human Movement": dual level course for BIOE and MIME students
 - “Occupational Biomechanics” dual level course for BIOE and MIME students
- At the University of Toledo, Dr. Hefzy has worked on the development of the gait and motion analysis capabilities of the College of Engineering as a joint venture between the departments of bioengineering and mechanical engineering to study the dynamics of human motions. Major acquired equipment through OBOR and NSF funding includes an integrated state-of-the-art ten-camera Raptor-E digital real time analysis system (Motion Analysis, Inc., California, USA), four Optima force plates (Advanced Mechanical Technology, Inc., Massachusetts, USA), and a Trigno™ Wireless Electromyography (EMG) system with sixteen EMG sensors (Delsys Inc., Massachusetts, USA).
- During his residency at the King Faisal Specialist Hospital & Research Center (KFSH&RC), Dr. Hefzy worked with the Department of Physical Therapy in order to improve patient care by assessing different rehabilitation regimens and treatment modalities employed by the physical therapists at the hospital.
- Developed 10 experiments for the experimental stress analysis lab at Grand Valley State University.

NATIONAL & INTERNATIONAL PROFESSIONAL ACTIVITIES

Services to the ASME

Dr. Hefzy has been a very active member at the local and national levels of the American Society of Mechanical Engineers and its Bioengineering Division **since 1984 and for the past 28+years**. His services encompass a wide range of activities to include founding the West Michigan Group of ASME in 1984 to serving three times on the Executive Committee of the Bioengineering Division. Below is a detailed listing of his services to the ASME in a chronological order:

2016	Member of the ASME Scholarship Committee (2016 and 2017)
2010 – 2013	Treasurer and Member of the Executive Committee of the Bioengineering Division
2010	Treasurer and Member of the Organizing Committee, 2010 Summer Bioengineering Conference
2009	Treasurer and Member of the Organizing Committee, 2009 Summer Bioengineering Conference
2008	Treasurer and Member of the Organizing Committee, 2008 Summer Bioengineering Conference
2007 – 2010	Treasurer and Member of the Executive Committee of the Bioengineering Division
2007 – 2012	Associate Editor, Journal of Biomechanical Engineering, ASME Transactions
2000 – present	ABET evaluator for ASME
2010	Member, NIH Task Force, Inter-Council Committee on Federal R&D Budget Review
2004 – 2007	Chair, Biosolids Technical Committee, Bioengineering Division

- 2005 Member, Technical Committee, 2005 Summer Bioengineering Conference, June 22-26, Vail, Colorado.
- 2005 Basic Engineering Group Representative to the 2005 ASME IMECE that was held in Orlando, Florida, November 5-11, 2005
- 2004 Basic Engineering Group Representative to the 2004 ASME IMECE that was held in Anaheim, California, November 14 -19, 2004
- 2004 Member, NIH Task Force, Inter-Council Committee on Federal R&D Budget Review
- 2003 – 2005 Member of the National Nominating Committee, 1st alternate
- 2003 Chairman, Local Arrangements Committee and Member of the Steering Committee, 2003 Summer Bioengineering Conference, June 25 - 28, 2003, Miami, Florida
- 2003 Member, NIH Task Force, Inter-Council Committee on Federal R&D Budget Review
- 2002 – 2003 Member of the National Nominating Committee, 2nd alternate
- 2002 Chairman, NIH Task Force, Inter-Council Committee on Federal R&D Budget Review
- 2001 Member of the National Nominating Committee, voting member
- 2001 Chairman, Publications Committee and member of the Steering Committee, 2001 Summer Bioengineering Conference, June 28 – July 1, 2001, Snowbird, Utah
- 2001 Chairman, NIH Task Force, Inter-Council Committee on Federal R&D Budget Review
- 2000 Chairman, NIH Task Force, Inter-Council Committee on Federal R&D Budget Review
- 2000 Participant in the Science-Engineering-Technology Congressional Visits Day
- 1999 – 2002 Member of the Executive Committee of the Bioengineering Division, External Affairs
- 1999 Organized 9 sessions for the 1999 ASME IMECE, Nov. 14 – 19, 1999, Nashville, Tennessee
- 1995 – 1999 Secretary, Solid Mechanics Committee, Bioengineering Division
- 1997 Chairman of the Publications Committee and Member of the Steering Committee for the 1997 Summer Bioengineering Conference, June 11 – 15, 1997, Sun River, Oregon
- 1995 Chairman of the Publications Committee and Member of the Steering Committee for the 1995 Summer Bioengineering Conference, June 28 – July 2, 1995, Beaver Creek, Colorado
- 1993 Organized one session on “Joint Dynamics and Mechanics” for the Joint Mechanics Symposium at the 1993 ASME Winter Annual Meeting, Bioengineering Division, New Orleans, Louisiana, Nov. 28 – Dec. 3, 1993
- 1992 – 1995 Member, Executive Committee of the ASME Northwest Ohio Section
- 1991 Organized five session as a Forum on Joint Mechanics for the 1991 Biomechanics Symposium at the ASME Applied Mechanics and Biomechanics Conference, Ohio State University, Columbus, Ohio, June 16 – 19, 1991
- 1991 Organized the First All-Ohio Biomechanics Student Poster Session which was held at the 1991 ASME Applied Mechanics and Biomechanics Conference, Ohio State University, Columbus, Ohio, June 16, 1991
- 1989 Organized five sessions for the “Joint Mechanics” Symposium for the 1989 ASME Winter Annual Meeting, Bioengineering Division, San Francisco, California, December 10 – 15, 1989
- 1984 – 1985 Member, Board of Directors of the ASME Central Michigan Section
- 1984 – 1985 Secretary and Founder of the West Michigan Group of ASME

Professional Review Activities:

- Reviewer on the 2016, 2015 and 2014 NSF Graduate Research Fellowship Program (GRFP) panels.
- Program Evaluator for the accreditation board for engineering and technology, Inc., 2000 – present
- Reviewer for the following journals and organizations:

Qatar national Research Fund (QNRF)	2013-2015
Journal of Biomechanical Engineering (ASME),	1983 - present.
Journal of Medical Devices (ASME)	2014 - present
Clinical Journal of Sports Medicine	1995 - 1999
Journal of Orthopaedic Research,	1988 - 2005
Journal of Investigative Surgery	1991
National Science Foundation	Ad hoc reviewer since 1993.
Ohio Super Computer	May 1993, June 1993, June 1996
National Institute of Health, Special Study Section.	December 1983

Membership in Professional Societies:

- | | |
|---|-----------------|
| Orthopaedic Research Society | 1988 - present. |
| American Society of Biomechanics | 1987 - present. |
| American Society of Engineering Education | 1983 - present. |
| American Society of Mechanical Engineers | 1982 - present. |
| Sigma Xi, The Scientific Research Society | 2010-present. |

UNIVERSITY SERVICE ACTIVITIES

Service on University Committees (Univ. of Toledo)

- | | |
|----------------|--|
| 2004 – present | Graduate Council |
| 2009 – 2011 | Research Council (Elected) |
| 2006 – 2007 | Executive Committee of the Graduate Council (Elected) |
| 2003 – 2008 | Diversity Commission |
| 2002 – 2003 | Strategic Planning Committee: Phase 2 |
| 2002 – 2003 | Executive Committee of the Faculty Senate (Elected) |
| 2002 – 2003 | Center for Teaching and Learning Advisory Committee |
| 2000 - 2003 | Faculty Senate (Elected) |
| 2002 – 2005 | University Committee on Academic Personnel (Elected) |
| 2001 – 2004 | University Committee on Sabbaticals (Elected) |
| 2000 – 2003 | Research Council of The University of Toledo |
| 2000 – 2001 | University Committee on Sabbaticals |
| 1998 - 1999 | Research Council of The University of Toledo. |
| 1998 - 1999 | Chair, Real Estate & Financial Markets Program Review Committee. |
| 1992 - 1995 | College of Engineering Representative, University Library Committee. |
| 1988 - 1992 | Human Subjects Research Committee. |
| 1988 - 1992 | Study Committee on Joint Biomedical Engineering Program between the Univ. of Toledo and the Medical College of Ohio. |

Service on College Committees (Univ. of Toledo)

2009 - present	Co-Chair, Joint Committee for the joint Ph.D. degree in Biomedical Engineering
2013-2015	Committee to establish the M.S. in Engineering with a concentration in Energy Engineering
2003	Dean of Engineering Search Committee
1999 - 2001	Constitution and By Laws Committee, College of Engineering (elected)
1993 - 1995	Chairman of the Engineering Mechanics Area Doctoral Committee of the College of Engineering.
1993 - 1995	Constitution & By Laws Committee, College of Engineering (elected)
1993 - 1994	College of Engineering committee for workload policies.
1987 - 1993	Secretary of the Eng. Mechanics Doctoral Committee of the College of Eng; major contribution includes the restructuring of the comprehensive exams.
1990 - 1992	Chairman, Merit Review Committee for the College of Engineering.
1991 - 1992	Chairman, Finance Committee, 1992 American Society Engineering Education (ASEE) local planning at UT.

Service on Departmental Committees (Univ. of Toledo)

2002 – 2007	ABET Committee, Dept. of Mech., Industrial and Manufacturing Eng.
2000 – 2007	Graduate Director, Dept. of Mech., Industrial and Manufacturing Eng.
1999 – 2005	Undergraduate Curriculum Committee, Dept. of Mech. Eng.
1999 – 2003	Mechanical Engineering Department Personnel Committee (elected)
1997 - 1998	Mechanical Engineering Department Personnel Committee (elected)
1994 - 1995	Founding Graduate Director, Dept. of Mech., Industrial & Manufacturing Eng.
1993 - 1995	Mechanical Engineering Department Personnel Committee (elected)