

ALAA A. AHMED

Associate Professor
Departments of Integrative Physiology and Mechanical Engineering
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EDUCATION

1999 – 2005 University of Michigan
PhD Biomedical Engineering, 2005
MSE Mechanical Engineering, 2001
MS Biomedical Engineering, 2000

1995 – 1999 American University in Cairo, Egypt
BS Mechanical Engineering, 1999

EMPLOYMENT

2017 – present Associate Professor
Department of Integrative Physiology
Department of Mechanical Engineering
University of Colorado, Boulder, CO

2015 – 2017 Associate Professor
Department of Integrative Physiology
University of Colorado, Boulder, CO

2008 – 2015 Assistant Professor
Department of Integrative Physiology
University of Colorado, Boulder, CO

2007 – 2008 Research Associate
Department of Engineering
University of Cambridge, U.K.

2006 – 2007 Whitaker Foundation International Scholar
Department of Engineering
University of Cambridge, U.K.

2005 – 2006 NIH Postdoctoral Research Fellow
Medical School
University of Michigan

2001 – 2004 NIH Predoctoral Research Fellow
Institute of Gerontology
University of Michigan

AFFILIATIONS

2015 – 2017 Associate Professor
Department of Mechanical Engineering
University of Colorado, Boulder, CO

2011 – 2015 Assistant Professor
Department of Mechanical Engineering

2014 – Present	University of Colorado, Boulder, CO <u>Fellow</u> Institute of Cognitive Science, Department of Psychology University of Colorado, Boulder, CO
2008 – Present	<u>Member</u> Center for Neuroscience University of Colorado, Boulder, CO
2008 – Present	<u>Member</u> Center for Research on Training University of Colorado, Boulder, CO

HONORS & AWARDS

1. Executive Board Member, Institute of Cognitive Science, CU Boulder, 2016-2018.
2. Board Member, Society for the Neural Control of Movement (NCM), 2015-2018.
3. Best Poster Award, Society for Neuroeconomics, 2015.
4. National Science Foundation (NSF) CAREER Award, 2014.
5. DARPA Young Faculty Award, 2012.
6. Junior Faculty Development Award, CU Boulder, 2009.
7. Royal Society Conference Grant, University of Cambridge, 2008.
8. Whitaker Foundation International Scholar Grant, University of Cambridge, 2006-2007.
9. NIH Postdoctoral Fellowship, University of Michigan Medical School, 2005-2007.
10. Distinguished Dissertation Award Nominee¹, University of Michigan, 2005
11. Outstanding Mentor Award, University of Michigan College of Engineering, 2005.
12. NIH Predoctoral Fellowship, University of Michigan Institute of Gerontology, 2001-2004.
13. Clinical Biomechanics Award, Annual Meeting of the American Society of Biomechanics, 2003.
14. First Place, Best Presentation Award, 4th Annual Mechanical Engineering Graduate Student Symposium, University of Michigan, 2003.
15. Best Content Award, College of Engineering Graduate Student Poster Competition, University of Michigan, 2003.
16. Second Place, Best Presentation Award, 3rd Annual Mechanical Engineering Graduate Student Symposium, University of Michigan, 2002.
17. Engineering Honors Student, The American University in Cairo, 1997-1999.
18. Dean's Honors List, The American University in Cairo, 1995-1999.
19. Academic Merit Scholarship (40% tuition waiver), The American University in Cairo, 1995-1999.

PUBLICATIONS IN PEER-REVIEWED JOURNALS

- * Indicates post-doctoral trainee under the supervision of Dr. Ahmed
- ** Indicates graduate student under the supervision of Dr. Ahmed
- *** Indicates undergraduate student under the supervision of Dr. Ahmed

1. **Pienciak-Siewert, A., ***Horan, D.P., **Ahmed, A.A.**, “Trial-to-trial adaptation in control of arm reaching and standing posture,” *Journal of Neurophysiology*, in press.
2. Shadmehr, R., Huang, H.J.*, **Ahmed, A.A.**, “A representation of effort in decision making and motor control,” *Current Biology*, 26:1929–1934 2016, doi: 10.1016/j.cub.2016.05.065.

¹ Thesis was nominated by the Department of Biomedical Engineering for the University of Michigan 2005 Distinguished Dissertation Award. Each department nominates one dissertation annually.

3. **O'Brien M.K., **Ahmed, A.A.**, "Irrationality in movement decision making," *Exercise and Sports Science Reviews*, 44:20-8 2016, doi: 10.1249/JES.0000000000000066.
4. **O'Brien M.K., **Ahmed, A.A.**, "Threat affects risk-preferences in movement decision making," *Frontiers in Behavioral Neuroscience*, 9:150 2015 doi: 10.3389/fnbeh.2015.00150.
5. *Nikooyan.A.A, **Ahmed A.A.**, "Reward feedback accelerates motor learning", *Journal of Neurophysiology*, 113:633-646 2014, doi:10.1152/jn.00032.2014.
6. *Huang, H.J., **Ahmed, A.A.**, "Reductions in muscle activity and metabolic cost during visuomotor adaptation," *Journal of Neurophysiology*, 112:2264-2274 2014 doi:10.1152/jn.00014.2014.
7. **O'Brien M.K., **Ahmed, A.A.**, "Take a stand on your decisions, or take a sit: posture does not affect risk preferences in an economic task" *PeerJ*, 2:e475 2014 doi: 10.7717/peerj.475.
8. **Pienciak-Siewert, A., **Barletta, A., **Ahmed, A.A.**, "Asymmetric transfer of learned postural control between stability contexts," *Journal of Neurophysiology*, 111:1466-1478 2014 doi:10.1152/jn.00235.2013.
9. *Huang, H.J., **Ahmed, A.A.**, "Older adults learn less, but still reduce metabolic cost during motor adaptation," *Journal of Neurophysiology*, 111:135-144 2014 doi:10.1152/jn.00401.2013.
10. **Trent M.C., **Ahmed, A.A.**, "Learning from the value of your mistakes: evidence for a risk-sensitive process in movement adaptation," *Frontiers in Computational Neuroscience*, 7:118 2013 doi: 10.3389/fncom.2013.00118.
11. Wilder M.H., Jones M., **Ahmed A.A.**, Curran T., Mozer M.C., "The persistent impact of incidental experience," *Psychonomic Bulletin and Review*, 2013 doi: 10.3758/s13423-013-0406-3.
12. **O'Brien M.K., **Ahmed, A.A.**, "Does risk-sensitivity transfer across movements?" *Journal of Neurophysiology*, 109:1866-1875 2013.
13. Berniker, M., **O'Brien M.K., Kording, K.P., **Ahmed, A.A.**, "An examination of the generalizability of motor costs," *PLoS ONE*, 8:1, (e53759) January 2013.
14. ***Manista, G.C., **Ahmed, A.A.**, "Stability limits modulate whole-body motor learning," *Journal of Neurophysiology* 107: 1952-1961 2012.
15. *Huang, H.J., Kram, R. **Ahmed, A.A.**, "Reduction of metabolic cost during motor learning of arm reaching dynamics," *Journal of Neuroscience* 32(6): 2182-2190 2012.
^ Featured in Time, PBS, Forbes^{1*}
16. *Huang, H.J., **Ahmed, A.A.**, "Tradeoff between Stability and Maneuverability during Whole-Body Movements," *PLoS ONE*, 6 (e21815) 2011.
^ featured PLoS ONE image of the week (<http://blogs.plos.org/everyone/2011/07/18/worth-a-thousand-words-44/>)
17. **Ahmed, A.A.**, Wolpert, D.M, "Transfer of dynamic learning across postures," *Journal of Neurophysiology*, 102 (2816-2824) 2009.
18. **Ahmed, A.A.**, Wolpert, D.M., Flanagan, J.R., "Flexible representations of dynamics are used in object manipulation," *Current Biology*, 18 (763-768) 2008.
19. **Ahmed, A.A.**, Ashton-Miller, J.A., "On Use of a Nominal Internal Model to Detect a Loss of Balance in a Maximal Forward Reach," *Journal of Neurophysiology*, 97 (2439-24447) 2007.
20. **Ahmed, A. A.**, Ashton-Miller, J. A., "Effect of Age on Detecting a Loss of Balance in a Seated, Whole-Body Balancing Task," *Clinical Biomechanics*, 20 (767-775) 2005. (ASB 2003 Clinical Biomechanics Award Paper)

¹ TIME: <http://ideas.time.com/2013/08/20/dont-just-practice-over-practice/>

PBS: <http://www.pbs.org/wgbh/nova/blogs/secretlife/blogposts/the-science-of-smart-dont-just-learn-overlearn/>

Forbes: <http://www.forbes.com/sites/daviddisalvo/2012/02/13/of-mind-and-muscle-how-top-performers-become-more-efficient-with-practice/>

21. **Ahmed, A.A.**, Ashton-Miller, J. A., “Is a Loss of Balance a Control Error Signal Anomaly? Evidence for Three-Sigma Failure Detection in Young Adults,” *Gait and Posture*, 19 (252-262) 2004.

FUNDING

Current

1. Principal Investigator: “Effort, reward and vigor in decision making and movement control,” National Institutes of Health, \$2,812,387; Start Date: 4/1/17; Duration: 5 years; Co-Is: Prof. Reza Shadmehr, Johns Hopkins University; Dr. Zoltan Mari, Johns Hopkins University.
2. Principal Investigator: “CAREER: The Neuroeconomics of Metabolic Cost in Movement Decision Making,” National Science Foundation, Directorate for Social, Behavioral, and Economic Sciences (SBE), Division of Social and Economic Sciences (SES), Decision, Risk and Management Sciences (DRMS) Program, \$562,748; Start Date: 6/1/14; Duration: 5 years.

Completed

3. Principal Investigator: “Risk, variability and decision making in whole-body movements,” National Science Foundation, Directorate for Engineering (ENG), Division of Civil, Mechanical & Manufacturing Innovation (CMMI), Dynamical Systems Program (DS), \$384,568; Co-PI: Dr. Max Berniker, Start Date: 9/1/12; Duration: 3 years.
4. Principal Investigator: “Neuroeconomics and risk-sensitivity in movement adaptation,” National Science Foundation, Directorate for Social, Behavioral, and Economic Sciences (SBE), Division of Behavioral and Cognitive Sciences (BCS), Perception, Action and Cognition (PAC) Program, \$406,650; Date: 9/1/12; Duration: 3 years.
5. Principal Investigator: “Influence of threat on decision making under risk: a neuroeconomic approach to movement control,” DARPA Young Faculty Award, \$295,404, Start Date: 7/1/12; Duration: 2 years.
6. Co-Investigator: Conference Grant to organize the 2013 Regional Rocky Mountain American Society of Biomechanics Conference, American Society of Biomechanics, \$2000.
7. Co-Investigator: “Teaching Biomechanics with Screencasts” ASSETT Development Award: University of Colorado. Start Date 6/2012; PI: Rodger Kram. Duration: 1 year. Funds: \$1227.
8. Principal Investigator: “Learning about Biomechanics using the Nintendo Wii.” ASSETT Development Award: University of Colorado. Start Date 6/2011; Duration: 1 year. Funds: \$3955.
9. University of Colorado Council on Research and Creative Work: Junior Faculty Development Award, \$5,000, Coactivation and the control of movement in older adults. PI: Alaa Ahmed, status: funded 7/09 - 7/10.
10. Whitaker Foundation International Scholar Grant, Modular Decomposition in Human Sensorimotor Learning and Control. Scholar: Alaa A. Ahmed, Sponsor: Daniel M. Wolpert, University of Cambridge, UK, status: funded 9/06 - 12/07.
11. NIH Institutional Postdoctoral Training Fellowship (T32), Mechanisms of Human Muscle Adaptation to Lengthening Contraction Training. Trainee: Alaa A. Ahmed, Mentor: James A. Ashton-Miller, Medical School, U-M, status: funded- 5/05 - 5/07.
12. NIH Institutional Predoctoral Training Fellowship (T32), A Theory for Identifying Loss of Balance: Control Error and Compensatory Responses in Healthy Adults. Trainee: Alaa A. Ahmed, Mentor: James A. Ashton-Miller, Institute of Gerontology, U-M, status: funded- 4/01 - 4/04.

TEACHING CONTRIBUTIONS**University Courses:**University of Colorado, Boulder, CO

Spring 2017	<u>Course Instructor</u> , Biomechanics (IPHY 4540, 34 students)
Fall 2016	<u>Invited Lecture</u> , Physiology of Aging (IPHY 6010) Topic: <i>The Aging Motor System</i>
Fall 2015	<u>Course Instructor</u> , MATLAB for Physiology (IPHY 6680, 14 students)
Fall 2015	<u>Invited Lecture</u> , Intro to STEM Research Methods (ARSC 1450, 11 students) Topic: <i>The Motor System</i>
Spring 2015	<u>Invited Lecture</u> , Intro to STEM Research Methods (ARSC 1450, 11 students) Topic: <i>The Motor System</i>
Spring 2015	<u>Course Instructor</u> , Biomechanics (IPHY 4540, 73 students)
Fall 2014	<u>Invited Lecture</u> , Physiology of Aging (IPHY 6010) Topic: <i>The Aging Motor System</i>
Spring 2014	<u>Course Instructor</u> , Biomechanics (IPHY 4540, 75 students)
Fall 2013	<u>Course Instructor</u> , MATLAB for Physiology (IPHY 6680, 12 students) <u>Invited Lecture</u> , Professional Skills (IPHY 4540) Topic: <i>Work-Life Balance</i>
Spring 2013	<u>Course Instructor</u> , Biomechanics (IPHY 4540, 59 students)
Spring 2012	<u>Course Instructor</u> , Biomechanics (IPHY 4540, 62 students) <u>Course Instructor</u> , MATLAB for Physiology (IPHY 6680, 20 students)
Fall 2011	<u>Invited Lectures (2)</u> , Professional Skills (IPHY 4540) Topics: <i>Setting up a research lab, Women in science</i>
Spring 2011	<u>Course Instructor</u> , Biomechanics (IPHY 4540, 42 students)
Fall 2010	<u>Invited Lecture</u> , Physiology of Aging (IPHY 6010) Topic: <i>The Aging Motor System</i>
Spring 2010	<u>Course Instructor</u> , Biomechanics (IPHY 4540, 58 students)
Fall 2009	<u>Course Instructor</u> , MATLAB for Physiology (IPHY 6680, 9 students)

Spring 2009 Course Instructor, Biomechanics (IPHY 4540, 36 students)

University of Cambridge, Cambridge, U.K.

Fall 2006 Supervisor, Engineering Structures, Michaelmas Term
Robinson College, University of Cambridge, Cambridge, U.K.

Summer School Courses:

August 2017 Lecturer, Motor Control & Learning (40 Students)
7th Summer School Computational Sensory-Motor Neuroscience (CoSMo 2017)
University of Minnesota, Minneapolis, MN, U.S.A.

August 2016 Lecturer, Motor Control & Learning (40 Students)
6th Summer School Computational Sensory-Motor Neuroscience (CoSMo 2016)
University of Minnesota, Minneapolis, MN, U.S.A.

August 2014 Lecturer, Motor Control & Learning (40 Students)
4th Summer School Computational Sensory-Motor Neuroscience (CoSMo 2014)
University of Minnesota, Minneapolis, MN, U.S.A.

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

American Association for the Advancement of Science
American Physiological Society
American Society of Biomechanics
Society for the Neural Control of Movement (Board Member)
Society for Neuroeconomics
Society for Neuroscience