

Adam G. Hendricks

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Department of Bioengineering
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EDUCATION

Ph.D., Mechanical Engineering, May 2008

“Collective dynamics of kinesin-1”

Advisors: Bogdan I. Epureanu and Edgar Meyhöfer

University of Michigan, Ann Arbor, MI

M.S., Mechanical Engineering, December 2003

“Determination of Flame Dynamics for Unsteady Combustion Systems using Tunable Diode Laser Absorption Spectroscopy”

Advisor: Uri Vandsburger

Virginia Polytechnic Institute and State University, Blacksburg, VA

B.S., Mechanical Engineering, May 2002

Summa Cum Laude and in honors

Virginia Polytechnic Institute and State University, Blacksburg, VA

PROFESSIONAL POSITIONS

Assistant Professor. Department of Bioengineering, McGill University, Montreal, QC, 2014-present.

Postdoctoral Researcher. Pennsylvania Muscle Institute and Department of Physiology, University of Pennsylvania, Philadelphia, PA, 2008-2013.

Graduate Research Assistant. Mechanical Engineering, University of Michigan, Ann Arbor, MI, 2004-2008.

Graduate Research Assistant. Mechanical Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA, 2002-2003.

Undergraduate Researcher. Mechanical Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA, 1999-2002.

HONORS AND AWARDS

Ruth L. Kirchstein National Research Service Award postdoctoral fellowship, National Institutes of Health (2010-2012)

Ivor K. McIvor award in recognition of outstanding scholastic and research performance in Applied Mechanics (2008)

National Science Foundation Graduate Research Fellowship (2004-2007)

Advanced Gas Turbine Systems Research (DOE) Internship Fellowship (2001)

Virginia Space Grant Consortium (NASA) Scholarship for undergraduate research (2000)

JOURNAL
PUBLICATIONS

E Perlson*, **A G Hendricks***, J E Lazarus, K Ben-Yaakov, T Gradus, M Tokito, E L F Holzbaur, “Dynein interacts with the Neural Cell Adhesion Molecule NCAM180 to tether dynamic microtubules and maintain synaptic density in cortical neurons” *Journal of Biological Chemistry* 288 (2013).

A G Hendricks, E L F Holzbaur, Y E Goldman, “Force measurements in living cells reveal collective dynamics of microtubule motors” *Proceedings of the National Academy of Sciences* 109 (2012) 18447-18452. *Highlighted in Science, Editor’s Choice, March 6, 2013.*

H W Schroeder III, **A G Hendricks**, K Ikeda, H Shuman, V Rodionov, M Ikebe, Y E Goldman*, E L F Holzbaur*, “Force-dependent detachment of kinesin-2 biases track switching at cytoskeletal intersections” *Biophysical Journal* 103 (2012) 48-58.

A G Hendricks*, J E Lazarus*, E Perlson, M K Gardner, D J Odde, Y E Goldman, E L F Holzbaur, “Dynein tethers and stabilizes dynamic microtubule plus-ends” *Current Biology* 22 (2012) 632-637. *“Recommended” by Faculty of 1000.*

A G Hendricks*, E Perlson*, J L Ross*, H W Schroeder III, M Tokito, E L F Holzbaur, “Motor coordination via tug-of-war mechanism drives bidirectional vesicle transport” *Current Biology* 20 (2010) 697-702. *Featured in a Dispatch by R S Rock, Rated “Must Read” in Faculty of 1000.*

A G Hendricks, B I Epureanu, E Meyhöfer, “Collective dynamics of kinesin-1” *Physical Review E* 79 (2009) 031929.

A G Hendricks, B I Epureanu, E Meyhöfer, “Cooperativity of multiple kinesin-1 motors mechanically coupled through a shared load” *Physica D* 238 (2009) 677-686.

A G Hendricks, B I Epureanu, E Meyhöfer, “Mechanistic mathematical model of kinesin under time and space fluctuating loads” *Nonlinear Dynamics* 54 (September 2008) 303-320.

A G Hendricks, U Vandsburger, “The Effect of Fuel Composition on Flame Dynamics” *Experimental Thermal and Fluid Science* 32 (October 2007) 126-132.

A G Hendricks, U Vandsburger, W R Saunders, W T Baumann, “The use of tunable diode laser absorption spectroscopy for the measurement of flame dynamics” *Measurement Science and Technology* 17 No 1 (January 2006) 139-144 *Featured Article.*

*these authors contributed equally to this work.

INVITED
ARTICLES

A G Hendricks, Y E Goldman, E L F Holzbaur, “Reconstituting the motility of isolated intracellular cargoes” *Methods in Enzymology* 540 (2014) 249-262. (in press).

A G Hendricks, A E Twelvetrees, E L F Holzbaur, “Intracellular transport: New tools provide insights into transport by multiple motors” *Current Biology* 22 (2012) R1053-R1055.

A Twelvetrees, **A G Hendricks**, E L F Holzbaur, “Snapshot: axonal transport” *Cell* 149 (2012) 950.

A G Hendricks, J E Lazarus, E L F Holzbaur, “Dynein at odd angles?” *Nature Cell Biology* 12 (2010) 1126-1128.

REFEREED
CONFERENCE
PROCEEDINGS

A G Hendricks, B I Epureanu, E Meyhöfer, “Collective dynamics of kinesin-1 motor proteins transporting a common load” ASME 2007 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Las Vegas, NV, USA, September 2007.

A G Hendricks, B I Epureanu, E Meyhöfer, “Synchronization of motor proteins coupled through a shared load” ASME 2006 International Mechanical Engineering Congress and Exposition, Chicago, IL, USA, November 2006, IMECE2006-15752.

A G Hendricks, U Vandsburger, W R Saunders, K Subramanian, “Experimentally-derived, reduced-order models of flame dynamics” American Flame Research Committee International Symposium, Livermore, CA, USA, October 2003.

V K Khanna, U Vandsburger, W R Saunders, W T Baumann, **A G Hendricks**, “Dynamic analysis of burner stabilized flames, part 1: laminar premixed flame” American Flame Research Committee International Symposium, Newport Beach, CA, USA, September 2000.

INVITED
TALKS

McGill University, Department of Biomedical Engineering, “Coordination of microtubule motor ensembles in intracellular transport” Montreal, QC, February 2014.

McGill University, Department of Biology, “Coordination of microtubule motor ensembles in intracellular transport” Montreal, QC, January 2014.

McGill University, Bioengineering Workshop, “Kinesin and dynein collective dynamics in the complex cellular environment” Montreal, QC, April 2013.

McGill University, Department of Bioengineering, “Collective dynamics of kinesin and dynein in intracellular transport” Montreal, QC, March 2013.

Pennsylvania State University, Department of Bioengineering, “Collective function of kinesin and dynein in the bidirectional transport of intracellular cargoes” March 2013.

Gordon Research Conference: Muscle and Motors, “Dynein as a motor and tether in axonal transport and synaptic stabilization” Colby-Sawyer College, New London, NH, July 2011.

University of Vermont, Department of Molecular Physiology and Biophysics, “Dynein as a motor and tether in axonal transport and synaptic stabilization” Burlington, VT, June 2011.

University of Pennsylvania, Annual Dept. of Physiology Retreat, “Dual functions of dynein in the neuron” Philadelphia, PA, May 2011.

University of Pennsylvania, Institute for Medicine and Engineering Chalk Talk, “Motor coordination via tug-of-war mechanism drives bidirectional vesicle transport” Philadelphia, PA, September 2009.

CONFERENCE
PRESENTATIONS

Alpbach Workshop on Motors, Myosin, and Muscle, “Collective function of kinesin and dynein in the bidirectional transport of intracellular cargoes” Alpbach, Austria, March 2013.

Biophysical Society Meeting, “Collective function of kinesin and dynein in the bidirectional transport of intracellular cargoes” Philadelphia, PA, USA, February 2013 (platform presentation and session co-chair).

Biophysical Society Meeting, “Forces in intracellular transport: calibrated optical trap recordings in living cells” San Diego, CA, USA, February 2012 (platform presentation and session co-chair).

Biophysical Society Meeting, “Dual functions of dynein in the neuron” Baltimore, MD, March 2011 (minisymposium).

American Society for Cell Biology Meeting, “Dual functions of dynein in the neuron” Philadelphia, PA, December 2010 (subgroup talk).

Biophysical Society Meeting, “The effect of randomness on the collective behavior of kinesin-1” Long Beach, CA, February 2008 (platform presentation and session co-chair).

Biophysical Society Meeting, “Mechanistic mathematical model of kinesin under time and space fluctuating loads” Baltimore, MD, March 2007 (platform presentation).

Center for Turbomachinery and Propulsion Research, Virginia Tech, “The use of tunable diode laser absorption spectroscopy for the measurement of flame dynamics” Blacksburg, Virginia, 2003.

POSTER
PRESENTATIONS

A G Hendricks*, E Perlson*, J L Ross*, H W Schroeder III, M Tokito, E L F Holzbour, “Motor coordination via tug-of-war mechanism drives bidirectional vesicle transport” American Society for Cell Biology Meeting, Philadelphia, PA, December 2010.

A G Hendricks*, E Perlson*, J L Ross*, H W Schroeder III, M Tokito, E L F Holzbour, “Motor coordination via tug-of-war mechanism drives bidirectional vesicle transport” Mathematical Biosciences Institute workshop: Transport in a cell, Columbus, OH, April 2010.

A G Hendricks*, E Perlson*, J L Ross*, H W Schroeder III, M Tokito, E L F Holzbour, “Motor coordination via tug-of-war mechanism drives bidirectional vesicle transport” Biophysical Society Meeting, San Francisco, CA, February 2010.

J L Ross, **A G Hendricks**, E Perlson, H W Schroeder III, E L Holzbour, “Motor coordination via tug-of-war mechanism drives bidirectional vesicle transport” American Society for Cell Biology Meeting, San Diego, CA, December 2009.

A G Hendricks, B I Epureanu, E Meyhöfer, “The effect of loads on the collective behavior of neurospora kinesin” Biophysical Society Meeting, Boston, MA, March 2009.

A G Hendricks, B I Epureanu, E Meyhöfer, “Mechanistic, mathematical models of motor proteins with time-varying loads” Single Molecule Symposium, Ann Arbor, Michigan, May 2006.

A G Hendricks, B I Epureanu, E Meyhöfer, “Mechanistic, mathematical models of motor proteins with time-varying loads” Midwest Biomedical Engineering Conference, Ann Arbor, Michigan, March 2006.

A G Hendricks, B I Epureanu, E Meyhöfer, “Mechanistic models of motor proteins based on first-passage time” Biophysical Society Meeting, Salt Lake City, Utah, February 2006.

A G Hendricks, B I Epureanu, E Meyhöfer, “Mechanistic models of motor proteins based on first-passage time” Gordon Research Conference on Nonlinear Dynamics, Colby, Maine, August 2005.

A G Hendricks, U Vandsburger, W R Saunders, W T Baumann, “Flame dynamics of a forced conical flame” Virginia Space Grant Consortium (NASA) Conference, Langley, Virginia, 2002.

TEACHING
EXPERIENCE

- Graduate student instructor for ME 360 (Modeling, Analysis, and Control of Dynamic Systems) where I held office hours and led problem sessions and recitations for two sections consisting of ≈ 150 students. (2 semesters, 2007-2008)
- Taught several lectures (100+ students) for ME 240, undergraduate dynamics (2006-2007)
- Served as a mentor for:
 - Michael Woody, rotation student in the Goldman lab, “Force-dependent dissociation kinetics of kinesin motors” (2013)
 - Gregory Osborn, rotation student in the Holzbaur lab, “Dynein-dynactin localizes to dynamic microtubule plus ends” (2012)
 - Bryan Marques, rotation student in the Goldman lab, “Cargoes driven by kinesin-1 and myosin-V at microtubule-actin intersections” (2012)
 - Michael Howland, high school student in the Holzbaur lab, “Principle component analysis of 3D nuclear rotation and translocation in developing muscle cells” (2011)
 - Swathi Ayloo, rotation student in the Holzbaur lab, “The use of kinesin dominant negative constructs to examine bidirectional vesicle transport” (2011)
 - Katherine Gribble, rotation student in the Holzbaur lab, “The role of dynein and NCAM in synaptic stabilization” (2011)
 - Eric Rosenberg, master’s student in the Goldman lab, “A study of kinesin cargo transfer on a multi-dimensional suspension of cytoskeletal tubulin” (2009)
 - Arjun Krishnan, master’s student in the Epureanu lab, “Probabilistic models of motor proteins” (2007-2008)
 - with Dr. Bodgan Epureanu a team of 5 undergraduates in their senior project “A reconfigurable frame for structural health monitoring measurements” (2004)
 - Karthik Subramanian, undergraduate researcher in the Vandsburger lab, “The response of a laminar flat flame to equivalence ratio oscillations” (2002-2003)

SERVICE
ACTIVITIES

- Member of Biophysical Society, American Society for Cell Biology, American Society of Mechanical Engineers
- Reviewer for Nonlinear Dynamics, Cellular and Molecular Bioengineering, Biophysical Journal, Journal of Cell Biology, and Proceedings of the National Academy of Sciences