

Amos G. Winter, V
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Department of Mechanical Engineering
Massachusetts Institute of Technology

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RESEARCH INTERESTS

Design for emerging markets and developing countries; international development; reverse innovation and cross-cultural technology transfer; fluid, solid, granular mechanics; biomechanics; mechanical, precision machine design; medical device design; water purification and desalination; irrigation; agricultural equipment

EDUCATION

Massachusetts Institute of Technology

Ph.D. in Mechanical Engineering

Cambridge, MA

2011

S.M. in Mechanical Engineering

2005

Tufts University

B.S. in Mechanical Engineering, *Magna Cum Laude*

Medford, MA

2003

EXPERIENCE

MIT Department of Mechanical Engineering

Ratan N. Tata Career Development Associate Professor

Cambridge, MA

July 2017 - Present

Ratan N. Tata Career Development Assistant Professor

July 2012-June 2017

Director, Global Engineering and Research (GEAR) Lab

July 2012-Present

Global Research Innovation and Technology (GRIT)

Co-Founder and Chief Scientific Advisor

Cambridge, MA

Sept. 2011-Present

Battelle Memorial Institute

Contractor – RoboClam Project and Various Bluefin Robotics Projects

Cambridge, MA

Sept. 2011-June 2012

MIT – Singapore University of Technology and Design (SUTD) International Design Center

Post-Doctoral Associate – Leveraged Freedom Chair Project, Supervisor: Prof. Daniel Frey

Cambridge/Singapore

Sept. 2010-June 2012

Indian Institute of Technology Delhi

Visiting Researcher – Leveraged Freedom Chair Project, Supervisor: Prof. Sudipto Mukherjee

New Delhi, India

Sept. 2010-June 2011

MIT Mobility Lab (M-Lab)

Founder and Director, Project lead – Leveraged Freedom Chair

Cambridge, MA

Dec. 2007-June 2012

SELECTED CONSULTING

Sime Darby

Oct. 2016-Present

Usha International Ltd.

Nov. 2013-2016

Okuma Fishing

Oct. 2013-Apr. 2014

SELECTED AWARDS

The 2016 - 2017 MIT Harold E. Edgerton Faculty Achievement Award

2017

The 2017 National Science Foundation Faculty Early Career Development (CAREER) Award

2017

The 2017 MIT School of Engineering Junior Bose Award for Excellence in Teaching

2017

Named one of the 2016 Boston Globe Game Changers

2016

McKinsey Award, for the best article in Harvard Business Review in the past year

2016

USAID Desal Prize, First Place

2015

Rockefeller Foundation \$100k Innovation Challenge Winner

2012

Mass Challenge Startup Comp., \$100k Diamond Prize Winner, to Global Research Innovation and Tech.

2012

Fast Company Magazine Innovation by Design Award, Concept Category, for Leveraged Freedom Chair

2012

Robert N. Noyce Career Development Chair

2012

Amos G. Winter V

SELECTED AWARDS, *continued*

Wall Street Journal Big Innovations of 2011 (one of seven) for the Leveraged Freedom Chair	2011
R&D 100 Award for the Leveraged Freedom Chair, given by R&D Magazine for the 100 most technologically significant products of the year	2010
R&D 100 Editors' Choice Award for the Leveraged Freedom Chair, given to the three favorite R&D 100 award winners by the magazine's editors	2010

PATENTS

1. A.G. Winter, V. "Turbocharged Single Cylinder Internal Combustion Engine Using an Air Capacitor", US Patent No. 9222405 B2, issued Dec. 29, 2015.
2. Winter V, A.G., et al. "Wheelchair with Lever Drivetrain." U.S. Patent No. 8844959 B2, issued Sept. 30, 2014.
3. Winter V, A.G., A.E. Hosoi, A.H. Slocum. "Method and Apparatus for Penetrating Particulate Substrates." Patent no. 8496410 B2, issued Jul. 30, 2013.

SELECTED PUBLICATIONS - *Peer-Reviewed Journal Articles & Conference Papers*

1. Shah, S.R., Wright, N.C., Nepsky, P., Winter V, A.G. "**Optimal Design of a Batch Electrodialysis System for Domestic Desalination.**" *International Desalination Association, World Congress on Water Reuse and Desalination*, São Paulo. IDA17WC-58064. Oct 15-20, 2017. **Awarded Best Oral and Written Paper Presented in the Technical Program in the Category of State-of-the-Art.**
2. Wright, N.C., Winter V, A.G. "**Model and Experimental Validation of a Spiral-Wound Electrodialysis Module.**" *International Desalination Association, World Congress on Water Reuse and Desalination*, São Paulo. IDA17WC-57872. Oct 15-20, 2017.
3. Olesnavage, K.M., Winter V, A.G. "**A Novel Framework for Quantitatively Connecting the Mechanical Design of Passive Prosthetic Feet to Lower Leg Trajectory.**" (In Review)
4. Olesnavage, K.M., Prost, V., Johnson, W.B., Major, M.J., Winter V, A.G. "**Clinical Validation of Predicting Lower Leg Trajectory for Passive Prosthetic Feet Using Physiological Data as Inputs.**" (In Review)
5. Shah, S. R., Wright, N. C., Nepsky, P., Winter V, A.G. "**Cost-Optimal Design of a Batch Electrodialysis System for Domestic Desalination of Brackish Groundwater.**" (In Review)
6. Bian, D.W., Watson, S.M., Wright, N.C., Shah, S. R., Buonassisi, T., Ramanujan, D., Peters, I.M., Winter V, A.G. "**Optimization and Design of a Low-Cost, Village-Scale, Photovoltaic-Powered, Electrodialysis Reversal Desalination System for Rural India.**" (In Review)
7. Wright, N. C., Shah, S. R., Amrose, S.E., Winter V, A.G. "**A Robust Model of Brackish Water Electrodialysis Desalination with Experimental Comparison at Different Size Scales.**" *Desalination*. (Accepted)
8. Olesnavage, K.M., Prost, V., Johnson, W.B., Winter V, A.G. "**Passive Prosthetic Foot Shape and Size Optimization Using Lower Leg Trajectory Error.**" *ASME Journal of Mechanical Design*. (Accepted)
9. Watson, S., Bian, D., Sahraci, N., Winter V, A.G., Buonassisi, T., Peters, I.M. "**Advantages of Operation Flexibility and Load Sizing for PV-Powered System Design.**" *Solar Energy*. (Accepted)
10. Prost, V., Olesnavage, K.M., Johnson, W.B., Major, M.J., Winter V, A.G. "**Design and Testing of a Prosthetic Foot with Interchangeable Custom Rotational Springs for Evaluating Lower Leg Trajectory Error, an Optimization Framework for Prosthetic Feet.**" *ASME Journal of Mechanisms and Robotics*. (In Press)
11. Shamsbery, P., Winter V, A.G. "**Shape and Form Optimization of On-Line Pressure-Compensating Drip Emitters to Achieve Lower Activation Pressure.**" *ASME Journal of Mechanical Design*, March 2018, Vol. 140 / 035001-1.
12. Shamsbery, P., Wang, R.Q., Tran, D.V., Winter V, A.G. "**Modeling the Future of Irrigation: A Parametric Description of Pressure Compensating Drip Irrigation Emitter Performance.**" *PLOS ONE* 12(4): e0175241.
13. Arelekatti, V.N.M., Winter V, A.G. "**Design and Preliminary Field Validation of a Fully Passive Prosthetic Knee Mechanism for Users with Transfemoral Amputation in India.**" *ASME Journal of Mechanisms and Robotics*. (In Press)
14. Nayar, K.G., Sundararaman, P., O'Connor, C.L., Schacherl, J.D., Heath, M.L., Gabriel, M.O., Shah, S.R., Wright, N.C., Winter V, A.G. "**Feasibility Study of an Electrodialysis System for In-Home Water Desalination in Urban India.**" *Development Engineering*, Volume 2, 2017, Pages 38-46, ISSN 2352-7285.
15. Narang Y.S., Arelekatti V.N.M., Winter V, A.G. "**The Effects of the Inertial Properties of Above-Knee Prostheses on Optimal Stiffness, Damping, and Engagement Parameters of Passive Prosthetic Knees.**" *ASME Journal of Biomechanical Engineering*. 2016; 138(12):121002-121002-10.
16. Narang, Y.S., Arelekatti, V.N.M., Winter V, A.G. "**The Effects of Prosthesis Inertial Properties on Prosthetic Knee Moment and Hip Energetics Required to Achieve Able-bodied Kinematics.**" *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 24, no. 7, pp. 754-763.
17. Winter V, A.G., Govindarajan, V. "**Engineering Reverse Innovations: How to Create Global Products Out of Emerging-Market Constraints.**" *Harvard Business Review*, July-August 2015. **Winner of the McKinsey Award - Best Article in HBR, 2015.**
18. Wright, N.C., Winter V, A.G. "**Justification for Community-Scale Photovoltaic-Powered Electrodialysis Desalination Systems for Inland Rural Villages in India.**" *Desalination*, 352, 82-91. 2014.

SELECTED ORGANIZATION MEMBERSHIP

Pi Tau Sigma International Mechanical Engineering Honor Society	2012-Present
American Physical Society	2009-Present
American Society of Mechanical Engineers	2004-Present
Tau Beta Pi Engineering Honor Society	2003-Present