Bradley Edward Layton, MS PhD PE

8 Columbine Rd, Missoula MT, 59802

406.203.2365 (m) / blay@alum.mit.edu

EDUCATION/LICENSURE

Professional Engineer – *Breadths:* **HVAC & Thermal Fluids** *Depth:* **Structures and Materials**

Biomedical Engineering, PhD **University of Michigan, Ann Arbor, MI** **2003**

Concentrations: soft-tissue modeling and experimental mechanics • neuromechanics • atomic force microscopy • diabetic neuropathy • neuroanatomy • molecular mechanics • stochastic failure analysis • endoneurial fluid pressure measurement • non-linear viscoelastic finite element analysis • mitochondrial imaging

Mechanical Engineering, MS **University of Michigan, Ann Arbor, MI** **1999**

Concentrations: finite element modeling • quantitative physiology • dynamics • vibrations • materials • biomedical instrumentation • exoskeleton design

Mechanical Engineering, SB **Massachusetts Institute of Technology, Cambridge, MA** **1992**

Concentrations: fluid mechanics • mechanical design • statics • materials testing • Writing Minor

PROFESSIONAL EXPERIENCE AND CREDENTIALS

University of Montana, Missoula MT **2010 – pres**

Associate Professor – Applied Computing and Engineering Technology Department

Director – Energy Technology Program, Missoula College

Affiliated Professor – Biochemistry and Biophysics, Climate Change, Environmental Studies

Courses: Introduction to Energy Systems I & II • Energy Practicum • Fuel Cells • Power Systems Technology • Building Energy Efficiency • Solar Thermal and Wind Systems • Energy Finance • Solar Car Design • ASME Human-Powered Vehicle Design • Energy Internship • Electrician Helper

Human Powered Future, PLLC **2010 – pres**

Founder and President

Specialties: Sustainable energy consulting • biomedical engineering consulting • biomechanical engineering consulting • soft tissue injury • structural engineering expert witness • biomedical engineering expert witness

Drexel University, Philadelphia PA **2003 – 2010**

Associate Teaching Professor – Mechanical Engineering and Mechanics

Affiliated Professor – Department of Neurobiology and Anatomy

Assistant Professor – Mechanical Engineering and Mechanics

Affiliated Professor – School of Biomedical Engineering, Science and Health Systems

Courses: Introduction to Engineering Design • Materials Science • Advanced Engineering Mathematics I, II & III • Mechanical Engineering Senior Design • Dynamics • Mechanoevolution

The University of Michigan, Ann Arbor MI **1997 – 2003**

Postdoctoral Fellow - Radiology Department and Neuroscience Department 2003

Graduate Student Research Assistant (1997 –2003) - Mechanical Engineering | Biomedical Engineering

Georgia Business Net – Augusta, GA – *Technical Assistant: TCP/IP, troubleshooting* **1997**

Stillwater Design – Cambridge, MA – *Construction and Design Assistant: wakeless boat building* **1997**

Associated Design – Alexandria, VA – *Junior Engineer: Environmental, thermal mechanical design* **1996**

Gasser Associates – Aiken, SC – *Fire Protection Engineer: Savanna River Site DOE L, NFPA* **1994 – 1996**

Photon Research Associates – Arlington, VA – *Assistant System Administrator, UNIX, DOD L* **1993 – 1994**

US DOE Office of Space – Washington, DC – *Jr Scientist: energy systems, lunar dust mechanics* **1992**

Merlin Metalworks – Somerville, MA – *Machinist: titanium bicycle design and machining* **1990**

AWARDS/FUNDING

Awards

Energy Innovator Award for contributions to Montana's clean energy sector **2015**
John Ruffatto Memorial Award for imparting practical principles in the classroom, UMontana **2014**
Robert M. Caddell Award for research contributions in materials manufacturing, UMichigan **2001**

Recently Funded Major Projects

"Energy Technology Education in Efficiency To Engender Energy Independence" 8/1/2014 - 7/31/2017. National Science Foundation. Role: PI. Co-PIs: Nicky Phear, Cheryl Madman. Funding: **$727,912**

"Montana TAACCCT SWAMMEI Consortium Grant" 2013-2017. US Dept of Labor. $25M. Role: Energy Technology Curriculum Developer. Lead Institution: Great Falls Community College. UMontana budget: **$1.3M**

Other Funded Major Projects 2003-2010

Three NSF grants in nanobiological mechanics **$958,000**
Keck Foundation grant in nanofluidics **$5M**
USDA grant in nanobiological research **$100,000**
PA Dept of Health grant for nanotechnology neuroscience research **$364,544**
NetScientific grant for wind turbine research and design **$45,000**
Coulter Foundation grant for biodegradable surgical staple design **$95,000**
NASA grant for space-based red blood cell sorter development **$60,000**

Other Recently Funded Projects

Perkins Foundation: *"Special Topics Course: Shell Eco-Marathon"* 2013 **$5,500**
Kless Revolving Energy Loan Fund: *"Solar Car for Shell EcoMarathon"* 2012 **$1,730**
The University of Montana *"Faculty Development Travel Grant for IEEE and ASME"* 2011 **$1,500**
UMontana Research and Creativity Committee *"Human Powered Future ASME Grant"* 2011 **$5,000**
Perkins Foundation *"Energy Auditing Technologies"* 2011 **$2,500**

PATENTS AWARDED, SUBMITTED and PROVISIONAL PATENTS

"An Integrated Atomic Force Microscopy Nanomanipulation Platform" Bradley Layton and Gregory Buzby Issued January 19, 2010. Patent number 7,647,848.
"Electromechanical Roadway Energy Scavenging Device" (pending) Smith, Layton and Brown Submitted February 16, 2013.
"A Surgical Stapler" Ari Brooks, Margaret Wheatley, Bradley Layton (pending)
"A Surgical Staple, with Elution Drug," Ari Brooks, Margaret Wheatley, Bradley Layton (pending)
"Vertical Axis Wind Turbine" Bradley Layton and Nicholas Haas, (submitted 2009)
"A Pontoon Rowing Boat" Bradley Layton (provisional patent, submitted November 29, 2005)

RECENT PUBLICATIONS last 3 years

Books

Layton, B.E. et al. "Cell and Protein Mechanics" B.E. Layton, Editor. Pan Stanford Publishing: ISBN: 978-981-4316-83-5 (Hardcover); 978-981-4613-44-6 (eBook)
Layton, B.E. "Mechanoevolution" Bentham Science Publishers (invited, in preparation)
Layton, B.E. "Landfill Free in Missoula Montana: A Personal Account and How-to Guide on Rethinking Waste in the Last Best Place" (in preparation)

Book chapters

Layton, B.E. 2012. "The Role of MechanoEvolution in Predicting Future Technologies" in Systems Engineering for Micro and Nano Scale Technologies. Jonathan W. Plant, Janet L. Barth, M. Ann Garrison Darrin, Eds. Taylor & Francis / CRC Press Johns Hopkins Applied Physics Laboratory, Editor (invited)
Layton, B.E. and M. Brent Boyd. 2011. "Atomic Force Microscopy of Isolated Mitochondria" In: Atomic Force Microscopy: Methods and Protocols in Biomedical Applications, 736 pp. 133-151. P.C. Braga and D. Ricci, Eds. (invited) PMID: 21660726.

Recent Conference papers and abstracts published (5 of 75 total)

Layton, B.E. "Anthropogenic entropy acceleration and its relationship to Shannon information in the context of socioeconomics" Energy and Sustainability 2014, 16 – 18 December, Putrajaya, Malaysia

Layton, B.E. "Mechanoevolution: An Examination of the Coevolution of Humans and Technology" Inaugural meeting of the International Big History Association, August 5, 2012, Grand Rapids, MI

Marks, F.M., Layton, B.E., Lowman, A.M. 2012 "AFM Force Mapping Method for Quantifying Adhesion Energy of Poly Methacrylic Acid pH-sensitive Hydrogels In Vitro" 34th Annual IEEE-EMBS Annual Conference, San Diego, CA Aug 28 - Sep 1.

Layton, Bradley "Energy Technology Program at the University of Montana College of Technology" UM + MCPS: Transforming Public Education through Collaboration and Innovation May 9, 2012

Layton, Bradley, "The Application of Game Theory to Thermoeconomics IMECE2011-62681" ASME International Congress and Exposition, November 11 – 17, 2011, Denver, Colorado.

CONSULTING

Mechanical engineering and permitting for off-grid webcam for kayak recreation area

Mechanical engineering consulting with NIST for CFL and power conditioner

Mechanical engineering consulting for sustainable forestry bioenergy extraction and low-emissions heat

Structural engineering for solar photovoltaic, solar thermal, and geothermal energy systems

Biomedical engineering consultation on viability of bone tissue engineering mechanical bioreactor

Biomedical engineering consultation for collagen-based tissue engineering construct

Mechanical engineering consultation for the design of an improved aircraft arresting system

DESIGN/CONSTRUCTION PROJECTS

Off-grid mobile wind turbine as part of Energy Practicum

Lighter-than-air wind turbine as part of Energy Practicum

Solar cars for Shell EcoMarathon

Human-powered vehicles for ASME Human Powered Vehicle Competition

Nanomanipulation device to be used in atomic force microscope

Microfabricated device for measuring red blood cell mean volume

Educational atomic force microscope for use in high school classrooms

Surgical stapler and staple for anastomoses

PROFESSIONAL MEMBERSHIPS

American Society of Engineering Education

American Society of Mechanical Engineers

National Society of Professional Engineers

Biomedical Engineering Society

IEEE-EMBS Society (Editor)

Order of the Engineer

World Society of Sustainable Energy Technologies

ATHLETIC ACCOMPLISHMENTS

United States Rowing Team *Single Sculler and Quadruple Sculls Rower* **1993 – 1997**

Queen Mother Cup Champion 1995 & 1997

Qualifier for 1996 Olympic Games in Atlanta for the men's 4x