

# TYLER WORTMAN

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## EDUCATION

**Massachusetts Institute of Technology**, Fall 2012 – Present  
Doctor of Philosophy, Mechanical Engineering, GPA: 4.80/5.00  
Expected graduation June 2015

**University of Nebraska – Lincoln**, Fall 2009 – Spring 2011  
Master of Science, Mechanical Engineering, GPA: 3.98/4.00  
Thesis: Design, Analysis, and Testing of In Vivo Surgical Robots

**University of Nebraska – Lincoln**, Fall 2004 – Spring 2009  
Bachelor of Science, Mechanical Engineering, GPA: 3.95/4.00

## EXPERIENCE

**Consultant, PillPack**, Cambridge, MA, 2013 – Present  
Designed and implemented sensor packages for medication adherence, performed sourcing and negotiation with contract manufacturers and material suppliers

**Consultant, ELL Operations**, Cambridge, MA, 2013 – Present  
Helped transform a proof of concept design into a full-scale manufactured product offering safer and more ergonomic delivery solutions for large distribution companies

**Precision Engineering Research Group, MIT**, Cambridge, MA 2012 – Present  
Pursuing PhD thesis under direction of Prof. Alexander Slocum with research focus on the development of multi-modal methods for identifying skin cancer

**Intern, Tech-Transfer, NUtech Ventures**, Lincoln, NE, Summer 2012  
Developed an algorithm to assist in the assessment of potential technologies for licensing

**Advanced Surgical Technologies Group, University of Nebraska**, Lincoln, NE, 2009-2012  
Performed kinematic and dynamic analysis of dexterous in vivo robots for minimally invasive surgery, designed and fabricated several next generation robots capable of complex surgical procedures, demonstrated effectiveness in live porcine models

**Intern, Mechanical Engineering, Honeybee Robotics**, Pasadena, CA, Summer 2011  
Performed analysis, design, and assembly of a custom rover to deploy a sample coring and caching system

**Intern, Research and Design, NASA Jet Propulsion Lab**, Pasadena, CA, Summer 2010  
Designed a rover-based sampling system for commercial open-pit mining operations

## AWARDS/ HONORS

**Graduate Research Fellowship Award**, National Science Foundation, 2011-2014

**Folsom Distinguished Master's Thesis**, University of Nebraska, 2013

**MIT Pappalardo Fellowship**, MIT Mechanical Engineering Dept., 2012

**Outstanding Graduate Research Assistant**, University of Nebraska, 2010

**Space Grant Award**, NASA, 2010 and 2011

**Superior Scholar Award**, University of Nebraska, 2009

**Brook Berringer Citizenship Team**, University of Nebraska, 2008 and 2009

**2<sup>nd</sup> Team Academic All-American**, ESPN-the-Magazine, 2008

**Football Letter Winner**, University of Nebraska, 2007 and 2008

**1<sup>st</sup> Team Academic All-Big 12**, Big 12 Conference, 2007 and 2008

**Commissioners Academic Honor Roll**, Big 12 Conference, 2004-2009

## PATENTS

**Robotic Surgical Devices, Systems, and Related Methods**, US13/546831, Assigned to UNL.  
**Stair Traversing Delivery Apparatus** - US61/801383, Assigned to ELL Operations

## PUBLICATIONS

**IEEE Transactions on Biomedical Engineering**, 2013, Vol. 60, No. 4.  
*Single-Site Colectomy with Miniature In Vivo Robotic Platform*

**Surgical Endoscopy**, 2012, Vol. 26, No. 3.  
*Miniature Surgical Robot for Laparoendoscopic Single-Incision Colectomy*

**Master of Science Thesis, UNL**, 2011.  
*Design, Analysis, and Testing of In Vivo Surgical Robots*

**Surgical Endoscopy**, 2011, Vol. 25, No. 10.  
*Miniature In Vivo Robot for Laparoendoscopic Single-Site Surgery*

**International Journal of Medical Robotics & Computer Assisted Surgery**, 2011, Vol. 7, No. 1.  
*Laparoendoscopic Single-Site Surgery Using a Multi-Functional Miniature In Vivo Robot*

**ASME Journal of Medical Devices**, 2011, Vol. 5, No. 2.  
*Kinematic and Workspace Comparison of Four and Five Degree of Freedom Miniature In Vivo Robots*

**Biomedical Sciences Instrumentation**, 2011, No. 47.  
*Stereoscopic Visualization and Haptic Technology Used to Create a Virtual Environment for Remote Surgery*

**Biomedical Sciences Instrumentation**, 2011, No. 47.  
*Miniature In Vivo Cameras for Use in Single-Incision Robotic Surgery*

## CONFERENCES/ PRESENTATIONS

**ASME International Design Engineering Technical Conference**, Washington, DC, Aug. 2011.  
*Multi-Functional Surgical Robot for Laparo-Endoscopic Single-Site Colectomies*

**International Academy of Astronautics 18<sup>th</sup> Humans in Space Symposium**, Houston, TX, Apr. 2011.  
*Multi-Functional Surgical Robot for Space Applications*

**10<sup>th</sup> Design of Medical Devices Conference**, Minneapolis, MN, Apr. 2011.  
*Kinematic and Workspace Comparison of Four and Five Degree of Freedom Miniature In Vivo Surgical Robots*

**48<sup>th</sup> Annual Rocky Mountain Bioengineering Symposium**, Denver, CO, Apr. 2011.  
*Stereoscopic Visualization and Haptic Technology Used to Create a Virtual Environment for Remote Surgery*

**48<sup>th</sup> Annual Rocky Mountain Bioengineering Symposium**, Denver, CO, Apr. 2011.  
*Miniature In Vivo Cameras for Use in Single-Incision Robotic Surgery*

**Society of American Gastrointestinal and Endoscopic Surgeons Annual Meeting**, San Antonio, TX, Apr. 2011.  
*Multi-Functional Robot for Laparoendoscopic Single-Site Colectomy*

**ASME Frontiers in Biomedical Devices**, Newport Beach, CA, Sept. 2010.  
*Workspace and Force Capabilities of a Miniature Multi-Functional Surgical Robot*

**Society of Laparoendoscopic Surgeons**, New York, NY, Sept. 2010.  
*Design of a Multi-Functional In Vivo Surgical Robot*

**Society of American Gastrointestinal and Endoscopic Surgeons**, Landover, MD, Apr. 2010.  
*Multi-Functional Robot for Laparoendoscopic Single-Site Surgery*

**5<sup>th</sup> Annual Minimally Invasive Robotics Association Conference**, San Diego, CA, Jan. 2010.  
*Laparoendoscopic Single-Site Surgery Using A Multi-Functional Miniature In Vivo Robot*

## PROFESSIONAL AFFILIATIONS

**Institute of Electrical and Electronics Engineers (IEEE)**, Student Member, 2013 – Present

**American Society of Mechanical Engineers (ASME)**, Student Member, 2012 – Present

**Tau Beta Pi Engineering Honor Society**, Student Member, 2008 – Present

**Pi Tau Sigma Mechanical Engineering Honor Society**, Student Member, 2008 – Present

## SKILLS

**Mechanical Design:** Solidworks, Pro/Engineer, Autodesk Inventor, AutoCAD, Algor, Cosmos, Hand Drafting

**Programming:** LabVIEW, Matlab, Python, C++, Arduino, LaTeX, Squirrel, Basic, Fortran, Maple

**Other:** Microsoft Office Suite, Adobe Creative Suite, Windows Movie Maker

## TEACHING

**Teaching Assistant, 2013 – Present (Fall Semester)**

**MIT Course 2.75 – Medical Device Design**

Worked with student teams to develop solutions for clinical problems presented by physicians from local hospitals, managed team meetings and design reviews, managed students from problem statement to successful prototype in 12 weeks

**Teaching Assistant, 2014 – Present (Spring Semester)**

**MIT Course 2.753 – Development of Mechanical Products**

Aided student teams to evolve a product from a proof of concept to a beta prototype for business development, led team meetings and monitored project timelines, acted as design and business consultant in development sessions

**Teaching Assistant, 2014 – Present**

**MIT Course 2.75x – Precision Machine Design MOOC**

Developed Massive Open Online Course (MOOC) to supplement 2.75 Course, utilized EDx platform, curated and migrated content for lectures, problem sets, and interactive activities

## PROJECTS MENTORED/ SUPERVISED

**Surgical Robotics Vision and Haptics Exploration, Advanced Surgical Technologies Lab, 2010**

**Improved Delivery System for HCG Therapy, MIT Course 2.75, 2013 - Recontherapeutics.com**

**Omax Tilting Water Jet Head, MIT Course 2.753, 2013**

**Keg Delivery Sensor Package, University of Dayton Innovation Capstone, 2014**

**Methods for Keg Unloading, University of Dayton Innovation Capstone, 2014**

**Mallet Finger Splint, MIT Course 2.75, 2014**

**Semi-Automated Tube Thoracostomy Insertion System, MIT Course 2.75, 2014**

## VOLUNTEER SERVICE

**Youth STEM Outreach, 2010 – Present**

**NAMC “Dream it, Do it” Campaign Spokesperson, 2009 – 2010**

**Bright Lights Robotics Camp, 2009 – 2010**

**Elliot Elementary School, 2007-2008**

**Husker Youth Experience, 2004-2009**

**Nebraska Football Team Hospital Visits, 2004-2009**

## RELEVANT COURSES

**MIT Courses:**

2.796j – Quantitative Physiology

2.080j – Structural Mechanics

2.75 – Precision Machine Design

2.810 – Manufacturing Processes and Systems

**UNL Business Courses:**

MECH898 – Innovation and Entrepreneurship

ENTR821 – New Venture Planning

GRBA812 – Managerial Economics

GRBA851 – Managerial Decision Making

**UNL Engineering Courses:**

MECH850 – Control Systems Design

MECH857 – Mechatronic Systems Design

MECH958 – Advanced Mechatronics

MECH853 – Robotics: Kinematics and Design

MECH842 – Intermediate Kinematics

METL866 – Materials Selection for Mechanical Design

ENGM891 – Advanced Biomaterials

CSCE990 – Robotics

MECH498 – Biomedical Device Design

MECH436 – Continuum Biomechanics