

Elissa Danielle Ledoux

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Objective:

To obtain a university teaching position applying my skills and passion for engineering design, fabrication, control, and instruction.

Education:

Master of Science in Mechanical Engineering, GPA 3.9/4.0

School of Engineering, Vanderbilt University (VU)

Thesis title: *Control and Evaluation of Stair Ascent with a Powered Transfemoral Prosthesis*

Studied under Dr. Michael Goldfarb, H. Fort Flowers Professor of Mechanical Engineering

graduated 2016

Nashville, TN

Bachelor of Science in Mechanical Engineering, Mathematics Minor, *Summa Cum Laude*, GPA 3.9/4.0

College of Engineering, Louisiana State University (LSU)

graduated 2013

Baton Rouge, LA

Teaching Experience:

Full-time Lecturer, MTSU Engr. Dept., Murfreesboro, TN

2018-present

- Instruct undergraduate students in dynamics, kinematics, robotics, and senior design engineering courses
- Guide teams of students in developing prototypes for robotic and industrial applications
- Develop lectures, assignments, grading rubrics, and tests

Senior Design Teaching Assistant, VU Mech. Engr. Dept., Nashville, TN

2014-2017

- Guided teams of students in developing prototypes for robotic, medical, industrial, automotive, and artistic applications
- Instructed and supervised students to ensure safe laser cutting, machining, and power tool use
- Helped instructor develop assignments, grading rubrics, and a best practices manual

System Dynamics and Instrumentation Teaching Assistant, VU Mech. Engr. Dept., Nashville, TN

2013-2014

- Instructed and assisted students during laboratory activities involving hardware-software interactions with MATLAB and LabView
- Graded homeworks, tests, and lab reports

Tutor, LSU Center for Academic Success, Baton Rouge, LA

2010-2013

- Tutored college physics, calculus, chemistry, and statics
- Explained concepts and problem-solving methods to undergraduate students

Physics Teacher, Holy Family Homeschoolers, Baton Rouge, LA

2012- 2013

- Taught algebra-based physics to homeschooled, high-school students, and performed laboratory activities
- Graded tests and lab reports, wrote and administered term examinations

Work Experience:

Mechanical Designer, Universal Logic, Nashville, TN

2017-2018

- Designed, prototyped, and tested end effectors for industrial pick-and-place robotic arms
- Designed cell layouts for robot workspaces
- Continued contract/consulting work after re-entering academia

Research Assistant, VU Mechanical Engineering Department, Nashville, TN

2013-2017

- Developed a stair ascent controller for a powered knee and ankle prosthesis to enable reciprocal stair ascent
- Assessed the biomechanical and metabolic benefits of the stair ascent controller on three transfemoral amputee subjects
- Developed a gait event detection algorithm for healthy subject and transfemoral amputee level walking
- Assisted in the development and assessment of a bicycling controller for a powered transfemoral prosthesis
- See publications on next page

Engineering Intern, Albemarle Corporation, Pasadena, TX

summer 2013

- Designed, built, and populated databases for ranking corrosion susceptibility of plant piping and equipment
- Assessed the corrosion susceptibility of plant piping and equipment
- Worked on two safety projects involving communication, portable tank unloading, and ladder rung covers.

Related Skills/Coursework:

dynamics, controls, robotics, mechatronics, Onshape CAD, drafting, MATLAB, Simulink, machining, laser cutting, Microsoft Office, technical report writing/documentation, problem solving, PCB assembly, EIT certification, college teaching certification

Awards and Honors:

- Outstanding Teaching Assistant award, VU, 2015
- NSF Graduate Research Fellowship, 2014
- IBM Fellowship, VU, 2013
- 4-event intramural champion, VU, 2013-2016

Activities and Interests:

- Volunteer, *Room in the Inn* mission program for homeless
- AirBnB entrepreneur www.airbnb.com/h/starwarsnashville
- Half-marathon runner
- Home improvement

Publications:

Journal Articles

- [J1] Ledoux, E. D., & Goldfarb, M. (2017). Control and evaluation of a powered transfemoral prosthesis for stair ascent. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 25(7), 917-924.
- [J2] Lawson, B. E., Ledoux, E. D., & Goldfarb, M. (2017). A robotic lower limb prosthesis for efficient bicycling. *IEEE Transactions on Robotics*, 33(2), 432-445.
- [J3] Ledoux, E.D. (2018). Inertial Sensing for Gait Event Detection and Transfemoral Prosthesis Control Strategy. *IEEE Transactions on Biomedical Engineering*.

Conference Papers

- [C1] Lawson, B. E., Shultz, A., Ledoux, E., & Goldfarb, M. (2014, August). Estimation of crank angle for cycling with a powered prosthesis. In *Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE* (pp. 6207-6210).
- [C2] Ledoux, E. D., Lawson, B. E., Shultz, A. H., Bartlett, H. L., & Goldfarb, M. (2015, August). Metabolics of stair ascent with a powered transfemoral prosthesis. In *Engineering in Medicine and Biology Society (EMBC), 2015 37th Annual International Conference of the IEEE* (pp. 5307-5310).