

# Daniel E. Brown

RESEARCHER · MECHANICAL ENGINEER

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*Determined, creative and inquisitive engineer who is a very resourceful team player, always prepared to apply academic knowledge to solve real world problems. Able to visualize potential solutions virtually, armed with an abundance of hands-on and practical knowledge. New and interesting projects can't come soon enough.*

## Experience

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### Research Specialist - Instrumentation Engineer, MIT

Cambridge, Massachusetts

MASSACHUSETTS INSTITUTE OF TECHNOLOGY – AGE LAB

May. 2014 - Present

- Primary focus on automotive safety systems research using semi-autonomous driving features, HCI/HMI distractions, data collection and analysis. Hands-on experience building and integrating intelligent systems into Tesla, Ford, GM, Volvo, Toyota, Jaguar Land Rover, and Mercedes vehicles.
- Conceived, prototyped, built and tested compact automotive data logging platform to capture over half a dozen sensors throughout different data types including CANbus data - along with audio and high definition video capture. Hands-on instrumentation of over 20 vehicles, including 18 Teslas.
- Assisted subject data collection in laboratory, simulation, field, and naturalistic experiments. Performed data analysis using Python, OpenCV, and R on large scale data sets stored as flat file and SQL databases, created technical documentation for instrumentation installations, formed and executed test plans, and assisting with the development of experimental protocols.
- Collaborates with fellow MIT departments and external research groups, PhD, postdocs and undergraduate students, software/hardware developers, prototype/manufacturing labs and workshops to further driver safety research globally.

### Undergraduate Research, Metallurgy Lab

Amherst, MA

UNIVERSITY OF MASSACHUSETTS – AMHERST

Dec. 2012 - May. 2013

- Conducted research in laboratory of Professor Joseph Goldstein, performing metallurgical experiments to form the Tetrataenite phase of Iron-Nickel found in meteorites
- Set up, calibrated, measured output from heat furnaces. Gained knowledge of grinding, polishing and etching techniques for use in optical microscopy and spectroscopy.

### NeoGraft Technologies, Inc.

Taunton, Massachusetts

INTERN

Jul. 2012 - Sept. 2012

- Performed experiments collecting and evaluating data using scanning electron microscopy (SEM) and force testers on electrospun polycaprolactone biodegradable polymer coatings on large animal model veins for coronary bypass surgery.
- Assisted senior engineers in conceiving designs and building specialty electrical and electromechanical assemblies to add functionality, value and analytical capability to process instruments.

## Education

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### University of Massachusetts Amherst

Amherst, Massachusetts

B.S. IN MECHANICAL ENGINEERING

Graduated May 2013

- SAE Supermileage Vehicle Competition
- Metallurgy Lab Technician/Research Assistant

## Projects

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### MIT \$100K Business Plan Competition

Cambridge, Massachusetts

VELOAI

Jan. 2016 - May. 2016

- Computer vision based bicycle safety system (ABAS)
- Using 2 cameras, GPS, IMU and other sensors, VeloAI detects threats such as potholes, opening car doors, turning vehicles, pedestrians, dangerous intersections and warns the rider.
- Advanced to the semi-final round of 15 other startups. Awarded \$1000 in project funding.

## Society of Automotive Engineers Supermileage Vehicle Competition

Amherst, Massachusetts

SUB-GROUP CAPTAIN-"OLD" BODY TEAM

Sept. 2012 - May. 2013

- Leading team of 5 students to improve upon the previous years' car design of body, power transmission.
- Searched areas for which losses are present, lessening losses at wheel bearings, aerodynamic profile for increased fuel mileage.
- Placed 4<sup>th</sup> of 28 universities with 1010mpg, a almost 20% increase from the prior years' fuel mileage.

## Senior Design Project - Assistive Door Opener

Amherst, Massachusetts

GROUP LEAD

Jan. 2013 - May. 2013

- Brainstormed potential design solutions to the problem at hand, while providing monthly design reports.
- Built a working prototype of a foot pedal powered refrigerator door opener, with potential for a consumer product.

## Skills

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**Programming/Software** Python, R, Linux, LaTeX, Solidworks, Matlab, MathCAD, ANSYS, EagleCAD

**Other** Electronics, CANbus, Force testers, SEM, Lean Yellow Belt

## Publications/Presentations/Posters

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### Comparing Near-Infrared and Visible Light for Gaze Estimation in the Wild

DANIEL E. BROWN, LEX FRIDMAN, WILLIAM ANGELL, BRYAN REIMER. IN PREPARATION, 2017

### MIT Bike Vision Dataset: A Computer Vision Approach to Cyclist Safety

WILLIAM ANGELL, LEX FRIDMAN, DANIEL E. BROWN, SPENCER DODD, BRYAN REIMER, SERTAC KARAMAN. IN: INTERNATIONAL DRIVING SYMPOSIUM ON HUMAN FACTORS IN DRIVER ASSESSMENT, TRAINING AND VEHICLE DESIGN, 2017

### Observed Differences in Lane Departure Warning Responses during Single-Task and Dual-Task Driving: A Secondary Analysis of Field Driving Data

THOMAS MCWILLIAMS, DANIEL E. BROWN, BRYAN REIMER, BRUCE MEHLER, JONATHAN DOBRES. SAE TECHNICAL PAPERS, 2016

### Detecting Road Surface Wetness from Audio: A Deep Learning Approach

IRMAN ABDIĆ, LEX FRIDMAN, ERIK MARCHI, DANIEL E. BROWN, WILLIAM ANGELL, BRYAN REIMER, BJÖRN SCHULLER. IN IEEE SIGNAL PROCESSING, 2016

### Automated Synchronization of Driving Data Using Vibration and Steering Events

LEX FRIDMAN, DANIEL E. BROWN, WILLIAM ANGELL, IRMAN ABDIĆ, BRYAN REIMER, HAE YOUNG NOH. IN PATTERN RECOGNITION LETTERS, 2016

### An on-road study involving two vehicles: observed differences between an auditory and haptic lane departure warning system

DANIEL E. BROWN, BRYAN REIMER, BRUCE MEHLER, JONATHAN DOBRES. POSTER AT PROCEEDINGS OF THE 2015 INTERNATIONAL CONFERENCE ON AUTOMOTIVE USER INTERFACES AND INTERACTIVE VEHICULAR APPLICATIONS, NOTTINGHAM, UK 2015

## Interests and Activities

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- Teaching assistant for the MIT IAP course 6.S094 Deep Learning for Self-Driving Cars
- Executed major repairs to automotive systems of various brands, and many electro-mechanical systems.
- Participated in SAE-Supermileage Vehicle competition, placed 4<sup>th</sup> with 1010MPG, Member of UMass Motorsport Club, active in Hillel House organization and charitable fund raising.
- Built NIXIE tube clock with components from Cold War era international sources.
- Member of open source community for ECU Development and Exploration.