

Lewis Boyd, EI

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EDUCATION

M.S. in Mechanical Engineering (GPA: 3.9) 2015 – 2017

Colorado State University – Fort Collins, CO

Thesis: Superhydrophobic Surfaces for Reducing Liquid Adhesion and Contact Time

Coursework including Fluid and Solid Mechanics

B.S. in Mechanical Engineering (GPA: 3.8) 2011 – 2015

Colorado State University – Fort Collins, CO

Minor: Mathematics

University Honors Scholar

Mechanical Engineering Honors Scholar

Coursework including Fluid Mechanics, Creo Modeling, Combustion, Heat and Mass Transfer, Solid Mechanics, Intro to Manufacturing Processes, Thermodynamics, Machine Design, CFD (Fluent), Statics, Dynamics, Mechatronics, Physics

TECHNICAL SKILLS

- Design and fabrication of water repellent and liquid repellent coatings
 - Spray coating of low surface energy materials (e.g., fluorocarbons and hydrocarbons)
 - Physical vapor deposition (PVD) of fluorocarbons
 - Mask based surface patterning with oxygen plasma
 - Dip coating fluorocarbons
 - Spin coating adhesives
- Ultra-high-speed imaging capturing droplet impact dynamics
- Contact angle and roll-off angle measurements using a goniometer
- Owens Wendt analysis surface energy calculations
- **Creo Parametric** (3D modeling and 2D drawings)
- Microsoft **Word**, **Excel**, and **PowerPoint**
- Image processing using ImageJ
- Surface modification using oxygen plasma
- Gas chromatography-mass spectrometry (GC-MS) for detecting chemicals
- Optical microscopy
- Chemical etching of metals for micro and nanoscale texture
- Quality Function Deployment (QFD) design
- Python programming

WORK EXPERIENCE

Python Programmer 2018

Filter Source - Fort Collins, CO

- Developed Python code for Raspberry Pi
 - Read sensor inputs and display outputs to touchscreen
- Designed code and wiring for simple pressure sensor

Laboratory Researcher

2014 – 2017

Colorado State University - Fort Collins, CO

- Developed and published **novel** FDA-approved, super repellent coating with **edible** materials
- Designed and fabricated water repellent and super liquid repellent coatings
 - Fabricated micro and nanoscale texture via spray coating, PVD, and etching
 - Applied coating to a variety of surfaces using spin coated adhesives
 - Modified surface chemistry with low surface energy waxes and fluorocarbons:
 - Spray coating, PVD, and dip coating of waxes and fluorocarbons
- Characterized super repellent coatings
 - Micro and nanoscale texture with optical microscopy
 - Wettability with contact angle and roll-off angle measurements
 - Material surface energy with Owens Wendt analysis
- Fabricated wettability patterns on surfaces with oxygen plasma for discrete test zones
- Captured ultra-high-speed droplet dynamics on super repellent surfaces
- Detected odor compound absorption on clothing using GC-MS analysis
- Assisted writing research reports and grant proposals to Department of Defense and National Institute for Occupational Safety and Health
- Mentored undergrad and graduate students in lab protocol and safety

Laboratory Outreach Coordinator

2015 – 2017

- Organized bi-annual outreach programs for groups of 50 high school students
- Presented surface science concepts for Native American and African American students

Teaching Assistant, MECH 202 (Engineering Design II)

2016 – 2017

Colorado State University - Fort Collins, CO

- Graded and returned assignments for 90+ students within 1 week
- Held office hours and answered student questions including QFD design
- Organized and ran design competition for student devices

Teaching Assistant, MECH 307 (Mechatronics)

2015 – 2016

Colorado State University - Fort Collins, CO

- Graded and returned assignments for 90+ students within 1 week
- Organized and ran weekly electronics labs for students
- Held office hours and answered student questions

PUBLICATIONS AND PRESENTATIONS

H. Vahabi, L. M. Boyd, S. Movafaghi, W. Wang, A. K. Kota. Droplet dynamics on super repellent surfaces. Manuscript under preparation. (2018).

Colorado State University Graduate Student Showcase “Superhydrophobic coatings with edible materials,” (2017).

Colorado State University Demo Day. “Superhydrophobic coatings with edible materials,” (2017).

Young Talent in Colorado and beyond. “Superhydrophobic coatings with edible materials,” (2016). **Won 1st place prize.**

W. Wang, K. Lockwood, L. M. Boyd, M. D. Davidson, S. Movafaghi, H. Vahabi, S. R. Khetani, A. K. Kota, “Superhydrophobic coatings with edible materials,” American Chemical Society Applied Materials & Interfaces, 8, p. 18664 (2016).