WILLIS O'LEARY

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EDUCATION:

Massachusetts Institute of Technology Sept. 2018 – Present
PhD student, Department of Materials Science and Engineering

California Institute of Technology Sept. 2014 – June 2018
BS in Chemical Engineering (materials track), GPA 3.8/4.0

- Studied abroad at St. John's College, University of Cambridge in Fall 2017

SKILLS:

- **Laboratory:** Micropipetting, working in fume and bio hoods, cell culture, UV-Vis, NMR, atmospheric plasmas.
- **In silico:** Density functional theory, force fields, molecular dynamics, QM/MM.
- **Programming**: C, Python, C++, Scala, Ocaml, Java, Bash, LaTeX, Mathematica, Matlab, Git.
- **Chemistry software:** LAMMPS, ReaxFF, Jaguar, CRYSTAL, VASP, Maestro, VESTA, VMD, ChemDraw.
- **Other software**: PBS, MS Office, Mac OSX, MS Windows.

EXPERIENCE:

William Goddard Group, California Institute of Technology: Undergraduate Researcher Mar. 2016 – Sept. 2017

- Modelled vanadyl pyrophosphate catalyst and discovered dual-phase atomistic mechanism.
- Designed and implemented QM/MM tool for modelling heterogeneous catalysts.
- Began work to model the mechanism of the oxygen evolution reaction on iridium dioxide.
- Periodically presented at group meeting, maintained scripts, and passed skills to other group members.

Laboratory for Reliable Software, NASA Jet Propulsion Laboratory: Undergraduate Researcher June – Aug. 2015

- Wrote a new, database-driven tool to automate manual code analysis.
- Used the tool to analyze core software onboard the Curiosity rover and the future mission to Europa.
- Presented the tool to core software engineers of Europa mission.

Charles Wright Group, Portland State University: High School Intern June – Aug. 2013, 2014

- Used symbolic execution to test an email server and to evaluate the technology's maturity.
- In collaboration with a team from MIT Lincoln Laboratory, extended KLEE, a symbolic execution tool, to find buffer overflows within C++ data structures.

Leslie Muldoon Group, Oregon Health & Science University: High School Intern June – Aug. 2012

- Studied cancer killing abilities of chemotherapy-acetaminophen drug combo *in vitro*.
- Presented findings at state-level Intel science fair.
- Conducted several surgical procedures on rats and developed a simple graphical software program to aid in cell counting.

PUBLICATIONS:

- O'Leary, W. C., Goddard, W. A., & Cheng, M. J. (**2017**). The Dual-Phase Mechanism for the Catalytic Conversion of n-Butane to Maleic Anhydride by the Vanadyl Pyrophosphate Heterogeneous Catalyst. The Journal of Physical Chemistry C.

HONORS AND AFFILIATIONS:

- Tau Beta Pi member since 2018
- 2017 Cambridge Scholar (Study Abroad)
- 2017 Class of '52 60th Reunion Summer Undergraduate Research Fellow
- 2016 Prof. Fredrick H. Shair Summer Undergraduate Research Fellow
- 2015 Summer Undergraduate Research Fellow

SELECTED COURSEWORK:

California Institute of Technology

Introduction to Computer Programming
Introduction to Programming Methods
Computer Language Shop (Ocaml)
Decidability and Tractability
Calculus of One and Several Variables
Linear Algebra
Differential Equations
Intro. Methods of Applied Math for the Phys. Sciences
Classical Mechanics and Electromagnetism
Waves
General, Organic, and Physical Chemistry
Chemical Engineering Thermodynamics
Chemical Thermodynamics (graduate level)
Introduction to Statistical Thermodynamics (graduate level)
Introduction to Environmental Science and Engineering
Introduction to Chemical Engineering Computation
Transport Phenomena
Separation Processes
Dynamics and Control of Chemical Systems
Chemical Reaction Engineering
Electronic Materials Processing
Fundamentals of Sustainability Science and Engineering
Fundamentals of Materials Science
Experimental Methods in Solar Energy Conversion
Chemical Synthesis and Characterization for Chem. Eng.
Chem. Eng. Design Lab (Gold Nanoparticle Project)
Optimal Design of Chemical Systems

University of Cambridge

Polymer Chemistry
Inorganic Materials
Organic Solids
Energy Landscapes and Soft Materials
Solid Electrolytes
Computer Simulation Methods in Chemistry and Physics

OTHER INTERESTS:

- French language.
- Longboarding, cycling, swimming, rock climbing, and bodyweight conditioning.
- Backpacking and hiking.
- Cooking and baking.