Jacob W. Toney

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EDUCATION

Massachusetts Institute of Technology (MIT) — **Cambridge, MA**
Doctor of Philosophy, Chemical Engineering — May 2027
Minor: Computational Chemistry
Honors: Alfred P. Sloan UCEM Fellowship

University of Southern California (USC) — **Los Angeles, CA**
Bachelor of Science, Chemical Engineering | GPA: 4.00 — May 2021
Thesis: Investigating the Mechanisms of C-H Activation with Enzyme-Inspired Molecular Catalysts
Honors: Albert Dorman Valedictorian, National Academy of Engineering Grand Challenges Scholar, Chemical Engineering Outstanding Student Award, University Trustees Award
Master of Science, Chemical Engineering | GPA: 3.86 — May 2021

RESEARCH EXPERIENCE

Sharada Research Lab at USC — **Los Angeles, CA**
Undergraduate Researcher — Feb. 2018 – May 2021

- Used molecular modeling and high-performance computing to perform over 2,000 density functional theory calculations on homogeneous catalytic systems
- Simulated novel bio-inspired monometallic catalysts for C-H hydroxylation with applications in sustainability (methanol generation, biomass processing, polymer upcycling)
- Research funded by USC Provost's Research Fellowship

ExxonMobil Research & Technology Development — **Houston, TX**
Process Engineering R&D Intern — Jun. 2020 – Aug. 2020

- Created high-throughput automated heat exchanger design tool, increasing efficiency by 10% and design rate from days to minutes via iterative manipulation of thermodynamic variables and design parameters
- Distributed across engineering, research, and facilities groups for use in liquefied natural gas plant design

WORK EXPERIENCE

SpaceX — **Hawthorne, CA**
Operations Engineer — Jun. 2021 – Aug. 2022

- Project-managed cross-functional team implementing 1,000+ scope reduction projects worth 373K+ hours per year
- Created model forecasting builds across production, test, and launch, presented weekly to C-level executives
- Executed root-cause investigations / analyses on materials anomalies in propulsion and fluids hardware

California Resources Corporation — **Bakersfield, CA**
Facilities Engineering Intern – Gas Plants — May 2019 – Aug. 2019

- Created Utility Steam System documentation of process flow diagrams, nominal operating conditions, and control screens, critical for plant's federal status as cogeneration facility (valued at ~$50M annually)
- Diagnosed failures and designed modifications to cryogenic gas plant glycol system and associated equipment

PRESENTATIONS & PUBLICATIONS

Catalysis Science and Technology **Aug. 2022**

Lan Z, Toney J, Mallikarjun Sharada S. "A computational mechanistic study of CH hydroxylation with mononuclear copper-oxygen complexes". ***Catal. Sci. Technol.***, 2022

USC School of Engineering **May 2021**

- Honors Thesis: "Investigating the Mechanisms of C-H Activation with Enzyme-Inspired Molecular Catalysts"
- Best Research Paper: "Bioinspired Catalysis of C-H Hydroxylation: A Computational Approach"
- Best Analytical Essay: "Engineering Ethics: Grand Challenges and Grander Responsibilities"

USC Department of Chemical Engineering and Materials Science **Feb. 2022**

- Best Research Presentation: "Investigating the Mechanisms of C-H Activation with Enzyme-Inspired Molecular Catalysts"

AIChE Annual Student Conference **Nov. 2020**

- "Computational Analysis of C-H Hydroxylation in Bio-inspired Monometallic Complexes"

USC Department of Chemical Engineering and Materials Science **Mar. 2020**

"Computational Analysis of C-H Hydroxylation in Bio-inspired Monometallic Complexes"

AIChE Annual Student Conference **Nov. 2019**

- Computational Analysis of C-H Hydroxylation in Bio-inspired Monometallic Complexes

LEADERSHIP & SERVICE

USC American Institute of Chemical Engineers (AIChE)

President Apr. 2020 – May 2021

- Developed K-12 STEM Outreach Program for local middle schoolers to learn remotely during COVID-19 pandemic
- Developed Freshman Design Challenge to foster technical aptitude and increase underclassman involvement, featured in AIChE National News
- Led Jeopardy team to winning first place in 2019 AIChE National Jeopardy Competition

USC Latino Alumni Association Scholar Committee

President Jan. 2019 – May 2021

- Organize and executed inaugural Alumni Mentorship Program, with approx. 100 participants annually