Michael E. Bustamante

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EDUCATION

Ph.D. Student in Material Science and Engineering Started Fall 2020
Arizona State University- Ira A. Fulton School of Engineering, Tempe, Arizona
GPA: 3.56
Funding: Harold & Lucille Dunn Memorial Engineering Scholarship (Fall 2020, Spring 2021), Versum Materials Graduate Fellowship Award (Fall 2020, Spring 2021), Graduate Research Associateship Grant (Fall 2020, Spring 2021)
Course Work: Kinetics and phase transformations of solids, advance metal alloys and processes, chemical reactor engineering, transport processes I

Bachelor of Science in Chemistry, Cum Laude Spring 2018
University of Houston-Downtown, Houston, Texas
Major GPA: 3.43
Minors: Mathematics, Spanish
Honors: Dean's List (3 out of 5 semesters), Scholars Academy Member (Spring 2016-Spring 2018), Outstanding first year SI Leader award (Fall 2016)
Awards: NRC Scholarship Recipient (Fall 2016-Spring 2018)
Funding: Scholars Academy Summer Research Scholarship Recipient (Summer 2016), Welch Foundation Scholarship Recipient (Fall 2015, Spring 2016)
Languages: Fluent Castilian Spanish (reading, writing, speaking)

PRESENTATIONS

Fourth Annual NSF-PIRE-PDC MEETING, Boulder, Colorado "Rare Earth High Temperature ceramic materials, poster presentation, Summer 2021

Glenn Research Center, Cleveland, Ohio "The Advancement of Mars Colonization Through Agricultural Development", poster presentation, Spring 2018

Scholars Academy Student Research Conference, University of Houston-Downtown, Houston, Texas "The Advancement of Mars Colonization Through Agricultural Development", poster presentation, Spring 2018

Glenn Research Center, Cleveland, Ohio "Synthesis of Nanocomposite Films Using Solvent-Polymer-Nanoparticle Methods", poster presentation, Spring 2017

SACNAS 2016 Conference, University of Houston-Downtown, Salt Lake City, Utah "Theoretical Studies of Gallium (III) Complexes Containing Nitrogen and Oxygen Donor Atoms", poster presentation, Fall 2016

Scholars Academy Student Research Conference, University of Houston-Downtown, Houston, Texas "Synthesis of New copper Bi-metallic Complexes", poster presentation, Spring 2016

RELEVANT PAPERS

"The Advancement of Mars Colonization Through Agricultural Development", NASA-USDC 2018 competition paper, Spring 2018

"Synthesis of Nanocomposite Films Using Solvent-Polymer-Nanoparticle Methods", research paper, Spring 2017

INDEPENDENT RESEARCH PROJECTS

NASA, Cleveland, Ohio and **The University of Houston-Downtown**, Houston, Texas Fall 2017-Spring 2018
Team Leader, NASA USDC-2018 Competition

- Led a team of 8 undergraduate peers to design a theoretical space garden and build an experimental prototype as prove of the concept to colonize Mars in the future.
- Formulated execution plan, set deadlines and meetings, delegated tasks, oversaw team progress, and prepared the final report.

COLLABORATIVE RESEARCH PROJECTS

Arizona State University, Tempe, Arizona Fall 2020-Present
Experimental Thermodynamics and High-Temperature Calorimetry Ph. D. Researcher

- Currently using high-temperature calorimetry techniques to measure the heat effects of below room temperature liquid and solid Ga-based alloy systems.
- Past projects included the thermodynamic study of silicon-based polymer-derived ceramics and transition metal oxycarbides.
- The main focus of the Group's research is deriving the structural and energic relationships within these materials by the use of the AlexSYS calorimeter and the MHTC-96 calorimeter/DSC.

Total Energies, La Porte, Texas Summer 2018-Fall 2020
Polymer Research Chemist

- Supported Bayport Polymers by investigating plant process problems and new avenues to optimize the industrial polymerization of high-density polyethylene made from the Phillips and Ziegler-Natta catalysts.
- Characterized preliminary physical qualities of polyethylene plant and in-house samples through particle size, flowability, and melt index.
- Troubleshot equipment, made purchasing requests, wrote research reports, performed safety checks, and handled all analytical testing sample management.
- Synthesized THT catalyst from Magnesium ethylate using Schlenk line techniques.

NASA, Cleveland, Ohio Spring 2017
Material Chemistry Research Assistant

- Collaborated on original research concerning the integration of new polymer electrolyte nanocomposites into existing lithium battery technology.
- Examined several synthesis protocols for the nanocomposite materials using solvent-polymer-nanoparticle mixing methods to simplify already established manufacturing processes.
- Determined thermal and electric properties of polymer composite films through DSC and cyclic voltammetry.

University of Houston-Downtown, Houston, Texas Summer 2016-Fall 2017
Chemical System Modeling Research Assistant

- Employed Gaussview 09 to develop computational models for macrocyclic ligands and Gallium (III) complexes, to determine their physical and chemical properties by computational analyses.
- Research results were presented at SACNAS 2017, Salt Lake City Utah.

University of Houston-Downtown, Houston, Texas Spring 2016
Thermal Analysis Research Assistant

- Led original research on the chemical characterization of organocopper complexes.
- Distinguished their chemical properties through DSC and TGA tests.

University of Houston-Downtown, Houston, Texas Spring 2015-Fall 2016
Organometallic Synthesis Research Assistant

- Explored and performed syntheses to produce bi-metallic and tri-metallic organocopper complexes using standard Schlenk techniques.
- Utilized IR and NMR spectroscopy tests for preliminary characterization. Used Acid/Base bath cleaning procedures for reaction vessels and other glassware. Used vacuum evaporation of solvents, silica gel filtration and separation, and single-crystal growing techniques.
- The research project was displayed at the University of Houston-Downtown's Student Research Conference.

TEACHING EXPERIENCE

Varsity Tutors, Houston, Texas Summer 2018-Present
Private Tutor

- Administered study sessions (in-person/online) for students in high school and college, mostly in general chemistry, organic chemistry (I), and Physics (I/II).
- Instructed an average of four students per week and maintained regular sessions with an average of two students for the duration of the school year.
- Maintained a 4.8/5.0-star rating based on student surveys.
- Received positive student feedback through online comments and in person inquiries.

University Houston-Downtown, Houston, Texas Fall 2015-Summer 2018
Supplemental Instruction Leader

- Led weekly study sessions to help students understand difficult content relating to Physics (I/II) as well as Organic chemistry (I), mostly dealing with conceptual explanations of theory and problem-solving.
- Taught and average of 15 students every semester gaining experience to advance and learn new eclectic teaching methods.
- Attended classes with students to help the creation of session activities, reviews, and games using firsthand information from faculty.
- Created propaganda materials and T-shirt designs for the SI program.

University of Houston-Downtown, Houston, Texas Summer 2016-Fall 2016
Research Leader for Scholar's Academy STEM Prep Camp

- Guided group of 12 high school students through a research project in computational chemistry.
- Instructed them on how to operate Gaussview09 and the basic theory behind it.
- Established criteria to validate data analysis and supported them in presenting results to peers at the end of the camp.

LEADERSHIP EXPERIENCE

Total Petrochemical, La Porte, Texas Fall 2019-Summer 2018
Fire Brigade Member

- Served as a member of the emergency response team at the La Porte Tech center.
- Executed weekly, bi-weekly, and monthly checks of fire extinguishers, emergency lights, and other emergency response equipment.

Total Petrochemical, La Porte, Texas Fall 2019-Present
Toast Masters Member

- Facilitated multiple speeches, presentations, and participated in meetings to enhance communication and public speaking skills.

University Houston-Downtown, Houston, Texas Spring 2016-Spring 2018
Supplemental Instruction Peer Mentor

- Interviewed new supplemental instruction leaders alongside the coordinator and other senior SI leaders.
- Provided an assessment on critical qualities to become a successful supplemental instructor.
- Mentored hires through observations and weekly one on one meetings. Covered workload management, maintenance of extracurricular activities, and the preservation of high academic performance.

COMMUNITY SERVICE

University of Houston-Downtown, Houston, Texas Spring 2016-Spring 2018
Scholars Academy

- Selected and volunteered in multiple activities including Habitat for Humanity's playground build, Rice University STEM festival, and Trash Bash Spring 2018.

University of Houston-Downtown, Houston, Texas, Spring 2015-Fall 2016
Secretary and Vice President (Gardening Club)

- Coordinated garden days, fabricated shirts, and documented attendance for all club gatherings.
- Dispersed official correspondence about upcoming club projects and events on campus.
- Rebuilt the university garden after tax-day flood inundated The University of Houston-Downtown.
- Planted greenery which successfully fed hungry students through a school food pantry.

University of Houston-Downtown, Houston, Texas Spring 2014-Fall 2016
Senator for The College of Science and Technology (Student Government Association)

- Wrote and voted on legislation to help student-led organizations such as UNA, ACM, and FANDOM UHD get funding for extracurricular activities.
- Established SMART goals among other senators for all three branches of the student government.
- Promoted presidential campaign candidates through distributing flyers, stickers, and other propaganda materials.
- Boosted organization through the creation of propaganda materials such as notebooks, pens, pencils, and notepads in addition to weekly tabling sessions on campus.

University of Houston-Downtown, Houston, Texas Fall 2016
Community Outreach Committee (Student Government Association)

- Participated in Food Not Bombs, The Beacon, and Gift Wrapping for Christmas.
- Drafted shirt designs to promote the committee to students on campus.

University of Houston-Downtown, Houston, Texas Fall 2014
Food Options Committee (Student Government Association)

- Administered surveys on campus to voice student opinions on food options available in the cafeteria. Surveyed 10% of the student population (1100 students).
- Successfully added healthiest food option on all the menus for each of the restaurants in the cafeteria as well as calories for all meals.

TECHNICAL SKILLS

Laboratory: Reactor polymerizations, melt index, flowability, bulk density, particle size distribution, Phillips catalyst titration, Ziegler-Natta catalysts concentration tests, catalyst deactivation, differential scanning calorimetry, thermal gravimetric analysis, cyclic voltammetry, infrared spectroscopy, gas chromatography, nuclear magnetic resonance (H-NMR/C^{13}-NMR)

Equipment: VAC Nexus (II) and OMNI Lab, purge glove box, Schlenk Line, 4.0 L Auto-clave polymerization reactor, 4.0L Eco-clave catalyst reactor, high-pressure cylinders, chromium catalyst activation equipment

Chemicals: Pyrophoric, carcinogens, moisture sensitive, flammable organic solvents, high-pressure gases, cryogenic liquids, drying agents

Certifications: Respirator fit test, forklift handling, Hazmat handling, industrial safety, fire-brigade, CPR