

Isabella Darke

Curriculum Vitae

icdarke@bu.edu

(805) 705-1925

Education

Boston University (2020-pres)

Biomedical Engineering, PhD Student GPA: 4.0

University of California, Los Angeles (2015-2019)

Bioengineering, BS, Magna Cum Laude GPA: 3.827

Work Experience

Dr. Timothy O'Shea Research Group, Boston University

Graduate Student Researcher (05/2021-pres)

- Developing glycan-nucleoside oligoester hydrogels that can serve as cell transplantation carriers or local drug delivery vehicles for treating brain and spinal cord injury

Laxmi Therapeutic Devices

Chemistry Researcher, Biosensor Engineer (07/2019-07/2020)

- Senior member of a team developing the chemical sensing mechanism for a continuous glucose monitor
- Optimized the composition of multiple components of Laxmi's device, including the catalytic metal electrodes, enzymatic sensor and flux-limiting membrane
 - Used electrochemical techniques to characterize the device's redox behavior and *in vitro* response to glucose
- Created a novel approach to precisely deposit our chemical sensor directly onto electrodes via a combination of electropolymerization and electrochemical adsorption techniques
- Developed custom metal electroplating techniques as part of our microelectrode fabrication process

Junior Chemistry Researcher (06/2018-01/2019)

- Improved the turn-on time, linearity and sensitivity of Laxmi's redox-mediated system
Characterized the effects of the polymer membrane on the sensor's glucose response
- Evaluated how polymer entanglement, morphology and overall thickness were affected by solution processing and deposition methods
 - Directed all sensor installation and designed engineering rigs to achieve reproducible fabrication
- Computationally optimized a microfluidic mixing system for an autonomous *in vitro* test setup, and evaluated the performance of 3D printed prototypes using quantitative fluorescence microscopy

Chemistry Contractor (06/2017-09/2017)

- Characterized the mechanical and electrochemical properties of early sensor iterations
- Assisted with preliminary sensor installation onto test substrates

Dr. Gerard Wong Research Group, UCLA

Undergrad Researcher (01/2019 – 07/2019)

- Evaluated the immunomodulatory behavior of AMP-DNA nanocrystalline complexes in amplifying Toll-like receptor 9 activation
- Quantified IFN- β production in vitro by murine macrophages in response to stimulation with immunogenic complexes

Dr. Ali Khademhosseini Research Group, UCLA: Biomaterials Team

Undergrad Researcher (12/2017-06/2018)

- Evaluated injectable cell-laden hydrogels for tissue repair
- Optimized material properties of hydrogels (gelation time, shear-thinning behavior) and evaluated biological characteristics (degradation, oxygen permeability, cell adhesion)
- Collaborated with surgeons at Ronald Reagan Medical Center to tailor our materials to the operating room
- Assisted with the development of novel nanocomposite sealant cryogels for wound closure/biopsies

Skills

- Electrochemistry techniques: cyclic voltammetry, amperometry, galvanostatic/potentiostatic electrodeposition, electropolymerization
- Characterization: SEM, EDX, EIS, XPS, contact and optical 3D profilometry
- Biological techniques: cell culture, microscopy, plate reader
- Chemistry lab skills: inert atmosphere chemistry, basic polymerization/crosslinking reactions
- COMSOL Multiphysics Modeling
- Other equipment: profilometer, plasma cleaner, freeze-dryer, laser cutter, 3D printer

Programming Languages: MATLAB

Papers/Patents/Posters

- US Patent (Pending): “Electrochemical Method for Enzyme Immobilization on Biosensor Microelectrodes” (2021)
- Poster, UCLA Bioengineering Symposium: “An optimized microfluidic chamber for *in vitro* biosensor characterization” (2019)

Honors

Boston University Dean’s Fellowship (2020)

Jane and Tien-Tsai Yang Centennial Scholars Endowment in Engineering (2018)

Muriel K. and Robert B. Allan Fund for Achievement in Engineering (2017)

UCLA Dean’s Honors List - Engineering

UCLA Cornelius Leondes Scholarship for Achievement in Engineering (2016)

UCLA Alumni Scholar (2015-2019)