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KEISHA Y. CASTILLO-TORRES

RESEARCH INTERESTS

▪ Magnetic materials ▪ Biosensors ▪ Micro/nano-technologies ▪ Microfabrication ▪ Environmental/health monitoring

EDUCATION

August 2015 – May 2020 **University of Florida (UF)** **Gainesville, FL**

MS and PhD in Electrical Engineering

Dissertation Title: "Magnetic Isolation of Fecal Indicating Bacteria using Bio-functionalized Magnetic Microdiscs for Water Quality Monitoring"

PhD Advisor: Prof. David Arnold

August 2009 – May 2015 **University of Puerto Rico at Mayaguez (UPRM)** **Mayagüez, PR**

BS Electrical Engineering

SKILLS

Microfabrication

- Metal deposition: KJL sputter deposition and PVD e-beam evaporator tools
- Photolithography: Laurell spinner, Suss Delta 80, and Karl Suss mask aligner (MA6)
- Soft lithography: vacuum chamber and ultraviolet-ozone (UVO) surface treatment (PDMS/glass slide bonding)
- Other microfabrication tools/procedures: Dektak profilometer, scanning electron microscope (SEM) FEI Nova 430 with EDS, Asher Anatech Barrel, Heidelberg laser writer, metal lift-off, and vibrating sample magnetometer (VSM)

Microbiology & Biosensors

- Bio-conjugation of gold coated materials (magnetic microdiscs) using DNA aptamers or Concavalin A lectins
- Hydration of lyophilized strain of EZ-CFU *E. coli* and EZ-Hydro-Shot coliforms: *E. coli*, *K. variicola*, and *P. mirabilis*
- Bacteria concentration dilutions, enrichment, and sample preparation
- Other tools: pipette/pipette tips, mini-vortexer, ultrasonic bath, and centrifuger

Microscopy

- Optical, SEM, epi-fluorescence, and confocal microscopes

Software

- LTSpice, MATLAB/Simulink, ImageJ, and COMSOL

Hardware

- Function/arbitrary waveform generators, oscilloscopes, AC/DC current probes, power amplifiers, National Instruments Analog Discovery Board 2, and Xilinx Virtex-5 field programmable gate array (FPGA)

RESEARCH EXPERIENCE

August 2015 – May 2020

Interdisciplinary Microsystems Group (IMG) – ECE Department – University of Florida

Graduate Research Assistant

- Rapid, portable detection of coliforms and *E. coli.* in water using bio-functionalized magnetic microdiscs
  Advisor: Dr. David Arnold

January 2015 – May 2015

Center for Nanotechnology at NASA Ames Research Center

Intern

- Android data acquisition system for printable gas sensors
  Advisor: Dr. Beomseok (Daniel) Kim

May 2014 – August 2014

SURE: NITRO Laboratory - University of Wisconsin - Madison

Intern

- Micro-patterning techniques using different gradients to guide axonal growth
  Advisor: Dr. Justin Williams

January 2014 – December 2014
Raytheon Company - University of Puerto Rico at Mayagüez (UPRM)
Undergraduate Research Assistant
- Study of technologies for reducing resource consumption in high performance complex multipliers applications
  Advisors: Dr. Domingo Rodríguez and Dr. Manuel Jiménez

February 2012 – December 2014
Automated Information Processing Laboratory (AIPLAB) - University of Puerto Rico at Mayagüez
Undergraduate Research Assistant
- Fast time-frequency methods for ophthalmic echography applications
- FPGA implementation of digital modulators for underwater communications
  Advisor: Dr. Domingo Rodríguez

TEACHING EXPERIENCE

January 2018 – May 2018
Electrical and Computer Engineering (ECE) Department – University of Florida
Supervised Teaching Practicum
- Course: Design of micro-electro-mechanical systems (MEMS) transducers – Instructor: Dr. David Arnold

August 2016 – December 2016
Electrical and Computer Engineering Department – University of Florida
Teaching Assistant and Lab Instructor
- Course: Semiconductor device microfabrication laboratory – Instructor: Dr. Yong-Kyu Yoon

AWARDS AND SCHOLARSHIP

2018	Dr. J. Michael Rollo **Diversity Impact Award**
2017	Ford Foundation Fellowship 2017 **Honorable Mention**
2017	Smart Biomedical and Physiological Sensor Technology XIII Conference **Best Paper Award** SPIE DCS
2016	ICTSE Student **Oral Presentation Award**
2016	College of Eng.: Nanoscience Institute for Medical and Engineering Technology (NIMET) **Fellowship**
2013 & 2014	William Zierenberg **Scholarship** (College of Professional Engineers and Land Surveyors of Puerto Rico)

OUTREACH, MENTORSHIP, AND VOLUNTEER EXPERIENCE

August	**2017-Present**	IMG Leadership Committee Member	Gainesville, FL
Fall	**2015-2017**	IMG Seminar Series Organizing Committee Member	Gainesville, FL
October	**2015, 2016, 2017**	UF Junior Preview Visit Mentor (ECE Department)	Gainesville, FL
Summer	**2017**	UF SURF Graduate Student Mentor	Gainesville, FL
February	**2016, 2017, 2018**	UF Spring Visit Mentor (ECE Department)	Gainesville, FL
October	**2016**	UF Recruitment Event Assistant at the 2016 Career Fair at UPRM	Mayagüez, PR
November	**2015, 2018**	Middle School Science Fair Judge	Gainesville, FL

PUBLICATIONS

- **K.Y. Castillo-Torres**, E.S. McLamore, D.P. Arnold, "A High-Throughput Microfluidic Magnetic Separation (μFMS) Platform for Water Quality Monitoring," Micromachines 2020, 11, 16.
- **K. Y. Castillo-Torres**, D. P. Arnold, and Eric S. McLamore, "Rapid isolation of Escherichia coli from water samples using magnetic microdiscs," Sensors & Actuators B: Chemical 291 (2019), 58-66.
- **K. Y. Castillo-Torres**, N. Garraud, E. S. McLamore, and D. P. Arnold, "Towards pathogen detection via optical interrogation of magnetic microdiscs," Tech. Dig. Solid-State Sensors, Actuators, and Microsystems Workshop (Hilton Head 2016), Hilton Head, SC, June 2016.
- **K. Y. Castillo-Torres**, N. Garraud, E. S. McLamore, and D. P. Arnold, "Investigation of magnetic microdiscs for bacterial pathogen detection," Proc. SPIE Defense Security & Sensing Conf. (Smart Biomedical and Physiological Sensor Technology XII), Baltimore, MD, April 2016, vol. 9863, 8 pages [Best Paper Award].
- V. Reyes-Rodriguez, M. Jiménez, **K. Castillo-Torres**, S. Dávila-Montero, and D. Rodríguez, "Statistical accuracy analysis of complex floating point multipliers," 2017 IEEE 60th Midwest Symposium on Circuits and Systems (MWSCAS), Boston, MA, August 2017.
- S. Dávila-Montero, **K. Castillo-Torres**, V. Reyes-Rodriguez, M. Jiménez, and D. Rodríguez, "An FPGA-based algorithm development framework for estimating the accuracy of embedded DSP signal transforms," 2017 IEEE 60th Midwest Symposium on Circuits and Systems (MWSCAS), Boston, MA, August 2017.