



# WILLIAM MAULBETSCH

wmaulbetsch@gmail.com  
 (847) 287-0962  
 Providence, RI

linkedin.com/in/william-maulbetsch  
 willmaulbetsch.com

## EXPERIENCE

PHD RESEARCHER ADVISOR: PROF. DEREK STEIN 2010 – 2018

- Developed and studied the feasibility of a new method for sequencing biopolymers combining the ordering capability of nanopores with the monomer identification of mass spectrometry.
- Designed and constructed complex experimental apparatuses and fabricated unique test samples.
- Wrote and used Matlab, Mathematica, and Python code for data acquisition and analysis.
- Modeled and simulated physical systems with Mathematica, COMSOL, and SIMION.
- Collected first mass spectra of nucleotides/amino acids electrosprayed directly into high vacuum.
- Managed several undergraduate researchers in projects related to my PhD work.

UNDERGRADUATE RESEARCHER ADVISOR: PROF. RUSS GIANNETTA 2007 – 2009

- Developed a new method to measure the absolute London penetration depth in high  $T_c$  superconductors through Labview data acquisition code, and superconductor sample prep.

TEACHING/TUTORING 2010 – 2018

- RI Men's Maximum and Medium Security Prison – Basic math (+, -, x, ÷).
- Summer@Brown – "Light and Sight: The Science of Vision" Created and co-taught a summer course for high school students focused on understanding how vision works from the perspectives of physics, biology, and neuroscience.
- Summer@Brown – "The Extraordinary Inventions of Nikola Tesla" Basic electricity and magnetism from a historical perspective with many, many, physics demonstrations.

## INDEPENDENT PROJECTS

Battle Bot	Designed and built an electronically controlled, pneumatically powered, axe wielding battlebot (4-person collaboration)
Space Adventure Zone	Interactive 3D augmented reality art project creating a virtual orrery using Javascript, Three.js, ARToolKit, and Socket.io (3-person collaboration)
Laser Table	Interactive art project in which people could draw on a phosphorescent surface with a laser controlled by a phone app (3-person collaboration)
LED Clocks	Built clocks out of LEDs soldered to both breadboards as well as PCB designed with KiCad and controlled with Arduinos

## PUBLICATIONS

JOSEPH BUSH, WILLIAM MAULBETSCH, MATHILDE LEPOITEVIN, BENJAMIN WIENER, MIRNA MIHOVILOVIC SKANATA, WOOUNG MOON, COLE PRUITT, AND DEREK STEIN, "THE NANOPORE MASS SPECTROMETER" REVIEW OF SCIENTIFIC INSTRUMENTS 88, 113307 (2017).

WILLIAM MAULBETSCH, BENJAMIN WIENER, WILLIAM POOLE, JOSEPH BUSH, AND DEREK STEIN, "PRESERVING THE SEQUENCE OF A BIOPOLYMER'S MONOMERS AS THEY ENTER AN ELECTROSPRAY MASS SPECTROMETER" PHYSICAL REVIEW APPLIED 6, 054006 (2016). [Selected for a Physics.APS.org Synopsis]

## PRESENTATIONS

- 30 MIN TALK "PROTEIN SEQUENCING WITH NANOCAPILLARIES", 648. WE-HERAEUS-SEMINAR TRANSPORT MECHANISMS IN BIOLOGICAL AND SYNTHETIC NANOPORES AND CHANNELS, JACOBS UNIVERSITY, BREMEN, GERMANY, 16-21 JULY 2017.
- 10 MIN TALK "NANOSCALE ELECTROSPRAY ION SOURCES AND A NEW DNA SEQUENCING TECHNIQUE", AMERICAN PHYSICAL SOCIETY MARCH MEETING, SAN ANTONIO, TX, MARCH 2-6, 2015.
- POSTER "ORDER PRESERVATION BETWEEN DNA MONONUCLEOTIDES MODELED BY LANGEVIN DYNAMICS", NHGRI ADVANCED DNA SEQUENCING TECHNOLOGY DEVELOPMENT GRANTEE MEETING, SAN DIEGO, CA, APRIL 29-MAY 1, 2013.
- 10 MIN TALK "ORDER PRESERVATION BETWEEN DNA MONONUCLEOTIDES MODELED BY LANGEVIN DYNAMICS", AMERICAN PHYSICAL SOCIETY MARCH MEETING, BALTIMORE, MD., MARCH 18-22, 2013.

## EDUCATION

BROWN UNIVERSITY

PH.D. IN PHYSICS  
Thesis: "The Nanopore Mass Spectrometer"

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

B.S. IN PHYSICS  
MINOR IN MATHEMATICS  
Graduated with High Distinction

## SKILLS

### LABORATORY

mass spectrometry, quadrupole mass filters, electrospray, experimental apparatus fabrication, scanning electron microscopy (SEM), high-vacuum systems, wet bench and clean room work, micro/nano fabrication, focused ion beam etching (FIB), high-voltage low-current measurements

### LANGUAGES

#### HUMAN

Spanish - Intermediate

#### ROBOT

Matlab - Experienced  
Mathematica - Experienced  
Labview - Intermediate  
Arduino - Intermediate  
Python - Intermediate

### PROGRAMS

COMSOL – electric field simulations of nanocapillary tip electrospray  
SIMION – electrostatic lens focusing of ion trajectories  
ONSHAPE – CAD apparatus design  
KICAD – LED clock PCB design  
ADOBE ILLUSTRATOR – scientific figures

## ABOUT ME

I love problem solving and the challenge of effective and efficient communication of complicated scientific ideas. In my free time I am a passionate gardener, art and science museum-goer, Arduino hobbyist, camper, traveler, and meditator.