

# E. Tomas Barraza

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**Summary:** Experienced researcher with deep technical knowledge across a variety of subjects. Interested in leveraging his analytical training to make an impact at institutions working with complex problems at the global scale.

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tomasbar.com

## EDUCATION

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<b>Duke University</b> (2016 – present)	<i>PhD, Electrical Engineering</i> GPA: 4.0 major, 3.78 overall  <i>Certificate in International Development Policy</i> September 2018 – May 2020  <i>Master of Science, Electrical Engineering</i> July 2016 – May 2018
<b>North Carolina State University</b> (2012 – 2016)	<i>BS, Electrical Engineering (cum laude)</i> GPA: 3.61 major, 3.46 overall

## EXPERIENCE

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### **Doctoral Research** *July 2016- present*

Stiff-Roberts Lab, Electrical & Computer Engineering Department  
Duke University, Durham, NC

- Developing nanomaterial synthesis techniques for applications in solar cells and LEDs
- Published first-of-their-kind synthesis guidelines that increased solar cell efficiency from 0.1% to over 12%
- Organizing and participating in project meetings with local, national, and international collaborators
- Trained and mentored 10 undergraduate and graduate students in scientific and lab safety methods
- Overseeing laboratory operation as lab manager, including maintenance of lab equipment worth >\$5000

### **Research Assistant** *May 2014 – January 2015*

Real-Time Engine Part Coating Monitoring, Air Force Research Laboratory STTR  
NC State University, Raleigh, NC

- Pioneered the usage of light polarimetry to monitor condition of military aircraft ceramic coatings
- Published 2 peer-reviewed articles describing the broad applications of polarimetry technique
- Worked independently in graduate optics laboratory environment with little supervision
- Performed extensive data analysis on over 100 samples using MATLAB software

### **Research Assistant** *September 2013 – May 2014*

Nanofabrication of PDMS Membranes, NSF REU Engineering the Grid  
NC State University, Raleigh, NC

- Used soft lithography processing techniques to prototype a microfluidics biomedical device
- Designed experiments to fill sample space as broadly defined by mentoring PhD student
- Defined priorities efficiently to maintain scientific output while participating in full-time coursework

## ACADEMIC PUBLICATIONS – ARCHIVAL JOURNALS

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- W.A. Dunlap-Shohl, **E.T. Barraza**, et al. “Tunable internal quantum well alignment in rationally designed oligomer-based perovskite films deposited by RIR-MAPLE.” *Materials Horizons*. March 2019.
- D.A. Luo, **E.T. Barraza**, M.W. Kudenov. “Aircraft Skin Defect Localization Using Imaging Polarimetry.” *Optical Engineering*. August 2018.
- **E.T. Barraza\***, W.A. Dunlap-Shohl\*, D.B. Mitzi, A.D. Stiff-Roberts. “Deposition of Methylammonium Lead Triiodide by Resonant Infrared Matrix-Assisted Pulsed Laser Evaporation.” *Journal of Electronic Materials*. February 2018.
- W.A. Dunlap-Shohl\*, **E.T. Barraza\***, A. Barrette, K. Gundogdu, A.D. Stiff-Roberts, D.B. Mitzi. “MAPbI<sub>3</sub> Solar Cells with Absorber Deposited by Resonant Infrared Matrix-Assisted Pulsed Laser Evaporation.” *ACS Energy Letters*. December 2017.
- D.A. Luo, **E.T. Barraza**, M.W. Kudenov. “Mueller Matrix Polarimetry on Plasma Sprayed Thermal Barrier Coatings for Porosity Measurement.” *Applied Optics*. December 2017.

## ACADEMIC PUBLICATIONS – CONFERENCE PROCEEDINGS

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- **E.T. Barraza**, N.E. Wright, M.C. Folgueras, A. Rastogi, R. Li, M. Fukuto, A.D. Stiff-Roberts, “Concentration and Precursor Delivery Effects on Hybrid Perovskites Deposited by Resonant Infrared Matrix-Assisted Pulsed Laser Evaporation.” *MRS Spring Meeting*, Phoenix, AZ. April 2019.
- W.A. Dunlap-Shohl, **E.T. Barraza**, A. Barrette, K. Gundogdu, A.D. Stiff-Roberts, and D.B. Mitzi, “Deposition of Halide Perovskite Thin Films and Solar Cells Using the RIR-MAPLE Technique.” *MRS Fall Meeting*, Boston, MA. November 2018.
- A.D. Stiff-Roberts, D.B. Mitzi, **E.T. Barraza**, and W.A. Dunlap-Shohl, “Resonant Infrared, Matrix-Assisted Pulsed Laser Evaporation of Hybrid Perovskites.” (Invited) *Novel Materials and Applications Conference, The Optical Society (OSA) Advanced Photonics Congress*, ETH Zürich, Switzerland. July 2018.
- **E.T. Barraza**, W.A. Dunlap-Shohl, Y. Liu, D.B. Mitzi, A.D. Stiff-Roberts. “Deposition of Crystalline Organic-Inorganic Hybrid Materials by RIR-MAPLE.” *Electronic Materials Conference*, South Bend, IN. June 2017.
- **E.T. Barraza**, M.C. Folgueras, A.D. Stiff-Roberts. “Exploration of Solvent Effects on Morphology of Polyaniline & Other Polymer Films Deposited Through RIR-MAPLE.” *APS March Meeting*, New Orleans, LA. March 2017.

## PROFESSIONAL PRESENTATIONS

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- **E.T. Barraza**, W.A. Dunlap-Shohl, D.B. Mitzi, A.D. Stiff-Roberts. “Deposition of Metal-Halide Perovskites by RIR-MAPLE: Materials & Processing Advances.” *Duke ECE Department Graduate Workshop*, Durham, NC. September 2017.
- **E.T. Barraza**, A.D. Stiff-Roberts. “Resonant-Infrared Matrix-Assisted Pulsed Laser Evaporation: Enabling Room-Temperature Mid-Infrared Detection Through Intraband Transitions”. *Duke ECE Department Graduate Workshop*, Durham, NC. September 2016.

## OTHER WRITTEN WORKS

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- **E.T. Barraza**, D. Copple, J. Zhou. "Science Module: Solar Power." *Duke University Initiative for Science & Society: SciPol Learning Database*. <http://sciencepolicy.duke.edu/content/science-module-solar-power>. March 2018.
- **E.T. Barraza**, A.D. Stiff-Roberts. "Breaking Down RIR-MAPLE." *Stiff-Roberts Research Group Website*. <http://stiffrobertslab.pratt.duke.edu/research/overview>. August 2016

## INTERNATIONAL DEVELOPMENT COURSEWORK

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- **Poverty Reduction and the International Financial Institutions.** *Fall 2018.*  
Reviewed historical missions of the World Bank and International Monetary Fund
- **Governance and Development.** *Spring 2019.*  
Analysis of broad topics in governance theory, including public sector reform
- **Economic Foundations for Development.** *Fall 2019.*  
Overview of microeconomic and macroeconomic principles related to development
- **Applied Development Economics.** *Spring 2020.*  
Case studies of economic analysis techniques applicable to challenges in international development

## SKILLS & ATTRIBUTES

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<b>Programming Languages</b>	MATLAB, Python, C
<b>Programming Tools &amp; Modules</b>	Visual Studio Code, git, GitHub, Jupyter, matplotlib, pandas
<b>Other Software</b>	Adobe Illustrator, Microsoft PowerPoint, Gwyddion
<b>Operating Systems</b>	Linux, Mac OS X, Windows
<b>Scientific Skills</b>	Electron microscopy, X-ray diffraction, physical vapor deposition, thermal evaporation, atomic force microscopy
<b>Languages</b>	English ( <i>native</i> ), Spanish ( <i>native</i> )
<b>Citizenship</b>	United States, Argentina

## HONORS & AWARDS

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- John T. Chambers Scholars Fellowship (2018- ) (2017 Honorable Mention)  
*One of 3 students to earn prestigious award from research center made up of 39 departments at Duke*
- GEM Consortium Associate Fellowship (2016 - 2020)
- Research Triangle MRSEC Graduate Fellowship (2016 - 2018)  
*Earned support from NSF-funded research center spanning Duke, UNC-Chapel Hill, and NC State University*
- NCSU Dean's List Member (2013, 2014)
- NCSU Wolfpack Recognition Scholarship (2012)

## PROFESSIONAL DEVELOPMENT

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- “Python for Data Science: Visualization with Altair.” Workshop. *Center for Data and Visualization Sciences, Duke University*, Durham, NC. September 2019.
- “Python for Data Science: Pandas and Jupyter Lab.” Workshop. *Center for Data and Visualization Sciences, Duke University*, Durham, NC. September 2019.
- “Science Outside the Lab: Nanotechnology and Policy.” Week-long workshop. *National Nanotechnology Coordinated Infrastructure & the School for the Future of Innovation in Society, Arizona State University*. Washington, DC. June 2018.
- “Polymer Colloids: Synthesis, Characterization and Application.” Short course. *American Physical Society, DPOLY Division*. New Orleans, LA. March 2017.
- “Mentoring and Graduate Student Success.” Day-long workshop. *The Graduate School, Duke University*, Durham, NC. August 2016.

## UNIVERSITY SERVICE

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### Duke University

#### *ECE Advocacy and Student Engagement (EASE) Volunteer (2016 - )*

- Join current student volunteers in organizing activities that promote student wellbeing
- Organize and coordinate outreach activities throughout the year
- Host prospective engineering graduate students over hallmark recruiting weekend

#### *Head Lab Designer/TA: ECE341L – Solar Cells (2018 - )*

- Independently developed semester-long laboratory experience for solar cells course
- Led laboratory sessions of 15+ undergraduate students at a time as sole TA
- Exploited Duke resources to show students cleanroom solar cell fabrication procedure

#### *Undergraduate Student Mentorship (2016 - )*

- Responsible for developing comprehensive research plans for undergraduate students
- Coordinates training of students in all aspects related to working in laboratory settings

#### *University Libraries Graduate Students Advisory Board Member (2016 - 2017)*

- Participated in interdepartmental discussions on needs of students
- Represented home department in allocation of discretionary resources

### North Carolina State University

#### *Electrical & Computer Engineering Department Ambassador (2015 - 2016)*

- Formalized expectations of department ambassadors as part of inaugural class
- Promoted activities and goals of the department at university-wide events
- Advised prospective and incoming students during one-on-one guided tours

#### *Institute of Electrical & Electronics Engineers Student Chapter (2014 - 2016)*

- Ensured university was represented at local, regional, and national IEEE events
- Charged with overseeing execution of events as chapter vice-president