

Destenie Nock

dnock@andrew.cmu.edu

Summary

PhD in Industrial Engineering and Operations Research with a strong background in Operation Research, Electrical Engineering, Applied Mathematics, Leadership Studies, and working with international communities. Study abroad experiences in Ireland and Malawi. Desire to work at the intersection of energy, engineering, policy, and international development.

Education

PhD, Industrial Engineering

University of Massachusetts, Amherst, MA

GPA: 3.93

May 2019

Dissertation Title: Power System Planning in Disparate Systems: Modeling Sustainability and Electricity Access

Master of Science, Leadership for Sustainable Development

Queen's University of Belfast, Belfast, Northern Ireland

GPA: 3.84 equivalent

Dec 2015

Bachelor of Science,

Electrical Engineering & Applied Mathematics (Dual-Degree)

North Carolina A&T State University, Greensboro, NC

GPA: 4.0

May 2014

Awards, Fellowships, and Grants

- **WUN Seed Grant 2018 (Awarded)**– Passed internal proposal for a seed grant, and now preparing the full proposal. I was responsible for drafting the project proposal, communicating with collaborators, and developing research agenda. If funded this grant will facilitate a meeting between researchers in Ghana, Massachusetts, Nairobi, and Cape Town with the aim of discussing the role inequality aversion plays in energy planning in developing countries.
- **Ford Foundation Doctoral Fellowship 2018** – Honorable Mention
- **NSF Graduate Research Fellowship 2014 - 2019**
- **NSF Sponsored Wind Energy IGERT Fellowship 2015-2018** – Part of interdisciplinary graduate research group focused on offshore wind energy.
- **Northeast Alliance for Graduate Education and the Professoriate (NEAGAP) Program Fellow 2015-2018**
- **Mitchell Scholar Class of 2015** – Awarded a year of study in Northern Ireland.

Research Interests

My research philosophy is centered around taking multi-criteria decision analysis, optimization, and linear programming, and applying these tools to fields in energy and sustainability. I am interested in researching topics related to preference elicitation of stakeholders, decision analysis, international development, as well as the energy-water-food and energy-poverty-climate change nexuses.

Publications and Presentations

Peer-Reviewed Publications:

- Nock, Destenie, Erin Baker. "Valuing System Flexibility Through Adding Pumped Hydro Energy Storage to in the New England Electricity System." (2019) *In Preparation*.
- Nock, Destenie, Todd Levin, Erin Baker. "Changing the Policy Paradigm: A Benefit Maximization Approach to Electricity Planning in Developing Countries." (2019) *Submitted to Applied Energy*.
- Nock, Destenie, Erin Baker. "Holistic multi-criteria decision analysis evaluation of sustainable electric generation portfolios: New England Case Study." (2019) *Applied Energy*. 2019. DOI: <https://doi.org/10.1016/j.apenergy.2019.03.019>
- Nock, Destenie, Erin Baker. "Unintended Consequences of Northern Ireland's Renewable Obligation Credit Policy." *Electricity Journal*. 2017. DOI: <https://doi.org/10.1016/j.tej.2017.07.002>

- Nock, Destenie, Venkat Krishnan, and James D. McCalley. "Dispatching intermittent wind resources for ancillary services via wind control and its impact on power system economics." **Renewable Energy**. 71 (2014): 396-400. DOI: <https://doi.org/10.1016/j.renene.2014.05.058>

Other Publications:

- Bottomley, Kevin, et al. "Crafting Community and Change through Books and Pads: The Tikondwe Teachers Project in Domasi, Malawi." **Grassroots Leadership and the Arts for Social Change**. Emerald Publishing Limited, 2017. 263-280. Print. Building Leadership Bridges.
- Nock, Destenie, et al. "Honors Privatization: A Professor's and Three Students' Responses." **Journal of the National Collegiate Honors Council** 15.1 (2014): 49

Invited Talks:

- EAERE-FEEM_VIU Summer School – Venice International University – Venice, June 30 – July 6 2018. Talk titled “Sustainable Generation Portfolios: An MCDA framework applied to the New England Power System”
- Promoting Emerging Engineering Research Scholars (PEERS) Seminar - Auburn University – Alabama - February 22, 2018. Talk titled “Electricity Planning Tools”
- Graduate Student Seminar Speaker - West Virginia State University – West Virginia, March 2, 2018. Talk titled “Electricity Planning Tools”
- University of Auckland - Distributed Energy Resources Workshop - New Zealand, January 2018. Talk titled “Sustainable Generation Portfolios”

Conferences:

- Nock, Destenie, Erin Baker. "Multi-criteria decision analysis of Future Electricity Capacity in New England: Impacts on the overall system sustainability." INFORMS. Houston, TX. 2017
- Nock, Destenie, Erin Baker. "Multi-criteria decision analysis of Future Electricity Capacity in New England: Impacts on the overall system sustainability." IFORS. Quebec City, Montreal. 2017
- Nock, Destenie, Erin Baker. "ROC-ing the Grid: The Unintended Consequences of Northern Ireland's Renewable Obligation Policy." IEW Conference. College Park, MD. 2017.
- Nock, Destenie, Erin Baker. "ROC-ing the Grid: The Unintended Consequences of Northern Ireland's Renewable Obligation Policy." INFORMS Conference. Nashville, TN. 2016.
- Nock, D., et al. "Crafting Community and Change through Books and Pads: The Tikondwe Teachers Project in Domasi, Malawi." **ICERI 2016** Proceedings (2016): 347-351. [Available online at: http://library.iated.org/authors/Destenie_Nock]
- Nock, D., et al. "Destiny Pads in Southern Malawi: Girls can go far!" **ICERI2013** Proceedings (2013): 347-351. [Available online at: http://library.iated.org/authors/Destenie_Nock]
- Barber, E., et al. 2012: “Learners, Educators, and Leaders Survey nine years of Trans-Global Collaboration in Malawi.” **ICERI 2012** Proceedings. Madrid, Spain. [Available online at: http://library.iated.org/authors/Destenie_Nock]

Posters:

- Nock, Destenie, Erin Baker. "Sustainable Generation Portfolios." **Georgia Tech Workshop on Energy Systems and Optimization**. Atlanta, GA. November 2017
- Nock, Destenie, 2013: Wind Energy Control on Power System Economics. **Wind Energy Science, Engineering and Policy REU Symposium**. Proceedings. Iowa State University, Ames, IA 31 July 2013, p 1.1-1.12. [Available online at: <http://home.engineering.iastate.edu/~jdm/wind/2013%20Proceedings.pdf>]
- Nock, Destenie, Corey Pough, Abebe Kebede, Ivo Dimitriov, Quiang Li, 2012: Magnetic Properties of Iron Chalcogenide Superconducting Materials for Energy Storage Applications. **SRC Techcon Conference**. Austin, TX. 21 June 2012. [Available online at: <http://www.src.org/library/publication/p063846/>]

Research Related Experiences

Assistant Professor

Engineering and Public Policy Department at Carnegie Mellon University

Starting 2020

Post-Doctoral Researcher

2019-2020

Graduate Research Assistant

Sep 2015 – May 2019

Supervisor: Dr. Erin Baker

University of Massachusetts, Amherst, MA

- Developing platforms for developed and developing countries that will better equip policy makers to understand energy planning options and the most efficient combination and deployment of technologies.
- Applied optimization techniques using Gurobi and Python to solving the generation expansion problem in Sub-Saharan Africa, under a benefit maximization approach.
- Developed a method for determining the sustainability of a mix of power generation technologies, using multi-criteria decision analysis.
- Developed leadership and teamwork skills through mentoring and collaborating with seven undergraduate students (three women, and three underrepresented minority), and advising three honors theses.

Argonne National Lab Intern

May 2017 - Aug 2017

- Developed a model which can determine the optimal layout of the power system in a given country given the goals of decision makers. This work applied a benefit maximization approach to the power grid planning problem.
- Enhanced project management, data gathering, and industrial engineering skills through developing a network flow model to allow government entities to evaluate different options for expanding the power grid.
- Performed a literature review of the value of transmission expansion projects in a high renewable future.

Northern Ireland Authority for Utility Regulation

Apr 2015 - June 2015

Intern

Belfast, Northern Ireland

- Developed a report detailing how a government policy, which was designed to increase the amount of small scale renewable energy generation in Northern Ireland, is affecting the reliability of the power grid, and electricity costs.
- Examined how government policies have impacted the security of the power grid in Northern Ireland.
- Analyzed the mitigation methods companies are employing to address the impacts of the rise in small scale and micro generation.

Wind Energy Science Program, Iowa State University

May 2013 - Aug 2013

Undergraduate Researcher

Ames, Iowa

- Investigated and evaluated the implementation of renewable storage methods to the power grid.
- My research investigated the effects of wind farm participation in energy markets as well as the regulation service market using a production costing study in the IEEE 24 bus system.
- A variable delta control strategy and maximum power limitation method were used to control wind output. The data from this study was used to show that wind control can benefit the power grid by reducing regulation requirements.

Brookhaven National Lab

June 2011 - Aug 2011

Undergraduate Researcher

Upton, NY

- Analyzed the magnetization of superconductors in regards to superconducting wire applications.
- Evaluated the effectiveness of the single-crystalline Iron-based superconductors for energy storage applications.
- Although the results showed that currently the cost of keeping the FeTe_{1-x}Se_x superconductor at a low temperature outweighed the benefits of integrating it into the industry, in collaboration with a team, determined that this material is still a candidate for superconducting wire development in the future.

NC A&T Semiconductor Research Corp. (SRC) and Louis Stokes Alliances for Minority Participation (LSAMP) Program

Jan 2011 - May 2014

Research Assistant

Greensboro, NC

- Project 1: Constructed a Radio Jove satellite, which allowed physics students to interpret data from the sun and experience a practical application of physics.

- Project 2: Analyzed the superconducting properties of various metals. Continued this work during the summer of 2011 at Brookhaven National Lab.

Teaching Experience

Guest Lecturer

Jan, Sept, Oct 2018

Amherst, MA

- I gave a lecture on electricity markets and flexibility to a group of ten sophomores, juniors, and seniors from a variety of disciplines (geology, political science, engineering, ecology). In this lecture I provided background regarding how electricity is created, how power plants work together to meet our electricity needs, and how electricity prices in New England are determined via the electricity market. To assist the students in understanding electricity markets I created a game called “Let’s Bid” where each student was a different power plant competing to supply electricity and generate a profit.
- I introduced concepts of industrial engineering, and energy markets to four different Freshman Seminar sections, with 19 students each, as a guest lecturer.

NC A&T, Supplemental Instructor for Circuit Analysis

Aug 2011-Dec 2012

Greensboro, NC

- I provided additional support to the Circuits 1 and 2 classes. I was responsible for running three 2-hour recitations classes where I would walk the students through concepts that were not covered in class. Here I was also responsible for helping the students build problem solving skills.

NC A&T Mathematic Department Teacher’s Assistant

Aug 2011 – Dec 2011

Greensboro, NC

- I was a teachers assistant for the Algebra class. I lead classes when the professor was out of town, and I held office hours to offer additional support to students outside of class.

NC A&T Center of Academic Excellence, Tutor

Aug 2010 – May 2011

Greensboro, NC

- I was responsible for tutoring students in Electrical Engineering, Algebra, Calculus, and Physics.

Professional Experience

Historic Royal Palaces

Feb 2015 - Apr 2015

Intern

Belfast, Northern Ireland

- Investigated and documented the current levels of energy usage at Hillsborough Castle.
- Determined ways that the Hillsborough Castle location can reduce their energy usage in the future, and presented findings to the company.
- Performed a cost benefit analysis to aid in the decision of whether or not to purchase new biomass boilers to meet future energy needs.

Exxon Mobil

Aug 2013 - Dec 2013

Co-Op Student

Houston, Texas

- Led the project development of a space heater surveillance system for SYU transformers.
- Designed an implementation plan to install permanent space heater circuits in four transformer units.
- During internship experience, developed knowledge of power systems equipment, and the role this plays in power system reliability. Supported California and King Ranch assets.

Honeywell Technology Solutions Inc.

May 2010 - Aug 2010

Intern

Lexington Park, MD

- Collaborated with team members to design and build a device that would allow a ship’s crew to check the continuity of a cable from one side, thus enhancing worker safety.
- Learned how to read technical diagrams and how to solder and wire electrical devices.

Professional Organizations and Leadership Skills

Graduate Women in STEM

Outreach Co-Chair

June 2017 - Present

Amherst, MA

- Coordinated and facilitated STEM talks for the local Middle School. Through this program we bring women graduate students to the local middle school to teach students about their research.
- Organized an event for 20 girl scouts to come to the UMass campus and work with graduate students to earn their Inventor Badge, through completing a series of engineering projects.

STEM Slam Competition

Jan 2016 - April 2017

Coordinator, Organizer and Host

Amherst, MA

- Coordinated and hosted the STEM Slam Competition at UMASS Amherst two years in a row. The goal of STEM Slam was to provide scientists and engineers with experience in communicating their research with the general public, while also creating a platform for public engagement. Tasked with organizing this event and hosting a workshop on public speaking, in conjunction with three colleagues. The event had 16 participants and over 50 audience members.

INFORMS Student Chapter at UMass Amherst

Sept 2015 - Present

Secretary (Sept 2015 – May 2017)

Amherst, MA

- Organized the trivia nights to promote relationships between members and the chapter officers.
- Documented the proceedings of the officer meetings.

Mentoring, Advising, and Service

Mentored Students – *Advised three honors theses, and two independent studies*

- **Olivia Pfeiffer** (Spring 2017 – Present) - Mentored as a research assistant and for an independent study, and subsequently an **honors thesis**. I am her graduate student advisor and I am responsible for helping her develop the project, and co-authoring the paper with her. She received a Wind Energy REU at Iowa State Summer 2017, PowerPoint Presentation at Undergraduate Research Conference Spring 2018, ISO New England Internship Summer 2018
- **Ami Khalsa** (Fall 2017 – Present)– As a part of her **honors thesis** graduate student advisor I was responsible for teaching her python programming, reading and editing her document, and currently we are in the process of publishing the work research she performed over the summer during an REU placement in my lab. While working with me she gave a poster presentation at the Undergraduate Research Conference Spring 2018, and held a Summer REU at UMass 2018.
- **Ivan Norman** (Fall 2017 - Present) – under my advising he learned python programing, and how to write a scientific article. He later received a Summer REU at UMass under a different graduate student advisor
- **Tristan Koopman** (Fall 2017 – Spring 2018) – Mentored competition of his **honors thesis**. I was responsible for assisting him in drafting the thesis, assisting in developing a python code which integrated pumped hydro storage into an energy model. Currently we are co-authoring a paper with will communicate the results of his honors thesis. Following his work with me he presented a PowerPoint Presentation at Undergraduate Research Conference Spring 2018, and received a job placement at IBM in 2018
- **Richard Anonyai** (Summer 2018) – Mentored summer REU student where he performed a sensitivity analysis
- **Jacob Davis** (Spring 2017)– Mentored as a volunteer in my lab when he performed data collection
- **Ambar Garcia** (Summer 2016) – Developed model for estimating electricity demand for UMass REU

Women in Engineering and Computing Career Day - UMass Amherst October 29, 2018

- I led a team of women engineers in the UMass High School Day. Here they were teaching girls about industrial engineering through an electricity market game I created. In this activity the girls were split into teams where each group was a different power plant, and had to compete to supply electricity, while making a profit. In total approximately 80 girls worked together to meet our electricity needs.

Mental Health Panel – College of Engineering UMass Amherst April 2018

- Discussed Work Life Balance, dealing with stress, the feeling of being alone, and dealing with microaggressions to a group of 40+. There was a mix of undergraduate, graduate, and faculty members in the audience.

Fostering Understandings of how Science informs Policy - IGERT DC trip May 2018

- Organized a trip for an interdisciplinary group of UMass graduate student to travel to DC and meet with NOAA, USAID, EPA, and JGCRI to discuss how scientific information informs policy making. The purpose of these meetings was to understand how scientific information and mathematical modeling efforts are used to inform decisions. Through meetings with DOE, NOAA, EPA, USAID, the World Bank, and the Joint Global Change Research institute (JGCRI) we found that there is a wide range of opportunities for research to inform policy at the federal and state level. Influence can range from sitting at the table while policy makers debate carbon reduction strategies, to creating models to predict impacts that governmental policies will have on a local and global level.

IGERT Summer Internship Mentor and Lunch Coordinator

June 2016 - Aug 2016

Amherst, MA

- Over the course of the summer, coordinated the lunch seminars for the 15 undergraduate research assistants. Coordinated which students would present each week and provided mini professional development seminars. A seminar that many of the students found helpful was "Presenting a summary of your research in the 100 most commonly used words." This gave the students practice in avoiding jargon and communicating with people outside of their respective fields.

Public Engagement

OP-Ed Published in the Boston Globe

- Kuras, Evan. Destenie Nock, Avelino Amado. "Budget Cuts threaten the community work of graduate students." May 31, 2017. Boston Globe. <http://www.bostonglobe.com/opinion/2017/05/31/budget-cuts-threaten-community-work-graduate-students/AN0thJ3rixdnSjOW4zehPI/story.html>

Malawi Leadership Team

June 2012

Project Coordinator

Zomba, Malawi

- Coordinated the Destiny Pads Project. The aim of this endeavor was to meet the needs of adolescent girls would were dropping out of school when they started their menstrual cycle. Tasked with developing and evaluating different reusable pad designs, based on the needs and customs of the local community, gathering raw materials to construct the pads, and teaching girls how to sew the pads. Over the course of 4 weeks, 85 girls and 11 teachers, across two different schools, learned how to sew the reusable pads. In 2013 I conducted a follow up with leaders of the school and they reported that attendance of girls in the school was up by 80% as a result of the Destiny Pads Project, which has led to more girls applying to secondary school.
- Coordinated the painting of a mathematics runway on school grounds, and trained teachers on how to use this learning tool. The mathematics runway is 10ft by 70 ft long and it provides a hands-on method for addition, multiplication, factoring, and many other math concepts.

Professional Development

Entering Mentoring Training

April 2018

- Received training on how to mentor a diverse group of students and retain minority students in STEM fields.

NSF ACADME Training

June 2018

- This was a two-week intensive program, which is focused on preparing graduate students for academic careers in engineering after the PhD. Here I learned how to read, write, and search for grants. I was also able to receive feedback on a mini-lesson I taught to my peers.