

AMANDA RAMCHARAN

Ph.D. Agricultural and Biological Engineering

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RESEARCH INTERESTS

Computer vision, soil spatial modeling, open source collaboration, multifunctional smallholder farming, renewable energy, machine learning

EDUCATION

Ph.D. The Pennsylvania State University, State College February 2017

Agricultural & Biological Engineering, Computational Science Minor

Advisor: Tom L. Richard

B.S.E. Princeton University, Princeton May 2011

Mechanical Engineering, Program in Sustainable Energy

Advisor: Frederick Dryer

GRANTS

2016 USDA NRCS The Use of Data Mining to Generate a Soil Dynamic Property Database (Co-PI), \$68,000

AWARDS, FELLOWSHIPS, AND SCHOLARSHIPS

2016 Alpha Epsilon (Omicron Chapter) Honor Society of Agricultural and Biological Engineering

2016 ISRIC Spring School Global Soil Information System Spatial, Prediction Competition, 2nd place

2014 ASA-CSAA-SSSA Graduate Leadership Conference Participant, \$800

2014 Agricultural Engineering Travel Award, \$400

2013 Association for International Agriculture and Rural Development Future Leaders Forum, \$1,000

2012 Third Place Poster Presenter (Biophysical Models), The Northeast Woody/Warm-season Biomass Consortium Annual Meeting

2012 Graham Fellowship, The Pennsylvania State University, \$8,000

2011 Princeton in Africa Fellow, Nyumbani Village, Kenya, \$61,000

2009 MAE & Boeing Summer Research Internship Program, Princeton University, \$5,000

PEER-REVIEWED ARTICLES

1. **Ramcharan A**, Baranowski K, McCloskey P, Ahmed B, Legg J, Hughes D (2017) Deep learning for image-based cassava disease detection. *Frontiers in Plant Science*, 8, p.1852.
2. **Ramcharan A**, Hengl T, Nauman T, Brungard C, Waltman S, Thompson J (2017) SoilGrids100m: Soil Property and Class Maps of the Conterminous US at 100 meter Spatial Resolution based on a Compilation of National Soil Point Observations and Machine Learning. arXiv preprint arXiv:1705.08323.
3. **Ramcharan A**, Hengl T, Wills S, Beaudette D. (2017) A Soil Bulk Density Pedotransfer Function Based on Machine Learning: A Case Study with the NCSS Soil Characterization Database. *Soil Sci. Soc. Am. J.* 0. doi:10.2136/sssaj2016.12.0421
4. **Ramcharan A**, Richard T. (2017) Carbon and nitrogen environmental trade-offs of winter rye cellulosic biomass in the Chesapeake Watershed. *Agricultural Systems*, 156, pp.85-94.
5. Haas FM, **Ramcharan A**, Dryer FL. (2011) Relative Reactivities of the Isomeric Butanols and Ethanol in an Ignition Quality Tester. *Energy and Fuels*, 25(9) 3909-3916.

OUTREACH PUBLICATIONS

1. **Wired**. (10/02/2017) Phone-powered AI spots sick plants with remarkable accuracy.
2. **Science News Article, Ramcharan A**. (10/19/2016) Link found between selfie viewing and decreased self-esteem. Published in Penn State News, Science Daily, CBS News, CNN, Phys.org, Miami Herald.
3. **Science News Article, Ramcharan A**. (11/21/2016) Adding higher frequencies helps detect adolescent hearing loss. Published in Penn State News.
4. **Science News Article, Ramcharan A**. (12/21/2016) Stressed snakes strike first.. Published in Penn State News, Science Daily, The Atlantic.
5. **Science News Article, Ramcharan A**. (1/9/2017) An ecological invasion mimics a drunken walk. Published in Penn State News, Science Daily.

REVIEWER FOR

Climate Risk Management
Soil Science Society of America

SERVICE

President, Agriculture & Biological Engineering Graduate Student Council,
May 2014- September 2015, student liaison and event coordinator.

Princeton in Africa Alumni Panel Member, Princeton, NJ, 2015 & 2016, lead discussions and fielded questions for fellows beginning the Princeton in Africa fellowship.

Vice-President, Agriculture & Biological Engineering Graduate Student Council, May 2013- May 2014.

Founder, ABE Graduate Student Mentorship Seminar Series, September 2014 - May 2015, designed, planned, and executed the first mentorship seminars for the department.

Volunteer Leader Penn State Adventure Recreation, September 2014 - present

Mentor, Nyumbani Village, 2011-2012, mentored teenage community group of orphans.

Nyumbani Village, Volunteer Coordinator, Nyumbani Village, 2011-2012, oversaw activities and logistics for 4 week to 6 month volunteer visits, and acted as liaison to management.

Resident College Advisor, Princeton University, August 2010 - May 2011, mentored first and second year undergraduate students.

Outdoor Action Leader, Princeton University, 2008-2009, week long wilderness leader for freshmen student orientation.

TEACHING

Teaching Assistant, Models in Agricultural and Natural Systems (AGRO 597b), Fall 2015 (1 section)

The Pennsylvania State University, State College, Department of Plant Science
Planned, designed, and executed the capstone modeling project for a graduate level course that examines the construction and application of simulation models in agricultural and natural systems. Directed projects that apply models of atmospheric, soil, plant, and biogeochemical processes.

Teaching Assistant, Biomass Energy Systems (BE 464), Fall 2015 (1 section)

The Pennsylvania State University, State College, Biological Engineering
Instructor for biochemical conversion laboratory; lectured on biochemical conversion, biomass feedstock potential, and sustainability within agricultural systems.

College Teaching, The Schreyer Institute of Teaching Excellence (HI ED 546), Summer 2015

The Pennsylvania State University, State College
Enrolled in a course on instruction from a research based, scientific perspective. Assessed instructional theory and approaches, discussed, reflected, and received feedback on what is known about good college teaching.

Teaching Assistant, Physical Principles of Agricultural Processes (ASM 425), Fall 2013 (2 sections)

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The Pennsylvania State University, State College, Agricultural Engineering
Planned, designed, and executed engineering laboratory (2 h/week/section);
lectured on bioenergy potential and sustainability.

Teacher, Water Management and Safety, 2011-2012

Nyumbani Village, Kenya

Planned, designed, and executed classes on rainwater management, water use
and safety for primary and secondary school students.

PRESENTATIONS

A Ramcharan (Oral Talk). Computer vision for cassava disease detection,
International Institute of Tropical Agriculture, Dar es Salaam, Tanzania (Oct
23, 2017)

A Ramcharan (Oral Talk). Computer vision in agriculture. Millennium
Science Cafe, State College, Pennsylvania (Aug 22, 2017)

A Ramcharan (Oral Talk). Drones in agriculture, Ag Progress Days, State
College, Pennsylvania (Aug 15, 2017)

A Ramcharan (Oral Talk). Soil bulk density estimation using
machine-learning to calibrate a pedo-transfer function. ABE Department
Seminar, State College, Pennsylvania (Oct 10, 2016)

A Ramcharan (Oral Talk). Applying machine learning methods to the US
pedon database. World Soil Museum, Wageningen, The Netherlands (May 17,
2016)

A Ramcharan, A Kemanian, T Richard (Poster). Environmental
cost-benefit analysis for winter rye cellulosic biofuel: A biophysically modeled
case study in the Northeast United States. College of Engineering Research
Symposium, State College, Pennsylvania (May 28, 2015)

Sustainability Thrust Annual Report (Oral Talk). Presented at the
Annual NEWBio All-hands Meeting, Geneva, NY (Jul 30, 2014)

A Ramcharan, A Kemanian, T Richard (Poster). A model for the decline
in percentage nitrogen of *Miscanthus x giganteus* with increasing plant mass.
Northeast Agricultural and Biological Engineering Conference (NABEC),
Altoona, PA (June 2013)

EMPLOYMENT, RESEARCH, AND TRAINEESHIPS

Postdoctoral Researcher, March 2017 -

Manages and directs the artificial intelligence modeling and field research on
automated plant disease diagnoses for PlantVillage.

Associate Professional Soil Scientist, April, 2015

Ph.D. Candidate, September 2012 - February 2017

Department of Agricultural and Biological Engineering, The Pennsylvania State
University, State College, PA

AMANDA RAMCHARAN

Designed and implemented original research study to construct and data mine a national geospatial soils database for the US.

Intern Penn State Office of Strategic Communications, September 2016 - December 2016

Conducted interviews and wrote four science news articles for the Penn State Research Communications office.

Associate Professional Soil Scientist, April, 2015

Princeton in Africa Fellow, August 2011 - July 2012

Nyumbani Village, Kitui, Kenya

Oversaw construction of rainwater harvesting system for 80 homes & installed water filtration systems.

Permaculture Design Certified, Kitui, Kenya, December 2011

Undergraduate Independent Design Thesis, September 2010 - May 2011

Princeton University Combustion Lab, Princeton, NJ

Designed a biodiesel surrogate fuel by modeling autoignition behavior using an Ignition Quality Tester (IQT). Investigated and tested novel methods of operation for the IQT to increase the number of metrics for surrogate fuel performance.

Undergraduate Researcher, May 2010 - August 2010

Princeton University Combustion Lab, Princeton, NJ

Collaborated with post-docs and graduate students to design and test novel renewable surrogate fuels.

MAE & Boeing Summer Research Internship Program, May 2009 -

August 2009

Princeton University Propulsion and Energy Lab, Princeton, NJ

Tested novel materials in the design of organic solar cells. Advisor: Yiguang Ju

RESEARCH AND COMPUTATIONAL SKILLS

Programming

R: A statistical language and environment (expert)

L^AT_EX (proficient)

Python (proficient)

Linux (proficient)

Matlab (proficient)

Applications

ArcGIS, SAGA GIS (expert)

Weka: Data Mining Machine Learning Software (proficient)

Data Visualization (R expert)

TensorFlow

Computational Techniques

Data mining (R, Python,)

Modeling (Visual Basic, R)

Deep Learning (TensorFlow)