Isaac Emery

Systems Engineering and Management, Air Force Institute of Technology, WPAFB OH

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PROFESSIONAL GOAL

To improve the resilience & sustainability of human systems by applying a combination of field experiments, life cycle assessment, ecosystem services evaluation, and other systems-level tools.

EDUCATION

Ph.D. Agricultural and Biological Engineering, Purdue University, West Lafayette IN Dec 2013

Specialization: **Ecological Sciences and Engineering** Interdisciplinary Graduate Program

Dissertation: Direct and indirect greenhouse gas emissions from biomass storage: implications for life cycle assessment of biofuels.

Adviser: Nathan Mosier

B.A. Biochemistry, Biophysics, and Molecular Biology, Whitman College, Walla Walla WA 2005

PUBLICATIONS

Emery, I, E Mbonimpa and AE Thal. Climate-based policies may increase life-cycle social costs of vehicle fleet operation. Energy Policy 101: 1-9, 2017.

Emery, I, S Mueller, Z Qin and JB Dunn. Evaluating the Potential of Marginal Land for Cellulosic Feedstock Production and Carbon Sequestration in the United States. Environ Sci Technol 51(1): 733-741, 2017.

Isaac Emery and Sally Brown. Lettuce to reduce greenhouse gases: A comparative life cycle assessment of conventional and community agriculture. In: Sowing Seeds in the City. Brown S, McIvor K, Hodges E (Eds). New York, NY, Springer, 1: 161-171, 2016.

Corinne Cooley and **Isaac Emery**. Ecosystem services from urban agriculture in the 'city of the future.' In: Sowing Seeds in the City. Brown S, McIvor K, Hodges E (Eds). New York, NY, Springer. 1: 1-22, 2016.

Isaac Emery and Nathan Mosier. Direct emission of methane and nitrous oxide from switchgrass and corn stover: Implications for large-scale biomass storage. GCB Bioenergy 7(4):865-876, 2015.

Athmanathan A, **Emery I**, Kuczek T, Mosier N. Impact of temperature, moisture & storage duration on the chemical composition of switchgrass, corn stover, and sweet sorghum bagasse. BioEnergy Research 8(2): 843-856, 2014.

Emery I, Dunn J B, Han J, Wang M. Biomass storage options influence net energy and emissions of cellulosic ethanol. BioEnergy Research 8(2): 590-604, 2014.

Isaac Emery and Nathan Mosier. The impact of dry matter loss during herbaceous biomass storage on net greenhouse gas emissions from biofuels production. Biomass and Bioenergy 39: 237-246, 2012

Withers G S, Wallace C S, Gibbs E, **Emery I**, Applegate M L. Synapses on demand require dendrites at the ready: How defining stages of dendritic development in vitro could inform studies of behaviorally driven information storage in the brain. Dev Psychobiol 53: 443-455, 2011

Farris S, Hu J H, Krishnan R, **Emery I**, Chu T, Du L, Kremen M, Dichek H L, Gold E, Ramsey S, Dichek D A. Mechanisms of urokinase plasminogen activator (uPA)-mediated atherosclerosis: Role of the uPA receptor and S100A8/A9 proteins. J Biol Chem. 286(25):22665-77, 2011

Krishnan R, Kremen M, Hu J H, **Emery I**, Farris S D, Slezicki K I, Chu T, Du L, Dichek H L, Dichek D A. Level of Macrophage uPA Expression Is an Important Determinant of Atherosclerotic Lesion Growth in Apoe -/- Mice. Arterioscler Thromb Vasc Biol 29, 2009

Kremen M, Ranjini K, **Emery I**, Hu J, Slezicki K, Wu A, Qian K, Du L, Plawman A, Stempien-Otero A, Dichek D. Plasminogen mediates the atherogenic effects of macrophage-expressed urokinase and accelerates atherosclerosis in apoE-null mice. PNAS, 105(44), 2008

Kelliher FM, Sedcole JR, **Emery I**, Condron LM. Grassland soil microbial respiration responses to urea and litter applications. New Zealand Journal of Agricultural Research, 50, 2007

PRESENTATIONS

Emery I, Kempisty D, Fain B, and Mbonimpa E. Life Cycle Evaluation of PFAS Remediation Scenarios. ISIE-ISSST Joint Conference, Chicago IL, June 29, 2017

Isaac Emery and Andrew Telesca. Tradeoffs in Human Health: Aircraft Safety & Fuel Use. ISIE-ISSST Joint Conference, Chicago IL, June 28, 2017

Isaac Emery and Sally Brown. Low-Carbon Urban Lettuce. LCA XV, Vancouver BC, Oct 8, 2015

Isaac Emery. Direct and Indirect Greenhouse Gas Emissions from Biomass Storage: Implications for Life Cycle Assessment of Biofuels.
Invited Seminar, University of Washington, Seattle WA, March 7, 2014.
Invited Seminar, Idaho National Laboratory, Idaho Falls ID, June 4, 2014

Emery I, Dunn J, Han J, and Wang M. Feedstock Supply Pathways Influence Net Emissions from Biofuels. ASABE 2013, Kansas City, MO, July 24, 2013.

Isaac Emery and Nathan Mosier. One Billion Tons: Feedstock Storage in Life Cycle Assessment of Bio-Ethanol. Invited Seminar, Argonne National Laboratory, Darien IL, Oct 16, 2011.

RESEARCH EXPERIENCE

Postdoctoral Associate, Air Force Institute of Technology, WPAFB, OH Aug 2015 – present
Developed new methodologies and integrated model analyses for social cost and environmental impacts assessment of passenger vehicle transportation. Coordinated data collection and life cycle assessment modeling for a variety of projects, including groundwater remediation technologies and aircraft fuel emissions.

Environmental Research Consultant, Self Employed, Seattle WA Oct 2013 – Dec 2016
Assessed land use change, urban agriculture, and bioenergy life cycle impacts for clients including the University of Washington, University of Illinois-Chicago and Argonne National Laboratory.

Resident Associate (Intern), Argonne National Laboratory, Darien IL Feb – Apr 2012
Developed probability distributions for biomass losses during harvest & storage. Incorporated data on cellulosic biomass feedstock supply chains into the GREET model of energy and emissions in transportation systems.

EPA STAR Graduate Fellow, Purdue University, West Lafayette IN Sept 2011 – Dec 2013
Graduate Research Assistant, Purdue University, West Lafayette IN Sept 2009 – Aug 2011
Lynn Fellow, Purdue University, West Lafayette IN Aug 2008 – Aug 2009
Conducted experiments on biomass decay and greenhouse gas emissions during grass storage. Developed models to correlate emissions with dry matter losses, and used data and models to improve LCA accounting for biofuels.

Research Scientist, U of Washington School of Medicine, Seattle WA 2006 – 2008
Implemented research projects to elucidate the physiological and molecular mechanisms of atherosclerosis in mice. Managed several mouse colonies and trained and supervised two undergraduate assistants.

Research Assistant, Whitman College, Walla Walla WA 2004 – 2005

Research Assistant, Lincoln University, Lincoln, New Zealand 2004

Research Assistant, Oregon State University, Corvallis OR 2000 – 2002

PROFESSIONAL ACTIVITIES

Invited Contributor, Sowing Seeds in the City Sept 2013 – Feb 2015
Developing general and technical content for a textbook on urban agriculture, including a comparative life cycle assessment of lettuce production and review of ecosystem services.

Co-founder/Volunteer Scientist, Heroes in Green, Seattle WA 2009 – 2013
Worked with internet, art, and business professionals to create a web-based game encouraging players to develop a low-impact lifestyle. Developed a database of water, landfill, and greenhouse gas impacts of 'everyday' activities and products.

Invited Presentation, ESE IGP External Review, Purdue University, West Lafayette IN Dec 2013
Direct and indirect greenhouse gas emissions from biomass storage: implications for life cycle assessment of biofuels

Invited Seminar, Rotary Club of Delphi, IN Sept 2012
Corn Ethanol: Between a Grain and a Hard Place.

Ecological Sciences and Engineering Keystone Series Planning Committee 2011 – 2013
Worked with a multidisciplinary team of graduate students to plan an annual seminar series for students and the broader University community about crucial environmental issues.

Professional Development Coordinator, ABE Graduate Student Association 2011 – 2012
Developed monthly professional development events for graduate students in the Agricultural and Biological Engineering department.

Ecological Sciences and Engineering Symposium Planning Committee 2009 – 2011
Speaker Committee Chair, 2010
Coordinated with a dozen classmates to expand the annual student-organized event, doubling attendance and featuring nine speakers, including keynote presenters from the US EPA and Duke Energy. Survey results show participants thought it a great success.

TEACHING EXPERIENCE

Guest Lecturer, ENV 556, Air Force Institute of Technology Jan 2017
Guest Lecturer, EEE 430, Purdue University Jan 2017
Guest Lecturer, MEE 472/RCL 572, University of Dayton Mar 2016
Guest Lecturer, EEE 430, Purdue University Jan 2016
Guest Lecturer, ENV 556, Air Force Institute of Technology Jan 2016
Guest Lecturer, ME 597, Purdue University Oct 2012

Teaching Assistant, CE 597 Sustainable Energy and Construction Practices in Brazil May 2012
Worked with 25 students and 2 faculty to develop & refine daily written and photographic reviews of material covered during an intensive 10-day Study Abroad course at 13 sites in Brazil.

Peer-to-Peer Mentor, Purdue University, West Lafayette IN 2009 – 2011
Guided first-year graduate students in the Ecological Sciences and Engineering graduate program.
Assessed students' written work and facilitated semester projects, including a review of issues in global food security, submitted to the journal Science.

Laboratory Assistant, Whitman College, Walla Walla WA 2004 – 2005

AWARDS AND HONORS

Tau Beta Pi, Engineering Honors Society Member 2013
Certificate of Excellence, Purdue University Interdisciplinary Graduate Programs 2011
Frederick N Andrews Travel Grant, Purdue University 2011
Finalist, ERM Sustainability Foundation Fellowship 2011
Five Students who are Making Global Impact, Purdue University 2010
Honorable Mention, NSF Graduate Research Fellowship Program 2009
Biological Sciences Award, Whitman College 2004
Whitman Internship Fund Grant Award, Whitman College 2004

POSTER PRESENTATIONS:

Emery I, Mbonimpa E, Kumar S, Muthukumarappan K, Wei L, Jahndideh A, Singh S, and Owens V. Life cycle assessment of drop-in biofuels from prairie cordgrass. ASABE 2017, Spokane WA, July 17 2017.

Isaac Emery and Nathan Mosier. Impact of feedstock loss during storage on life cycle greenhouse gas emissions for biofuel production. LCA XII, Tacoma WA, Sept 24-27, 2012.

Isaac Emery and Nathan Mosier. Integrating dry matter losses and direct gas emissions during biomass storage into life cycle inventory models of switchgrass- and Miscanthus-based ethanol production. 34th Symposium on Biotechnology for Fuels and Chemicals, New Orleans LA, Apr 30-May 3, 2012.

Isaac Emery and Nathan Mosier. Sorghum and Switchgrass storage systems' impact on net greenhouse gas emissions from cellulosic ethanol production. American Forage and Grassland Council Annual Conference, French Lick IN, June 12-15, 2011.

Isaac Emery and Nathan Mosier. Sorghum and Switchgrass storage systems' impact on net greenhouse gas emissions from cellulosic ethanol production. 33rd Symposium on Biotechnology for Fuels and Chemicals, Seattle WA, May 2-5, 2011.

Emery I, Park J, Sajeev E M, Mosier N. From Hay Bales to Biofuels: The Environmental and Economic Importance of Hay Storage. Purdue Day at the Statehouse, Indianapolis IN, Mar 22, 2011.

Isaac Emery and Nathan Mosier. The Impact of Dry Matter Loss during Biomass Storage on Net Greenhouse Gas Emissions from Biofuels Production. Frontiers in Bioenergy Symposium, Purdue University, April 25, 2010.
2nd Place 'Best Student Poster'

Emery I, Park J, Sajeev E M, Mosier N. The Influence of Dry Matter Loss during Biomass Storage on Net Greenhouse Gas Emissions during Ethanol Production from Corn Stover. 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater Beach FL, April 19-22, 2010

Isaac Emery and Nathan Mosier. The Impact of Dry Matter Loss during Biomass Storage on Net Greenhouse Gas Emissions from Biofuels Production. 3rd Annual Ecological Sciences and Engineering Symposium, Purdue University, Sept. 25, 2009
2nd Place 'Best Student Poster'

S Farris, R Krishnan, **I Emery**, L Du, T Chu, A Buben, K Qian, H Dichek, D Dichek. Both Macrophage-expressed Urokinase-Type Plasminogen Activator (uPA) and the uPA Receptor Accelerate Murine Atherosclerosis. ATVB 9th annual conference, April 2008.

D Dichek, R Krishnan, M Kremen, **I Emery**, J Hu, K Slezicki, A Wu, K Qian, L Du, A Plawman, A Stempien-Otero, H Dichek. Macrophage-expressed uPA, Plasminogen, and uPAR Enhance the Progression of Murine Atherosclerosis. Gordon Research Conference: Plasminogen Activation & Extracellular Proteolysis, February 2008

COMMUNITY INVOLVEMENT:

WeWork coworking community member — Feb – July 2015
Discussion host for ESE Keystone III: Genetically Modified Crops, April 15 2015

ASABE, member — 2013 – present

American Center for Life Cycle Assessment, member and volunteer — 2012 – present
Volunteer conference staffer at LCA XII; conference abstract reviewer 2013-2015