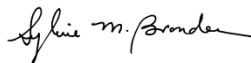


SYLVIE M. BROUDER



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Academic Record.

B.A., Biology, 1985, Harvard University, Cambridge, MA
Ph.D., Ecology, 1993, University of California, Davis, CA
Postdoctoral Associate, Agroecology, 1993-1995, University of California, Davis, CA

Faculty/Professional Appointments

1995-2000 Assistant Professor, Agronomy Department, Purdue University
2000-2005 Associate Professor, Agronomy Department, Purdue University
1997-pres. Director, Water Quality Field Station, Purdue University Core Facility
2005-pres. Professor, Agronomy Department, Purdue University
2009-2013 Assist. to the Dean (25% FTE), College of Agriculture, for
Agroecology/Smarter Agriculture™ Program Development
2012-pres. Wickersham Chair of Excellence in Agricultural Research

Memberships in Professional Societies and Organizations

- American Society of Agronomy
- Crop Science Society of America
- Soil Science Society of America
- American Association for the Advancement of Science
- Ecological Society of America
- Agriculture, Food and Human Values Society
- Phi Sigma, Gamma Delta Chapter
- Epsilon Sigma Phi, Alpha Lambda Chapter
- Gamma Sigma Delta, Purdue University Chapter
- Purdue University Cooperative Extension Specialists Association
- Sigma Xi, Purdue University Chapter

Awards and Honors Received (9 Fellowship, Scholarship, Merit & Publication Awards prior to 2005; 4 Educational/Extension Materials Awards from Professional Societies 2006 - present)

2004-2005 Faculty Fellow, Study in a Second Discipline, Dept. of Statistics, Purdue University
2005 Fellow, American Society of Agronomy
2008 Team Award, College of Agriculture, Purdue University
2009 Certified Senior Ecologist, Ecological Society of America (5-yr; renewable)
2010 Purdue University Spirit of the Land Grant Award for excellence across the tripartite Land Grant mission
2011 Fellow, National Academies *Keck Futures Initiative* Conference on Ecosystem Services
2012 Wickersham Chair of Excellence in Agricultural Research
2012 - 2014 Fellow, Cohort 8, Food Systems Leadership Institute

2014 – 2017 Appointee, EPA Standing Science Advisory Board

Agriculture and Food Security: Leadership Contributions/Experiences (selected appointments, agenda setting, program development, evaluation, scientific boards ...)
Purdue Program Development (R/T/E).

- The Water Quality Field Station (WQFS), A Purdue University “Core” Facility. The WQFS (est. 1992) is a highly instrumented, in-field laboratory for the study of C, N and water cycling in agroecosystems and of agricultural management impacts on the environment. Brouder directs research activities, pursues inter- and extramural funding to maintain base facility operations and manage the accruing database, and assists colleagues in the development and implementation of extramurally funded projects leveraging the facility’s capabilities. Since assuming leadership of the facility in 1997, Brouder has elevated the WQFS profile including its official listing as a Purdue “core” facility and increasing extramural funding from virtually nothing to >\$1M yr⁻¹ in projects that use the facility for one or more objectives (2008 – present). While receiving limited, recurring internal funds (currently <20K yr⁻¹), Brouder has also increased University reinvestment in the facility through targeted projects and internal competitions. Currently, the WQFS serves as the testbed for the “Sensor Pilot Study,” a project within the Purdue Plant Sciences Initiative (<https://ag.purdue.edu/plantsciences/Pages/default.aspx>; ~200K/270K implemented/planned investment).
- Purdue Smarter Agriculture™ Initiative. Brouder’s experiences with the WQFS data record, her Study in a Second Discipline in the Statistics Dept. and as an Extension specialist charged with knowledge translation led Brouder and colleagues in Agronomy and Libraries to launch the Smarter Ag™ Initiative. Facilitated by Brouder’s 3-yr administrative appointment with the Dean and coinciding with emerging federal agency policies on “open access’ data, the goal of the initiative is to improve the evidence base for management and policy to ensure a safe, sustainable and secure food supply. Key elements include workflows and policy for data curation and preservation in research repositories (e.g. Purdue Univ. Research Repository, <https://purr.purdue.edu/>) and reuse by secondary users, development and implementation of curricula around data competencies, and development of novel models for data sharing in public-private partnerships. Numerous, funded pilot projects are currently ongoing or under development including with the National Agricultural Libraries, the International Plant Nutrition Institute, and a consortium of Land Grant Univ. across the US. Outreach activities (presentations, press releases, white papers and working groups) target federal agency program managers, industry professionals/stakeholders in the data value chain, professional societies and Experiment Station Deans and Directors. At Purdue, the initiative now extends well beyond Brouder-led activities and is part of the branding of the overall Plant Sciences Initiative.
- Pillars of Excellence Initiative of the Offices of the Provost and Executive Vice President for Research and Partnerships (July 2015). Member of small team (5 experts; 2 internal to Purdue) convened to advise administration on best faculty-driven/preeminent team visions for advancing and investing in the Life Sciences with the 5-yr goal of improving Purdue’s rankings in biology (top 30, US News and World Report), other rankings (top 50 – 75, Times Higher Education, Academic Rankings of World Universities), and increasing NIH funding. Team recommendations have been forwarded to the Purdue President; a decision on investment(s) is pending.

Purdue Faculty Governance and Policy Administration.

- Faculty Censure and Dismissal Committee (Member, 2006 – 2011; Chair, 2012 – 2015). Lead formal investigations of faculty misconduct, convene hearings on proposed termination of faculty tenure, rule on motions and procedural matters and oversee the drafting of majority/minority reports on committee findings and recommendations for the Faculty Senate and President. During her tenure, Brouder provided substantive feedback to the Faculty Affairs Committee on coherence of C&D procedures with other Purdue faculty policies on academic freedom and responsibilities and with AAUP Statements on Procedural Standards for Faculty Dismissal precipitating the first formal review of tenure policies since 1977.
- Food Systems Leadership Development. Brouder was nominated by Purdue's Dean Akridge to the Food Systems Leadership Institute (FSLI), Cohort 8 (2012 – 2014). A program of APLU with support from the WK Kellogg Foundation, FSLI is for leadership development of upper-level leaders in higher education, government, and industry with a focus on improving leadership performance, skills for leading change and instilling broad perspectives of the 21st century food system. Brouder's Fellow's Project focused on development of the Purdue's Smarter Ag Initiative ("Open Access Data and Opportunities for Smarter Agriculture™" Impact Statement at http://www.fsli.org/cohort_8.html). Previously, Brouder was nominated to and completed the ESCOP/ACOP Leadership Development Program (Class 11, 2001 – 2002; program reinvented as Lead 21 in 2004).
- Panel A, University Promotions Committee (7/08 – 6/11). Appointed by Provost Woodson to serve as one of four faculty on the 19 member panel that reviews all cases (main and regional campuses) for promotion and tenure that are advanced from departments through all 10 colleges (90 to 115 documents annually), evaluates candidates for honorary degrees, and advises the provost on issues related to the implementation of tenure policy at the department and college levels. During Brouder's tenure, the committee initiated reviews of the scholarship of teaching and extension and associated changes have now been implemented at department and college levels. Brouder's selection for Panel A and her interest in data and Libraries drove a supplemental appointment to by the Dean of Libraries to their P&T Committee (7/09 – 6/11).

UN FAO/CGIAR. Independent expert/evaluator for the Independent Evaluation Arrangement for CGIAR Research Programs (CRPs) and for the Independent Science and Partnership Council (ISPC)

- CRP Wheat (April 2014 – April 2015). Evaluation Team: W. Beversdorf (Lead), S. Brouder, D. Templeton, R. Sulaiman, P. Sachdeva. Program expenditures total 40.8 and 47.7 Mil USD in 2012 and 2013, respectively. Brouder responsible for evaluation of program components on natural resource and crop management and assessment of overall Quality of Science (50 d commitment). Team-authored documents: 1) Inception Report – CRP Wheat Evaluation (50 pp.), 2) Final Report: Evaluation of CRP on Wheat (97 pp.), and 3) Annexes (Vol II) Evaluation of CRP in Wheat (58 pp.). (Info. avail at <http://iea.cgiar.org/evaluation/crp-evaluation-wheat>)
- CRP Water, Land, and Ecosystems (WLE, Feb. 2015 - present). Evaluation Team: J. Soussan (Lead), E. Fereres, C. Batchelor, S. Brouder, E. Rathgeber. Program expenditures total 55.5, 58.5 and 55.2 Mil USD in 2012, 2013 and 2014, respectively. Brouder responsible for evaluation of program components addressing restoration of degraded agricultural ecosystems and assessment of overall Quality of Science including development of the assessment protocol (50 d commitment). Team-authored documents: Inception Report: CRP

on Water, Land and Ecosystems (WLE; 78 pp.); final report is under development. (Info. avail. at <http://iea.cgiar.org/evaluation/crp-evaluation-water-land-and-ecosystems-wle>)

- ISPC Commissioned Review of Conservation Agriculture (CA) practice efficacy for Sub-Saharan Africa and South Asia. Sponsored in conjunction with an ISPC initiative to evaluate the role of CA practices in meeting CGIAR system-level outcomes (7/2012 – 1/2014); Brouder project focused on quality of science for evidence of CA impacts on crop yields. Initiative results published in special edition of *Agriculture, Ecosystem, and the Environment*. The ISPC initiative has led to the evolution of the research agenda with in CGIAR projects from the one-size-fits all CA approach to the more flexible, externally-conditioned sustainable or ecological intensification approach.

US Environmental Protection Agency Standing Science Advisory Board: Appointed for 3-yr term for expertise in ecology, climate sciences and agriculture to provide independent advice on technical issues underlying the EPA’s policy and decision making (12/2014 – 9/2017). Recent SAB reviews include: EPA’s Draft Fourth Drinking Water Contaminant Candidate List inclusive of the protocols for including or excluding candidate contaminants and pathways for regulatory action, Draft SAB Consultation Report “Early Advice on an Ensemble Modeling Approach for Developing Lake Erie Phosphorus Objectives” (Brouder lead reviewer), and Draft Reports on EPA’s Integrated Risk Information System (IRIS) Toxicological Reviews (ammonia, trimethylbenzenes, and ethylene oxide) inclusive of the review of IRIS protocols. (<http://yosemite.epa.gov/sab/sabpeople.nsf/WebCommittees/BOARD>)

Networking and Partnering for Program Development

- US Agency for International Development. Served as a technical consultant for USAID-USDA Research Priorities to help shape research priorities and set a new agenda for agricultural research (Washington, D.C., Feb. 25-26 2010). Follow-up activities included the Feed the Future Research Forum Group 9 (Brouder Recorder and Conference Reporter on Research Challenge II: Improve soil fertility, quality, and conservation; Washington, D.C. June 21 – 23, 2011) and invited participation in the Board for International Food and Agricultural Development (BIFAD) Public Meeting on Globalization of University-USAID Partnerships for a presentation on Sustainable Intensification and panel discussion addressing the development of the new USAID Innovation Labs for established research priorities in IPM and Sustainable Intensification (Columbia, MO, March 14-15, 2013; YouTube video at <https://www.youtube.com/watch?v=joeb6igiTjg&noredirect=1>).
- AGree (Agriculture research, education, extension transforming food and ag policy). Invited expert to 5 member working group tasked with setting national goals for agricultural production and environmental outcomes (April 2013 – April 2014); output “Working Landscapes: Achieving Productivity, Profitability, and Environmental Outcomes (http://foodandagpolicy.org/sites/default/files/AGree%20WLI_2014.pdf).
- International Plant Nutrition Institute (IPNI): Brouder has a long-standing relationship with IPNI (a not-for-profit, science-based organization supported by manufacturers of plant nutrients; formerly the Potash and Phosphate Institute). She has served formally on their Round Table / Advisory Committee for external review of IPNI goals and agendas and maintains an ongoing consultation (2013 to present) with IPNI leadership in developing i) an organization-wide data stewardship strategy inclusive of systematic review and data repository infrastructure (pilot funded in 2015), and ii) an international roadmap for potassium research to deliver improved K management globally (co-planned / co-led

- “Frontiers in K” workshop convening 12 international experts, Kona, HI, Jan. 26 – 28, 2015. Road mapping results available at <http://www.ipni.net/article/IPNI-3396>.
- European Commission Joint Research Center on Science Advice to Policy. Invited expert for Foresight Study to identify useful European Union policy interventions to affect 2030 global food security, contribution to 2nd Workshop on “Geography of Global Food Security.” Outcomes of the 3 workshop series summarized in “Global Food Security 2030: Assessing Trends in View of Guiding Future EU Policies.” (<https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/global-food-security-2030-assessing-trends-view-guiding-future-eu-policies>)
 - Bill and Melinda Gates Foundation. At BMGF convening on “Perennial Grain Crops for Smallholder Farmers,” invited expert to present/lead discussion on environmental considerations and ecosystem service tradeoffs for a potential Foundation investment in perennial grain development (Seattle Washington, Oct. 25-26, 2012). Subsequent service included independent peer reviewer of proposals (no further information can be provided as per required non-disclosure agreement).
 - “Feeding the World, Ethically”. Invited participant in working group sponsored by the Global Food Ethics Project of the Johns Hopkins Univ. Berman Institute of Bioethics, Bloomberg School of Public Health and the School of Advanced International Studies (funded by the Stavros Niarchos Foundation). Initial Mtg. Oct. 6-9, 2014, in Ranco, Italy. Convened 17 international experts in science, policy and society research domains relevant to food security/ethics (Brouder, crop production) to build shared conceptual framework for identifying distinctly moral disagreements / challenges impeding global food availability. Output: “The 7 by 5 Research and Policy Agenda: 7 Projects to Make Progress on Ethics and Global Food Security in 5 years”; funding is currently being pursued for these projects by the working group.
 - US EPA-USDA-USGS Working Groups on Management Strategies for Reactive Nitrogen and Co-Pollutants. Brouder invited participant in Workgroup 3 on Technical Solutions – On-farm Nutrient Management and Restoration / Mitigation (2014).
 - Fostering Public Private Partnerships on Open Access Data. Brouder developer/convenor of (i) Special Symposium “Beyond File Cabinets and Field Notes: Extending the Lifecycle and Utility of Agronomic Data” (Inter. Meeting of the Amer. Soc. Agron.-Crop Sci. Soc. of Amer.-Soil Sci. Soc. of Amer. Oct. 21-24, 2012, Cincinnati, OH) and (ii) follow-up “Smarter Agriculture – A dialogue on critical data for agriculture,” an invite-only, 2-d workshop for 70 “stakeholders” in open access data and the data value chain including research, Extension, industry and policy (Oct. 10-11, 2013, Potomac, MD). Brouder participant in G-8 “International Conf. on Open Data for Ag (April 29-30, 2013). Provided written commentary to National Res. Council’s open public meeting on needs/challenges of achieving open access data. Led Alliance of Crop, Soil and Environmental Sci. Soc. (ACSESS) Board Mtg discussion on professional society opportunities w/ open access data (Nov. 2, 2013). Currently serve on ACSESS201.1 – ACSESS Data Standards Task Force for developing data standards to facilitate open access data initiatives and consult with AgMIP (Agricultural Model Inter-comparison and Improvement Project) and CIMANS (Center for Integrated Modeling for Sustainable Agriculture and Nutritional Security) on availability / quality of data for extending crop models to nutrient cycling / use efficiency.

Other Academic and Professional Service

- XVI and XVII International Plant Nutrition Colloquium: Co-chair Plant Nutrition for Sustainable Development and Global Health, Session B on Nutrient Management for Sustainability and Productivity, (XVI, Aug. 26-30, 2009, Sacramento, CA), edit XVI Proceedings for publication, and Co-Chair Nutrient Cycling, Ecosystems, and Climate Change Session (XVII, Aug, 19-22, Istanbul, Turkey).
- Landgrant Inst. Global Food Centers. Invited member of the Purdue Center for Global Food Security, Executive Steering Committee (2013 – present; conducting needs assessment for new M.Sc. program in Food Security targeted to international professionals in R4D) and of the Institute for Food and Agriculture Literacy at the UC Davis World Food Center, Scientific Advisory Board (2015 – present).
- Journal of Global Food Security Editorial Advisory Board. Serving a 3-yr term on inaugural EAB (Jan 1, 2012-present).
- Ecological Society of America Board of Professional Certification (BCP). Elected to the 7-member board. The BCP administers the society's Certification Program and reviews/awards several ranks of professional certification (3-yr term, 2013 – present).
- Nicolas Institute for Environmental Policy: External peer review for Packard Foundation commissioned research synthesis to inform the California Air Resources Board in incorporating agriculture/GHG in their scoping reports, 2013; Technical consultant to Technical Working Group on Agricultural Greenhouse Gasses (T-AGG) as expert on N₂O and methane reductions, 2010.
- Agricultural Conservation Innovation Center's Ad hoc Committee to Develop Insurance Programs for BMPs, 1999; Nitrogen Management Expert Panel, 1999.
- US Department of Energy. Research portfolio review for Bioenergy Technology Office's Sustainability and Feedstock Research investment. Serve on 5 member team tasked with thorough evaluation of success of funded projects in meeting BETO mandates and required metrics (April 2011 and May 2013 biennial review sessions).
- US Federal Competitive Grants Programs. Panelist for (i) CSREES NRI Managed Ecosystems, 2003, 2005; (ii) NIFA AFRI Soil Processes Program, 2009; (iii) NSF Organism-Environment Interactions – Plants, 2012.
- Professional Science Consortia and ACSESS (recent activities). (i) 15 Societies participating in the Climate Sciences Working Group: Climate Science Day to inform Members of Congress of scientific achievements and build relationships with the scientific community (Feb. 2013 and Jan. 2014); (ii) Alliance of Crop, Soil and Environmental Science Societies (ACSESS) w/ the American Association of Animal Sciences: Presenter and expert panelist for "Snack and Fact" Policy briefing program for US House Ag. Committee (April 22, 2013); (iii) ACSESS Committee to Co-Author Official Tri-Societies (ASA-CSSA-SSSA) "*Position Statement on Climate Change*," Aug. 2010 – 2012, (iv) ACSESS Data Stewardship Committee (June 2014 – present).
- Crop Science Society of America. Appointed to Science Policy Committee (2015 – present).
- Soil Science Society of America Journal Editorial Board. Associate Editor of Div. S-4 (Soil Fertility and Plant Nutrition) 2003 to 2009; Subcommittee: SSSAJ competitiveness 2003.
- American Society of Agronomy. Planning Committee and Chair for 2015 Annual Mtg. Plenary Session on "Getting more from science: Deploying data for sustainable solutions." Div. A-8 (Integrated Agricultural Systems) Chair-Elect (2002), Incoming Chair (2003), Chair (2004); Annual Meetings Session Chair: Div. S-4 (1995); Div. S-8 (1997), and Div.

S-4 (1999); Selection Committee for the Werner L. Nelson Award for Diagnosis of Yield Limiting Factors. 1997 to 1998 and 2002 to 2004; Chair Feasibility Committee for Information Guide for Wetlands Management of Agricultural Systems, ASA Monographs Committee

- US North Central (NC) Region (NCR) Research/Education Committees. Purdue Univ./Indiana representative to (i) NCR-13 on Soil Testing and Plant Analysis, 1996 to 2009 (Member-at-large 2007); (ii) NC-218 on Characterizing N Mineralization, 1998 to 2006 (Member-at-large 1999, Secretary 2000, Chair 2001 to 2002); (iii) NC1032 on Characterizing active soil organic matter pools controlling soil N availability in maize-based cropping systems, 2006 to 2013; (iv) NCR-103 on Nontraditional Soil Additives, 1998-2006 (Chair 1999), and (v) NCR-180 on Site-Specific Management, 1997 to 2002.
- Regional Extension-Industry Conference Planning. Kentuckiana Crop Production Seminar, Planning Committee 1996-2004; Indiana Program Director, 1998 to 2004; Seminar Chair, 1999, 2002 and 2003. North Central Extension-Industry Soil Fertility Conference. Conference Planning Committee, 1998; State Representative, 1998 to 2004.
- Industry Advisory Boards. Indiana Plant Food Ag Chemical Association's Agribusiness Council and Knowledge Committee (1996-2004); University Advisory Board of Agrilience (formerly Farmland Industries), 1998-2005; Indiana Soybean Alliance: Strategic Planning Committee, 2013.
- Commodity Competitive Grant Programs. Proposal review for Wisconsin and California Fertilizer Research Programs – Reviews for scientific merit, recurring.
- iPlant Collaborative. Genotype-to-Phenotype (iPG2P) Grand Challenge Project Plant Nutrition Working Group, 2010 – 2013.
- US Department of Agriculture's Agricultural Research Service. Expert Review of 293 pp. commissioned report Global Climate Change, Food Security and the US Food System to “ensure that the materials are applicable to food security decision makers across multiple sectors.” Peer Review Panel for Office of Scientific Quality Review 2011 Watersheds, Water Availability, and Ecosystems Restoration Program, 2006-2007
- Commercial Soil Testing Industry. Serve on the Coordination of Official Methods of Soil Analysis Committee (S889), Soil Science Society of America, 1999 to 2002. Director of the Indiana Certification Program for Commercial Soil Testing Laboratories, 1997 - 2009. North American Proficiency Testing Program for Quality Assurance in Public and Private Laboratories: Steering Committee, 1996 to 1997; Proposal Committee, 1997, and appointed member of the Soil Science Society of America Ad-hoc committee, 1997.
- Purdue University Service (recent/selected). Purdue Water Community (PWC) Executive Committee Member (2010 – present); Ecological Sciences and Engineering Interdisciplinary Graduate Program, Governance Committee (2008 – present).

Professional Themes and Skills

- **Research:** Design/implementation/statistical analysis of field and controlled environment experiments on nutrient budgets and plant-soil nutrient cycling process in crop plants including sampling strategies and designs for spatio-temporal considerations, environmental C and N losses and crop nutrient use efficiency. Evaluation of agroecosystem viability / sustainability with emphasis on air, soil and water quality ecosystem services in a changing climate. Examination of rooting dynamics, the root-soil interface and root/shoot ecophysiology and linkages to genetic basis of abiotic stress tolerance. Multivariate statistical

approaches to analysis of environmental data sets. Analysis of scientific outputs (from science domains, research portfolios, etc.) for quality, inference space including relevance to smallholder farmers and usefulness in policy and management recommendation development.

- ***Evidence-based Agriculture and Extension***: Increase rigor and relevance of Extension programming through application of systematic (quantitative) reviews (SR) with meta-analysis as a robust/transparent model for translation of the rapidly accruing empirical research results into evidence-based management and policy contextualized to biophysical and socio-cultural conditions. Develop a collaborative infrastructure modeled on the Cochrane Collaborative for evidence-based medicine (<http://www.cochrane.org/>) including (i) educational modules for conducting high quality SRs and meta-analytical techniques, (ii) data repositories for SR protocols and extracted SR data to permit cumulative SRs on key questions, and (iii) workflows, tools and policies for acquiring and including non-traditional (e.g. farmer-, consultant- or industry-originated) data with research data in the development of farm- or site-/location-specific recommendations.

Professional, Peer-reviewed Publications (journal articles, book chapters, datasets, etc.)

1. Cibin, R., Trybula, E., Chaubey, I., Brouder, S., Volenec, J.J. 2015. Watershed impacts of bioenergy crops on hydrology and water quality using improved SWAT model. *GCB Bioenergy*. DOI: 10.1111/gcbb.12307.
2. Orr, M-J., Gray, M.B., Applegate, B., Volenec, J.J., Brouder, S.M., Turco, R.F. 2015. Transition to second generation cellulosic biofuel production systems reveals limited negative impacts on the soil microbial community structure. *Applied Soil Ecology*. 95:62-72.
3. Trybula, E., Raj, C., Burks, J., Chaubey, I. Brouder, S.M., Volenec, J. 2014. Perennial rhizomatous grasses as bioenergy feedstock in SWAT: Parameter development and model improvement. *GCB Bioenergy*. DOI: 10.1111/gcbb.12210.
4. Brouder, S., De Armond, N., Turco, R., Volenec, J. 2014. Maize grain yield record for the WQFS (1995-2012). Data publication. Purdue University Research Repository. doi:10.4231/R7RN35SJ.
5. Brouder, S.M., H. Gomez-McPherson. 2014. The impact of conservation agriculture on smallholder agricultural yields: A scoping review of the evidence. *In special issue "Evaluating conservation agriculture for smallholders in developing countries."* *Agriculture, Ecosystems and Environment*. 187:11-32.
6. Brouder, S.M., and R.F. Turco. 2014. Soil Nitrogen and Carbon Cycling. *Encycl. of Natural Resources*. Ed. Y.Q. Wang. Taylor and Francis Encyclopedia Program.
7. Volenec, J.J. and S.M. Brouder. 2014. Nutrient Deficiencies and Toxicities. In L.H. Rhodes and D. Sumac (eds). *Compendium of alfalfa diseases and pests (3rd edition)*. Am. Phytopathological Soc., Minneapolis, MN. pp. 113-117.
8. Brouder, S.M., J.J. Volenec. 2013. Open Access Data: A Federal Mandate and Agriculture's Opportunity. *Members Forum, CSA News* Pp. 26-28, Dec. 2013, doi: 10.2134/csa2013-58-12-14.
9. Adams, M.M., T.J. Benjamin, N.C Emery, S.M. Brouder, K. Gibson. 2013. The effect of biochar on native and invasive prairie plant species. *J. Invasive Plant Sci. Management*. 6(2):197-207.
10. Butler, R., S.M. Brouder, W.G. Johnson, K. Gibson. 2013. Response of four summer annual weed species to mowing frequency and height. *Weed Technology*. 27(4): 798-802.

11. Woodson, P., J.J. Volenec, S.M. Brouder. 2013. Field-scale potassium and phosphorus fluxes in the bioenergy crop switchgrass: Theoretical energy yields and management implications. *J. Plant Nutri. Soil Sci.* 176:387-399.
12. Berg, W.K., S. Lissbrant, J.J. Volenec, S.M. Brouder, B.C. Joern, K.D. Johnson, and S.M. Cunningham. 2012. Phosphorus and potassium influence on alfalfa nutrition. Data Publication. Purdue University Research Repository. DOI: 10.4231/D3251FJ7S.
13. Ale, S., L.C. Bowling, P.R. Owens, S.M. Brouder, J.R. Frankenberger. 2012. Development and application of a distributed modeling approach to assess water-shed scale impact of drainage water management. *Ag. Water Management.* 107:23-22.
14. Ale, S., L.C. Bowling, M.A. Youssef, S.M. Brouder. 2012. Evaluation of simulated strategies for reducing nitrate-N losses through subsurface drainage systems. *J. Environ. Qual.* 41:217-228.
15. Adeuya, R., N. Utt, J. Frankenberger, L. Bowling, E. Kladvko, S. Brouder, B. Carter. 2012. Impacts of drainage water management on subsurface drain flow, nitrate concentration, and nitrate loads in Indiana. *J. Soil Water Conserv.* 2012 67(6):167A-172A.
16. Climate Change Position Statement Working Group. 2011. Position Statement on Climate Change. Working Group Rep. ASA, CSSA, and SSSA, Madison, WI, May 11, 2011.
17. Hernandez-Ramirez, G., S.M. Brouder, D.R. Smith, G.E. Van Scoyoc. 2011. Nitrogen partitioning and utilization in corn cropping systems: rotation, N-source, and N timing. *European J Agron.* 34:190-195.
18. Hernandez-Ramirez, G., S.M. Brouder, M.D. Ruark, R.F. Turco. 2011. Nitrate, phosphate, and ammonium loads at subsurface drains in the eastern cornbelt: Agroecosystem and nitrogen management. *J. Environ. Qual.* 40:1229-1240.
19. Fernandez, F.G., S.M. Brouder, J.J. Volenec, C.A. Beyrouthy, R. Hoyum. 2011. Soybean shoot and root response to localized water and potassium in a split-pot study. *Plant Soil.* 344:197-212.
20. Brouder, S.M. Nutrient cycling in soils: Potassium. 2011. *In Soil Management: Building a Stable Base for Agriculture*. J.L. Hatfield and T.J. Sauer (eds.). ASA-SSSA, Madison, WI. Pp. 79-102.
21. Ale, S., L.C. Bowling, J.R. Frankenberger, S.M. Brouder, E.J. Kladvko. 2010. Climate variability and drain spacing influence on drainage water management system operation. *Vadose Zone J.* 9:43-42.
22. Lissbrant, S., S. Cunningham, S.M. Brouder, J.J. Volenec. 2010. Identification of fertility regimes that enhance long-term productivity of alfalfa (*Medicago sativa* L.) using cluster analysis. *Agron. J.* 102:580-591.
23. Berg, W., S. Cunningham, S. Brouder, B. Joern, K. Johnson, J. Volenec. 2009. Influence of phosphorus and potassium on alfalfa yield, taproot C and N pools, and transcript levels of key genes after defoliation. *Crop Sci.* 49:974-982.
24. Fernandez, F.G., S.M. Brouder, J.J. Volenec, C.A. Beyrouthy, R. Hoyum. 2009. Root and shoot growth, seed composition, and yield of no-till rainfed soybean under variable potassium. *Plant and Soil.* DOI 10.1007/s11104-009-9900-9.
25. Lissbrant, S., S. Stratton, S.M. Cunningham, S.M. Brouder, and J.J. Volenec. 2009. Impact of long-term phosphorus and potassium fertilization on alfalfa nutritive value-yield relationships. *Crop Sci.* 49:1116-1124.
26. Ale, S., L.C. Bowling, S.M. Brouder, J.R. Frankenberger, M.A. Youssef. 2009. Simulated effect of drainage water management operational strategy on hydrology and crop yield for

- drummer soil in the Midwestern United States. *Agricultural Water Management*. 96:653-665.
27. Ruark, M., S.M. Brouder, and R.F. Turco. 2009. Dissolved organic carbon from tile drained agro-ecosystems. *J. Environ. Qual.* 38:1205-1215.
 28. Hernandez-Ramirez, G., S.M. Brouder, D.R. Smith, G.E. Van Scoyoc and Greg Michalski. 2009. Nitrous oxide production in an Eastern Corn Belt soil: Sources and redox range. *Soil Sci. Soc. Am. J.* 73:1182-1191.
 29. Hernandez-Ramirez, G., S.M. Brouder, D.R. Smith, and G.E. Van Scoyoc. 2009. Greenhouse gas fluxes in an Eastern Corn Belt soil: Weather, N source and rotation. *J. Environ. Qual.* 38: 841-854.
 30. Hernandez-Ramirez, G., S.M. Brouder, D.R. Smith, and G.E. Van Scoyoc. 2009. Carbon and nitrogen dynamics in an eastern corn belt soil: N Source and Rotation. *Soil Sci. Soc. Am. J.* 73:128-137.
 31. Brouder, S.M., J.J. Volenec, R. Turco, D.R. Smith, G. Ejeta. 2009. Nutrient-use efficiency in bioenergy cropping systems: Critical research questions. Keynote Address. *In Proc. of the XVI International Plant Nutrition Colloquium: Plant Nutrition for Sustainable Development and Global Health*, Aug. 26-30, Sacramento, CA. 9 pp. <http://www.escholarship.org/uc/item/0444k0tp?query=Brouder>.
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112. Raj, C., I. Chaubey, S.M. Brouder, L.C. Bowling, K. Cherkauer, J. Frankenberger, R.R. Goforth, B.M. Gramig, and J.J. Volenec. 2014. Sustainability analysis of bioenergy driven land use change under climate change and variability. Poster H53E-0909. American Geophysical Union Fall Meeting. Dec. 15-19, 2014. San Francisco, CA. USA.
113. Long, M., J.J. Volenec, and S.M. Brouder. 2014. Lignocellulosic Theoretical Ethanol Production of Potential Bioenergy Sorghum Genotypes, ASA-CSSA-SSSAJ Annual International Mtg, Long Beach, CA. Nov. 2 – 5, 2014.
<https://scisoc.confex.com/scisoc/2014am/webprogram/Paper87703.html>
114. Orr, M.J., M. Bischoff Gray, S. M. Cunningham, N, De Armond, J. J. Volenec, S. M. Brouder and R. F. Turco. 2014. Comparative Analysis of Soil Properties and Greenhouse Gas Flux Responses to Nitrogen Fertilization in Bioenergy Production Systems, ASA-

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<https://scisoc.confex.com/scisoc/2014am/webprogram/Paper88067.html>
115. Dierking, R., J. J. Volenec, S. M. Brouder, and D. Allen, TX, Shell, Houston, TX
 Miscanthus Yields and Tissue N Concentrations during Establishment with Various N-Rates Grown on Marginal Soils. ASA-CSSA-SSSAJ Annual International Mtg, Long Beach, CA. Nov. 2 – 5, 2014.
<https://scisoc.confex.com/scisoc/2014am/webprogram/Paper86714.html>
 116. Brouder, S.M. 2014. The Potassium Crusades: On the Cusp of the Age of Enlightenment. ASA-CSSA-SSSAJ Annual International Mtg, Long Beach, CA. Nov. 2 – 5, 2014.
<https://scisoc.confex.com/scisoc/2014am/webprogram/Paper85919.html>
 117. Raj, C., I.C. Chaubey, S.M. Brouder, J.J. Volenec, and K. Cherkauer. 2013. Watershed scale environmental sustainability analysis of biofuel production in changing land use and climate scenarios. AGU Annual Meetings, Dec. 9-13, San Francisco, CA.
 118. Rivera Burgos Sr., L. A, S.M. Brouder, J.J. Volenec, and G. Ejeta. 2013. Development of brown midrib sweet sorghum as a biomass crop for ethanol production. Abstract 367-50. Inter. Meeting of the Amer. Soc. Agron.-Crop Sci. Soc. of Amer.-Soil Sci. Soc. of Amer. Nov. 2-6, Tampa, FL.
 119. Issa, S., S.M. Brouder, J.J. Volenec, T.S. Murrell, and I. Chaubey. 2013. An in-depth study of growth, stover and grain predictions of Hybrid-Maize and CERES-Maize in rainfed conditions in northwestern Indiana. Abstract 198-2. Inter. Meeting of the Amer. Soc. Agron.-Crop Sci. Soc. of Amer.-Soil Sci. Soc. of Amer. Nov. 2-6, Tampa, FL.
 120. Long, M.K., J.J. Volenec, and S.M. Brouder. 2013. Theoretical ethanol yield for potential bioenergy sorghum genotypes of differing compositions. Abstract 373-9. Inter. Meeting of the Amer. Soc. Agron.-Crop Sci. Soc. of Amer.-Soil Sci. Soc. of Amer. Nov. 2-6, Tampa, FL. <https://scisoc.confex.com/crops/2013am/webprogram/Paper80060.html>
 121. Volenec, J.J. R.B. Mitchell, D. Laird, D.K. Lee, C. Rosen, S.M. Brouder, R.F. Turco, E. Heaton, K.J. Moore, I. Chaubey, J. Lamb, and M. Casler. 2013. Evaluating perennial grasses for biomass production in diverse cropping systems in the Central United States (cenUSA). Proc. Am. Assoc. Industrial Crops. (in press).
 122. Volenec, J.J, S.M. Brouder, S. Lissbrant, W.K. Berg and P. Woodson. 2013. Cluster analysis in forms physiological and species-specific responses of alfalfa, maize and switchgrass to P and K nutrition. Int. Plant Nutrition Coll., Aug. 18-22, Istanbul, Turkey.
 123. Turco, R.F., P. Chivenge, J.J. Volenec, and S.M. Brouder. 2012. Opening our file cabinets and field notes with meta-analysis: An approach to overcome the soil C sequestration data void. Abstract 179-3. Inter. Meeting of the Amer. Soc. Agron.-Crop Sci. Soc. of Amer.-Soil Sci. Soc. of Amer. Oct. 21-24. Cincinnati OH.
<http://scisoc.confex.com/scisoc/2012am/webprogram/Paper74076.html>
 124. Trybula, E., I. Chaubey, J. Frankenberger, S.M. Brouder, and J.J. Volenec. 2012. Quantifying ecohydrological impacts of perennial rhizomatous grasses on tile discharge. Abstract 297-9. Inter. Meeting of the Amer. Soc. Agron.-Crop Sci. Soc. of Amer.-Soil Sci. Soc. of Amer. Oct. 21-24. Cincinnati OH.
<http://scisoc.confex.com/scisoc/2012am/webprogram/Paper75175.html>
 125. Dierking, R., J.J. Volenec, and S.M. Brouder. 2012. The potential of maize and sorghum biomass grown on marginal sites. Abstract 247-5. Inter. Meeting of the Amer. Soc. Agron.-Crop Sci. Soc. of Amer.-Soil Sci. Soc. of Amer. Oct. 21-24. Cincinnati OH.
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126. Long, M., J.J. Volenec, and S. M. Brouder. 2012. Nitrogen impacts on the yield and cell wall composition of contrasting sorghum lines used for biomass. Abstract 383-8. Inter. Meeting of the Amer. Soc. Agron.-Crop Sci. Soc. of Amer.-Soil Sci. Soc. of Amer. Oct. 21-24. Cincinnati OH.
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128. Burks, J., S.M. Brouder, J.J. Volenec. 2012. Seasonal Accumulation and Partitioning of Carbon- and Nitrogen-Containing Compounds in Perennial Bioenergy Crops. Abstract 99-4. Inter. Meeting of the Amer. Soc. Agron.-Crop Sci. Soc. of Amer.-Soil Sci. Soc. of Amer. Oct. 21-24. Cincinnati OH.
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131. Brouder, S.M., R. Turco, J. Volenec, G. Ejeta, D.R. Smith, L. Bowling, I. Chaubey, B. Gramig. Nitrogen partitioning and utilization in bioenergy cropping systems. *In* Proceedings of the 6th Frontiers in Bioenergy Conference & US-Brazil Symposium on Sustainable Bioenergy. West Lafayette, IN, May 15 -18 2011.
132. S.M. Brouder and J.J. Volenec. 2012. Impact of Climate Change on Crop Nutrient and Water Use Efficiencies: What we know we don't know. Plant Growth, Nutrition and Environment Interactions Conf., University of Veterinary Medicine, Vienna, Austria. Feb 18 – 21. Plenary
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134. Brouder, S.M. 2011. Alternatives to Traditional Approaches to Fertilizer Recommendations. Symposium on Development of Soil-Test Based Recommendations: Historical Perspectives, Current Issues, Future Directions. *In* Proceedings of the ASA-CSSA-SSSA Annual Meetings, San Antonio, TX, Oct. 16 – 19, 2011. <http://a-c-s.confex.com/crops/2011am/webprogram/Paper63885.html>.
135. Smith, D.R., D. Bucholtz, S. Brouder, J. Volenec, R. Turco, G. Ejeta. 2011. Greenhouse gas emissions from traditional and biofuel cropping systems. Symposium on Crop Influences on GHG Emissions and Soil C Sequestration. *In* Proceedings of the ASA-CSSA-SSSA Annual Meetings, San Antonio, TX, Oct. 16 – 19, 2011. <http://a-c-s.confex.com/crops/2011am/webprogram/Paper64779.html>.
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139. Brouder, S.M. 2011. Comparative Agro-ecological Performance of Perennial and Annual Biomass Systems: Metrics and Data Workflows. *In* Proceedings of the China-US 2011 Joint Symposium on Global Sustainability Issues in Energy, Climate, Water and Environment. West Lafayette, IN, Sept. 26 – 29.
140. Brouder, S.M. 2011. Minimum plant and soil metrics for characterizing Environment (E) x Management (M) impacts on crop performance. *In* Proceedings of the Yield Gap Assessment Workshop, Beijing, China, Aug. 31 – Sept. 2.
141. Brouder, S.M., and J.J. Volenec. 2010. Environmental impacts of using annual crops for biofuel. ASA-CSSA-SSSA International Meetings, Oct. 31 to Nov. 4, 2010. Presentation No. 250-1. <http://a-c-s.confex.com/crops/2010am/webprogram/Paper57723.html>.
142. Brouder, S.M., and J.J. Volenec. 2010. Grain and dual purpose production: system efficiencies, limitations, and potential. ASA-CSSA-SSSA International Meetings, Oct. 31 to Nov. 4, 2010. Presentation No. 124-2. <http://a-c-s.confex.com/crops/2010am/webprogram/Paper58277.html>.
143. Burks, J, J.J. Volenec, and S.M. Brouder. 2010. Cycling Dynamics in Perennial Bioenergy Crops. *Agron. Abstracts*. Poster No. 56-14 N. <http://a-c-s.confex.com/crops/2010am/webprogram/Paper59353.html>.
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145. Volenec, J.J., S.M. Brouder, and R.F. Turco. 2010. Agroecological considerations when growing biomass. China-US 2010 Joint Symp. on Energy, Ecosystem, and Environmental Change. Beijing, China. September 22-24.
146. Brouder, S.M., R.F. Turco, and J.J. Volenec. 2010. Nitrogen use efficiency in bioenergy cropping systems. 2nd China-US Workshop on Biotechnology of Bioenergy Plants. Beijing, China. September 19-21.
147. Volenec, J.J. and S.M. Brouder. 2010. Water-use efficiency in biomass cropping systems. 2nd China-US Workshop on Biotechnology of Bioenergy Plants. Beijing, China. September 19-21.
148. Hernandez-Ramirez, G. and S.M. Brouder. 2010. Reactive nitrogen cycling and potential ecosystem services trade-offs in an eastern Corn Belt soil. *In* Soil Solutions for a Changing World, Proceedings of the 19th World Congress of Soil Science, Aug. 1-6, 2010, Brisbane, Australia.
149. Ale, S., L.C. Bowling, M.A Yosef, S.M. Brouder, J.R. Frankenberger. 2010. Potential watershed nitrate load reduction with drainage water management under varied implementation options. ASABE 9th International Drainage Symposium held w/ joint CIGR & CSBE/SCGAB Proceedings. June 13 -16, Quebec, CA.

150. Volenec, J.J., S.M. Brouder, R.F. Turco, G. Ejeta, and D. Smith. 2010. Impact of water and nitrogen on biomass production and ecosystem services. *Frontiers in Bioenergy*, Purdue University, May 24-25.

Funded Research, Extension and Teaching Projects: (active over last 5 yrs)

(50 funded projects totaling 5.55M active 1996 – 2009 including: 14 federal and state contracts totaling 3.9M; 18 industry and private foundation awards, contracts and gifts totaling 1.1M, and 18 Purdue University competitive research awards and fellowships totaling 0.55M. Federal and state agencies included the Natural Resource Conservation Service, the Indiana Dept. of Environmental Management, the North Central Sustainable Agriculture Research and Education program, the US Department of Agriculture, the US Environmental Protection Agency, and the National Science Foundation. Private industry, commodity groups and foundations included the United Soybean Board, the Indiana Soybean Board, New Holland, IMC Agribusiness, Emerge, Agrium, the Potash and Phosphate Institute, the National Pork Producers, Georgia Pacific, the Showalter Trust, Pheasants Forever, and the Boeing Corp.)

47. 4R Research Fund of the Foundation for Agronomic Research. Proposal for a 4R Fund Research Repository (4R Fund RR). S.M. Brouder, J.J. Volenec, M. Bracke, A. Barton. 2015 – 2017. \$169,663. Research and Extension.
48. NCR-SARE. Evaluating the Impact of Biochar on Soil Fertility and Crop Productivity through Farmer Participatory Research and Student Internship Program. K. Gibson, S.M. Brouder, T.J. Benjamin, A.F. Thompson. 2014 – 2017. \$198,453. Fully Integrated.
49. USDA NIFA AFRI. cenUSA bioenergy, Coordinated Agricultural Project (CAP) in Bioenergy. Purdue Univ. sub-award from IA State Univ. (lead institution). J. Volenec (PU lead PI), S.M. Brouder, R. Turco, C. Chaubey, K. Johnson, P. Murphy, K. Orvis, N. Carroll, N. Olynk, C. Martin, K. Ileleji, C. Martin (PU Co-PIs). 2011 – 2016. \$3,700,000 (PU) of \$25 Million (total award to 6 institutions). Fully Integrated.
50. USDA/DOE North Central Sungrant Program. Optimization of Biomass Productivity and Environmental Sustainability for Cellulosic Feedstocks: Land Capability and Life Cycle Analysis. S.M. Brouder, R.F. Turco, J.J. Volenec, B. Gramig, D. Allen (Mendel Biotechnology, Inc.), and W. Tyner. 2010 – 2013. \$875,000. (\$700,000/\$175,000 sponsor/required match.) Integrated.
51. NIFA National Needs Fellowship. Graduate education to meet the agro-ecosystem services (AES) challenge. 2010 – 2015. \$236,000. L.S. Lee, S.M. Brouder, J.J. Volenec, K.D. Gibson, L.S. Prokopy. Education.
52. DOE. Watershed scale optimization to meet sustainable cellulosic energy crop demand. I. Chaubey (PI), L. Bowling, S.M. Brouder, K. Cherkauer, B. Engel, J. Frankenberger, R. Goforth, B. Gramig, P. Murphy, J.J. Volenec (Co-PIs). 2010 – 2014. \$1,991,177 (w/ match); \$1,592,385 (cost to sponsor). Research and Extension
53. International Plant Nutrition Institute. Global Maize Initiative. J.J. Volenec, PI, S.M. Brouder, T. Vyn, R.F. Turco, B.C. Joern, R.L. Nielsen, and R.F. Turco Co-PIs. 2008 – 20XX. \$97,000. Integrated/
54. Potash Corporation of Saskatchewan and the Mosaic Company. Graduate Fellowship in Potassium Research. \$400,000. 2002 – present. S.M. Brouder, C. Beyrouty, J.J. Volenec, T. Vyn and B.C. Joern, CoPIs.

55. International Plant Nutrition Institute. Gift funds to support research on productivity and environmental impacts of bioenergy crops. 2008-20XX . \$47,500. J.J. Volenec, S.M. Brouder, R.F. Turco.
56. NSF REU Program. Purdue REU Site: Tackling Some of the Grand Challenges for Engineering. I. Hua, PI, S.R. Hoffman, J.W. Sutherland, R. Turco, S. Brouder, L. Nies, E.C. Blatchley, M.T. Harris, F. Zhao, T. Harton, Co-PIs. 2010 – 2013. Education.
57. Purdue University-Moi University (PUMU) Partnership Seed Grants. Internationalizing soil and crop science curricula at Purdue and Moi Universities. D.G. Schulze, L. Unruh-Snyder, B. Joern, S. Brouder, G. Van Scoyoc, P. Owens, D.E. Stott. (AGRY) w/ W. Ng’etich, J.R. Okalebo, C.O. Othieno, P. Kisinyo, C. Serrem (Moi University). \$7000. Education.
58. USAID ISE Program. A Sub-Saharan Context for Internationalizing Crop, Soil, and Environmental Science Curricula. Schulze, D.G. (PI), G.E. Van Scoyoc, L.U. Snyder, B. Joern, P.R. Owens, S.M. Brouder, M. Crawford, H. Rowe, N. Freeman, D. Stott, W. Ng’etich, P. MnKen 2010 – 2013. \$150,000. Education
59. USDA NIFA-AFRI Long-term Sustainable Agroecosystem Program-Sustainable Agricultural Systems (LTAP-SAS). Environmental and Productivity Benefits of Ecological Intensification of U.S., Maize-based Cropping Systems. S.M. Brouder, J.J. Volenec, R.F. Turco, T.S. Murrell, B. Gramig, L. Prokopy, H. Zhang, T. Vyn, C. Gerber. 2009 - 2013. \$200,000. Integrated
60. USDA NRI Managed Ecosystems Program. Ecological services of agro-biofuels: Productivity, soil C storage and air and water quality. 2008 – 2013. \$399,999. S.M. Brouder, PI, J.J. Volenec, R.F. Turco, G. Ejeta, and D.R. Smith, CoPIs. Research.
61. USDA Special Programs (Washington) Project. National Test Facility for Aerospace Fuels and Propulsion. \$1,360,000. D. Stanley, D. Lopp, J.M. Thom (Aviation Technology), S.M. Brouder (Agronomy), S. Heister (Aeronautic and Astronautic Engineering), G. Shaver (Mechanical Engineering), R. Steuterman (Energy Center). Integrated.
62. NIFA/USDA Special Programs (Washington) Project. Integrated economic, environment, and technical analyses of sustainable biomass energy systems. (FY09 & FY10) \$351,263 (direct costs). W. Tyner, S.M. Brouder, L. Lee, B. Engel. Integrated.
63. NIFA/USDA Special Programs (Washington) Project. Midwest Center for Bioenergy Grasses Phase I (FY09 & FY10). \$351,236 (direct cost). N. Carpita, PI, S.M. Brouder, D. Buckmaster, G. Ejeta, K. Ileleji, N. Mosier, J.J. Volenec, C.R. Weil. Bioenergy group represents cropping system component. Integrated.

Students and Post Doctorates Advised

Externally funded undergraduates in summer research programs (2011 – present): 6 NSF-funded Research Experience for Undergraduate summer fellows; 1 Summer Research Opportunity Program fellow.

Graduate students under the direct supervision of Dr. Brouder:

Jason Wells	M.S. (1998) co-advised w/ Dr. C. Nakatsu; Non-thesis option.
Alexis Heldt	M.S. (1999); <i>Cover crop impacts on corn and soybean N acquisition and yield.</i>
Brenda Hofmann	M.S. (2002); <i>Influence of tile spacing on crop yields, nitrate concentrations and nitrogen flux in drainage water.</i>
Adam Brock	M.S. (2004); <i>Approaches to variable rate nitrogen management in the eastern corn belt</i>

Fabian Fernandez	Ph.D. (2006) co-advised w/ Dr. C. Beyrouthy; <i>Potassium acquisition by soybean as affected by stratified soil potassium, growth stage, and soil water content.</i>
Matt Ruark	Ph.D. (2006); <i>Fate of dissolved organic carbon in tile drained agroecosystems.</i>
Jamalyn Evans	M.S. (DNF) co-advised w/ Dr. J. Volenec; <i>Impact of phosphorus and potassium on alfalfa root morphology.</i>
Guillermo Hernandez	Ph.D. (2007); <i>Carbon sequestration in corn under four management systems: Greenhouse gas fluxes and soil organic carbon fractions</i>
Brad Carter	M.S. (2007) co-advised w/ Dr. E. Kladvko; <i>Effects of controlled drainage on crop growth, soil quality, and nitrate loading in watersheds.</i>
Andrea Bongen	M.S. (2007); <i>Metals in the Indiana environment.</i>
Sofia Lissbrant	Ph.D. (2008); co-advised w/ Dr. J. Volenec; <i>Innovative strategies for determining critical nutrient levels for alfalfa performance</i>
Jennifer Burks	Ph.D. (2013); co-advised w/ Dr. J. Volenec. <i>N cycling in candidate biofuel crops</i>
Monique Long	Ph.D. (expected 2015); <i>Physiology of N use efficiency in sorghum</i>
Ronald Navarrete	Ph.D. (2014); <i>Potassium availability and use efficiency in maize/soybean production systems</i>
Salah Issa	M.S.E. (2012); <i>Predicting maize productivity potential in humid regions of the U.S. Corn Belt with Hybrid Maize</i>
Patrick Woodson	M.S. (2011) co-advised w/ Dr. J. Volenec; <i>Switchgrass productivity potential on marginal soils</i>
Amanda Montgomery	M.S. (2015); co-advised w/ I. Chaubey; <i>Water quality impacts of bioenergy crops</i>
Elizabeth Trybula	Ph.D. (expected 2016); <i>Comparative nutrient cycling of maize and sorghum across water availability gradients in South Africa and the US</i>

Service on graduate student advisory committees: 20 M.Sc./M.S.E and 20 Ph.D. students in the following departments/programs: Agronomy, Agricultural Economics, Agricultural Engineering, Civil Engineering, Forestry and the Ecological Science and Engineering Integrated Graduate Program.

Postdoctoral employees under Dr. Brouder's supervision: Frederick Wanjau (1999 – 2001); Katerina Dontsova (co-advised with T. Vyn: 2002), Pauline Nhamo (2010 – 2012), Ryan Dierking (2011 – present). Mary-Jane Orr (2012 – present). Visiting Scholars: Dr. X. Fang (2002 – 2003) Chinese Academy of Science; Dr. Xiaokun Li (2014 – present), Chinese Agricultural University.

Classroom Teaching

AGRY 515 Plant Mineral Nutrition: Developed / instructor of record for 3-credit dual-level course that has been taught every other year beginning fall semester of 1996. The course is designed for students in the biological and agricultural sciences who require a comprehensive

understanding of mechanisms controlling nutrient availability in soils, and nutrient assimilation and physiological function in higher plants. Diagnostic symptoms for nutrient imbalances are linked to the assimilation and transport processes and functions of minerals in plant metabolism. The course provides students with a broad understanding of the ecological principles and genetic aspects of mineral nutrition, including disease resistance, interactions with microbial communities in the rhizosphere, genetic variation in uptake- and use-efficiency, competition, and adaptation to deficiencies and toxicities.

Contributions to other courses and curriculum:

ASM 322 Technology for Precision Agriculture and related text: (3 cr): A 3-module, multi-disciplinary course that is team-taught by Agricultural Engineering, Agronomy and Agricultural Economics faculty. Developed the portion of the curriculum pertaining to soil sampling and analysis, and plant nutrient management – a 2-wk module including lectures on the heterogeneous nature of soil chemical and physical properties, and on the theory and practice of fertility recommendations. The class includes discussions and lab exercises that explore the concept of scale of management.

AGRY 399 Undergraduate Directed Projects (3 cr): Dr. Brouder supervises undergraduate credit experiences in the soil fertility, plant nutrition and water quality. Projects are components of field research projects, and they typically combine field, laboratory, data handling / manipulation and writing experiences

AGRY 598: Ecosystem Services: Charting a Path to Sustainability (1 cr): Participatory seminar emphasizing ecosystem services as a framework for decision making in natural resource / land use and stewardship. The goal of this course was to stimulate critical thinking of MS and PhD students studying at the interface between agriculture and the environment, with a focus on sustainability.

AGRY 696 Graduate Seminar (1 cr): Participatory seminar class the responsibility for which is rotated among Agronomy faculty. The objective is to enhance graduate student skills for critically reviewing and analyzing scientific (peer-review) literature, leading discussions of literature with audiences of mixed expertise, and presenting justification for new research.

Borlaug Summer Institute for Global Food Security: Member of teaching cohort (responsible for Ecosystem Sustainability segment). Program is targeted at beginning graduate students interested in developing a holistic understanding of conceptual challenges around Global Food Security. The goal of my portion of the curriculum is to foster critical thinking about key environmental problems and trade-offs / synergies of potential development activities.

Sustainable Farming Systems Major in the Purdue College of Agriculture: With other AGRY faculty (R. Turco, J. Volenec) worked with BTNY, AgEcon, and Animal Science Faculty to develop the requirements for the interdisciplinary major. Major approved in Dec. 2013 College of Agriculture Faculty Meeting. First student cohort targeted for fall 2014.

Guest Lectures: Single lecture in numerous courses including AGRY 365 Soil Fertility (multiple topics); AGRY 560 Soil Physics (Topic: Introduction to Geostatistics); AGRY 101 (Topic: Managing Natural Resources); ABE 591Y Instrumentation and Data Acquisition (Topic: Real

World Sensor Function), AGE 569 Global Land Use Change (Topic: Biodiversity, Ecosystem Services and Agriculture) and Environmental Sciences and Engineering Graduate Colloquium (Topics: Tradeoffs and Tensions among Ecosystem Services, Sustainable Intensification, Extensification versus Intensification in Agricultural Landuse).

REFEREES: Please notify me prior to contacting my referees.

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