

BIOGRAPHICAL SKETCH

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A. Professional Preparation

<u>Degree</u>	<u>Major/Year</u>	<u>Institution</u>
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

B. Research and Professional Experience

Academic Appointments

1995-2000	Assistant Professor, Agronomy Department, Purdue University
2000-2005	Associate Professor, Agronomy Department, Purdue University
1997-pres.	Director, Purdue University Water Quality Field Station
2005-pres.	Professor, Agronomy Department, Purdue University
2009-2013	25% Admin appt. in Ag. Res. Prog. Off. for Agroecology

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, Council for Agricultural Science and Technology, Phi Sigma, Gamma Delta Chapter, Epsilon Sigma Phi ~ Alpha Lambda Chapter, Gamma Sigma Delta ~ Purdue University Chapter, Council for Agricultural Science and Technology, Ecological Society of America

Current Service to Science

2013 – pres.	Elected member, ESA Board of Professional Certification
2014 – pres.	Appointee, EPA Standing Science Advisory Board
2014 – pres.	Chair, ACSESS201.1 – ACSESS Data Standards Task Force
2015 – pres.	CSSA Science Policy Committee
2016 – pres.	Appointee, Scientific Committee, Israeli Center for Fertilization and Plant Nutrition

C. Awards and Honors (9 Fellowship, Scholarship, Merit & Publication Awards prior to 2005)

2004-2005	Faculty Fellow, Study in a Second Discipline, Dept. of Statistics, Purdue Univ.
2005	Fellow, American Society of Agronomy
2005	Certificate for Excellence in Service, Soil Science Society of America Journal
2006	2 Extension Materials Awards: Publications Category, American Society of Agronomy
2007	2007 Entomology Educational Project Award
2008	Purdue Univ. 2008 Team Award for Crop Diagnostic Training & Research Center
2009/2015	Certified Senior Ecologist, Ecological Society of America
2010	Purdue Univ. Spirit of the Land Grant Award for exceptional impact of integrated programs
2012	Wickersham Chair of Excellence in Agricultural Research
2012	Food Systems Leadership Institute – Fellow Cohort 8
2017	Fellow, American Society for the Advancement of Science

D. Synergistic Activities and Projects:

Research Skills and Interests: 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 with 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. Examination of rooting dynamics, the root-soil interface and root/shoot ecophysiology. Multivariate statistical approaches to analysis of environmental data sets.

Director of Purdue University Water Quality Field Station (WQFS): Brouder directs research activities at the WQFS, a multi-user, in-field laboratory dedicated to the study of C and N cycling in agro-ecosystems. She assists other researchers in mining data from the long-term database associated with this facility and is involved in numerous interdisciplinary projects focusing on relationships between nutrient cycling and agricultural sustainability with colleagues representing a broad array of disciplines.

Purdue Smarter Agriculture™ Initiative: Experiences with the WQFS data record, and as an Extension specialist charged with knowledge translation led Brouder and colleagues in Agronomy and Libraries to launch the Smarter Ag™ Initiative. 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.

Contributions to Education & Teaching: Brouder teaches Plant Mineral Nutrition, at the advanced undergraduate / graduate level and Soil Fertility (required for undergraduate majors). Brouder has advised 11 MSc and 10 PhD students, 5 post-doctoral associates and 3 visiting scholars and has served on committees for 22 MSc and 21 PhD students in Crop / Soil Sciences, Plant Breeding, Civil and Agric.& Biol. Engineering, Agric. Economics, and Forestry.

Major Grants and Contracts (active over last 5 years)

1. DOE. Watershed scale optimization to meet sustainable cellulosic energy crop demand. 2010 – 2015. \$1,991,177. CoPI
2. USDA NIFA AFRI. census bioenergy, Coordinated Agricultural Project (CAP) in Bioenergy. Purdue Univ. sub-award from IA State Univ. (lead institution). 2011 – 2015. \$3,700,000. CoPI.
3. NCR-SARE. Evaluating the Impact of Biochar on Soil Fertility and Crop Productivity through Farmer Participatory Research and Student Internship Program. 2014 – 2017. \$198,453. CoPI.
4. USDA NIFA AFRI. Assessing the long run sustainability of US agriculture in an integrated global economy. 2016-2017. \$500,000. CoPI.
5. USDA NIFA AFRI. PAgES: An Interdisciplinary Science Workshop on Payments for Agroecosystem Services. 2016 – 2017. \$49,500. Research Conference. CoPI.
6. 4R Research Fund of the Foundation for Agronomic Research. Proposal for a 4R Fund Research Repository (4R Fund RR). 2015 – 2017. \$169,663. PD.
7. NSF. BD Spokes: PLANNING: MIDWEST: Cyberinfrastructure to Enhance Data Quality and Support Reproducible Results in Sensor Originated Big Data. 2016 – 2018. \$99,938. CoPI.
8. USDA NIFA AFRI. Cover Crops for Co-Production of Bioenergy, Food, Feed (BFF) and Ecosystem Services (ES). 2017 – 2021. \$498,000. PD.
9. FFAR – 4R Research Fund. Coordinated Site Network for Studying the Impacts of 4R Nutrient Mgmt on Crop Production/Nutrient Loss. 10/1/2017-9/30/2020. Total: \$2M; Purdue Share: \$324,365. CoPI
10. Sumitomo Chemical Corp. Plant Screening Program-Phenotyping Phase 0 to 2. 10/1/2016-9/30-2018. \$1,152,919. CoPI
11. NSF. NRT- INFEWS: Collaborative Research: Sustainable Food, Energy and Water, Systems (SFEWS). 2017 – 2022. \$2,709,005. CoPI

E. Recent Publications (last 4 years):

Refereed Journal Papers

1. 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*. <http://dx.doi.org/10.1016/j.agee.2013.08.010>
2. Trybula, E., Raj, C., Burks, J., Chaubey, I. Brouder, S.M., Volenec, J. 2015. Perennial rhizomatous grasses as bioenergy feedstock in SWAT: Parameter development and model improvement. *GCB Bioenergy*. 7:1185-1202. <https://doi.org/10.1111/gcbb.12210>
3. 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](https://doi.org/10.1111/gcbb.12307)
4. 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. <https://doi.org/10.1016/j.apsoil.2015.06.002>.
5. Dierking, R.M., Allen, D.J., Brouder, S.M. Volenec, J.J. 2016. Yield, biomass composition, and N use efficiency during establishment of four *Miscanthus × giganteus* genotypes as influenced by N management. *Biomass and Bioenergy*. 91:98-107. <https://doi.org/10.1016/j.biombioe.2016.05.005>
6. Morell, F.J., Yang, H.S., Cassman, K.G., Van Wart, J., Elmore, R.W., Licht, M., Coulter, J.A., Ciampitti, I.A., Pittelkow, C.M., Brouder, S.M., Thomison, P., Lauer, J., Graham, C. Massey, R., Grassini, P. 2016. Can crop simulation models be use to predict local to regional maize yields and total production in the US Corn Belt? *Field Crops Res*. 192:1-12.
7. Ojeda, J.J., Volenec, J.J., Brouder, S.M., Caviglia, O.P., Agnusdei, M.G. 2017. Evaluation of Agricultural Production Simulator (APSIM) as yield predictor of *Panicum virgatum* and *Miscanthus x giganteus* in several US environments. *GCB Bioenergy*. 9:796-816. [doi: 10.1111/gcbb.12384](https://doi.org/10.1111/gcbb.12384)
8. Grassini, P., Pittelkow, C.M., Cassman, K.G., Yang, H.S., Archontoulis, S., Licht, M., Lamkey, K.R., Ciampitti, I.A., Coulter, J.A., Brouder, S.M., Volenec, J.J., Guidin-Garcia, N. 2017. Robust spatial frameworks for leveraging research on sustainable crop intensification. *Global Food Security*. <http://dx.doi.org/10.1016/j.gfs.2017.01.002>. <https://doi.org/10.1016/j.gfs.2017.01.002>
9. Dierking R.M., D.J. Allen, S.M. Cunningham, S.M. Brouder, and J.J. Volenec. 2017. Nitrogen dynamics in above and belowground tissues of two *Miscanthus × giganteus* genotypes under various N fertilization rates. *Front. Plant Sci*. DOI: [10.3389/fpls.2017.01618](https://doi.org/10.3389/fpls.2017.01618).
10. Ojeda, J.J., J.J. Volenec, S.M. Brouder, O.P. Caviglia, M.G. Agnusdei. 2018. Modelling stover and grain yields, and subsurface artificial drainage from long-term corn rotations using APSIM. *Agric. Water Manage*. 195:154–171. <https://doi.org/10.1016/j.agwat.2017.10.010>
11. Berg, W.K., S. Lissbrant, S.M. Cunningham, S.M. Brouder, and J.J. Volenec. 2018. Cluster analysis of phosphorus and potassium effects on plant persistence and taproot C and N reserves of alfalfa (*Medicago sativa* L.). *Plant Sci*. <https://doi.org/10.1016/j.plantsci.2018.02.026>
12. Ojeda, J.J., J.J. Volenec, S.M. Brouder, O.P. Caviglia, M.G. Agnusdei. 2018. Modelling stover and grain yields, and subsurface artificial drainage from long-term corn rotations using APSIM. *Agric. Water Manage*. 195:154–171. <https://doi.org/10.1016/j.agwat.2017.10.010>

Refereed Book Chapters

1. 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.

2. Brouder, S.M., and R.F. Turco. 2014. Soil Nitrogen and Carbon Cycling. *Enycl. of Natural Resources*. Ed. Y.Q. Wang. Taylor and Francis Encyclopedia Program.
3. Brouder, S.M., and J.J. Volenec. 2017. Future climate change and plant macro-nutrient use efficiency. pp. 357-379. *In* Plant macro-nutrient use efficiency: Molecular and genomic perspectives. Hossain, M.A., Kamiya, T., Burrit, D.J., Phan Tran, L.-S., Fujiwara, T. (Eds.). Elsevier. ISBN: 9780128113080.

Published data sets

1. 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. Purdue Univ. Research Repository. [DOI: 10.4231/D3251FJ7S](https://doi.org/10.4231/D3251FJ7S). (3,622 views, 1,248 downloads as of 7/25/2018)
2. Brouder, S.M., N. De Armond, R.F. Turco, and J.J. Volenec. 2014. Maize grain yield record for the WQFS (1995-2012). Purdue Univ. Research Repository. [DOI: 10.4231/R7RN35SJ](https://doi.org/10.4231/R7RN35SJ) (11,283 views, 1182 downloads as of 7/25/2018)