

Brian K. Gelder
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Ames, IA 50014
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EDUCATION

- Iowa State University, Ames, IA*
Co-Ph.D. in Soil Science/Agricultural Engineering 2007
Dissertation: "Land Management Database Development: Methods for Delineating Management Units and Estimating Crop and Residue cover"
- Colorado State University, Fort Collins, CO*
M.S. in Bioresource Engineering 2002
Graduated with Honors
Thesis: "Colorado's Front Range Reservoirs: A Regional Investigation of Eutrophication Modeling"
- Iowa State University, Ames, IA*
Double B.S. in Agronomy/Agricultural Engineering 2000
Graduated with Distinction
Honors Program Thesis: "Water Quality of Des Moines Lobe Agricultural Streams"

HONORS & AWARDS

- Young Engineer of the Year, Iowa Section ASABE 2012
- Journal of SWCS Research Paper Honorable Mention 2011
- Research Excellence Award, Iowa State University
- Who's Who Among Students in American Universities 2007
- Agronomy Department Premium Endowed Fellowship, Iowa State University 2002 – 2006
- Agronomy Department Outstanding Graduate Student Award, Iowa State University 2006
- Chemical & Bioresource Engineering Department Fellowship, Colorado State University 2000
- Iowa State University nominee for USA Today Academic All America Team 2000
- First Place ASAE K.K. Barnes Paper Contest 1999
- Alpha Epsilon Honor Society 1997
- Alpha Zeta Honor Society 1997

FUNDED RESEARCH

- "Nebraska Elevation Hydro-enforcement and ACPF Expansion Completion"** \$378,365 from USDA NRCS Nebraska (PI), Agreement 68-6526-18-002 12/2017-6/2020
- "Nebraska Elevation Hydro-enforcement and ACPF Expansion Trial"** \$70,739 from USDA NRCS Nebraska (PI), Agreement 68-6526-16-503 9/2016-12/2017
- "Development of Daily Erosion Project estimates and addition of WEPS estimates to DEP for agricultural counties in Minnesota"** \$387,578 from Minnesota Board of Soil and Water Resources/University of Minnesota (PI) 4/2016-12/2019

"Extending Land Use Data for Use with the Agricultural Conservation Planning Framework" \$30,000 from USDA ARS (PI), Agreement 59-5030-6-003	3/2016- 07/2017
Stream and Watershed Delineations using LiDAR Data \$49,844 from Iowa Department of Transportation HRB TR 692 (PI)	8/2015- 3/2017
"Development of Remote Sensing Protocols for Inventory of Nutrient Management Practices" (PI) \$70,000 from Iowa Nutrient Research Center	7/2014- 6/2016
" Evaluation of Current USDA Contour Buffer Strip Designs as Resources for Pollinators and for Meeting Goals of Water Quality Improvement in Iowa" (Key role; Mary Harris PI) \$150,000 from US Department of Agriculture	8/2013- 12/2015
"Attribution of changes in precipitation intensity over the central United States" (Key role; Ray Arritt PI) \$1,100,000 from US Department of Agriculture	4/2013- 3/2016
"GIS Automation of LiDAR DEM Cutting for Hydrologic/Hydraulic Modeling" \$112,488 from Iowa Institute for Hydraulic Research (PI)	3/2011 – 6/2012
"Automation of DEM Cutting for Hydrologic/Hydraulic Modeling" \$73,873 from Iowa Department of Transportation (PI)	3/2011 – 2/2015
"Farmer Perspectives on Ecosystem Service Management, Land-Use Targeting, and the Future of Cornbelt Agriculture" \$80,769 from Leopold Center (Co-PI; John Tyndall, PI) Project to evaluate farmer perspectives using IFARM as a survey tool.	3/2011- 2/2013
"Crop Rotation Mapping for Biofuel Production" \$53,364 from US DoE Sun Grant (Co-PI; Rob Anex, PI)	12/2009- 9/2011
"Biofuels and the Hydrologic Cycle" -\$303,812 from NSF (Co-PI; Rob Anex, PI) Project to estimate atmospheric water recycling ratios and the impact of potential biofuel production scenarios on the recycling ratio.	8/2008- 7/2011
"Determination of Tillage Type, Timing, and Residue Cover Using Remote Sensing" – \$36,987 from USDA NRCS (PI) Project to determine crop rotations, residue cover, and surface roughness for resource assessment/monitoring purposes.	10/2004- 9/2006

RESEARCH/WORK EXPERIENCE

<i>Iowa State University, Ames, IA</i> Scientist II/Associate Scientist Develop algorithms for hydrologic enforcement of digital elevation models. Determine crop rotations for biomass supply estimation. Develop and administer research proposals for external funding. Instructor for CRP 456/556, GIS Programming and Automation	2010 – Present
Postdoctoral Research Associate	2007 – 2010

Developing methods for estimating impacts of biofuel and crop production on the hydrologic cycle. Developed methods for determining crop rotations and estimating soil organic carbon. Evaluated WEPP model for estimating in-field yield variability.

GPG Inc. (Gelder Family Farm), Jewell, IA

Assist in operation and management of a 440 acre corn/soybean farm. Assisted in operation of a 4,000 head per year hog finishing operation and designed compost system for swine mortalities.

1992 – 2016

Co-Chair, AquaVentures Committee

Serve as technical chair for a value-added agriculture committee regarding the feasibility of indoor, recirculating shrimp production in IA and AL.

2003 – 2009

Iowa State University, Ames, IA

Graduate Research Assistant

Successfully wrote and completed two one-year proposals to the USDA NRCS for investigations into remote sensing for delineating management units and determining residue cover/surface roughness to aid in erosion modeling. Designed layout and supervised implementation of a 50 acre, 56 treatment, 280 plot soil compaction field study for Case/New Holland and Michelin.

2002 – 2007

Colorado State University, Fort Collins, CO

Graduate Research Assistant

Developed models and conducted research into modeling of eutrophication of Colorado Front Range Reservoirs. Designed and constructed weirs for water measurement at Aurora, CO.

2001 – 2002

TEACHING EXPERIENCE

Iowa State University, Ames, IA

Instructor of Record – CRP 454/554 LA 554, Introduction to Remote Sensing and Spatial Analyst, 4 hours/week

Fall 2018 (12)
Fall 2017 (16)
Fall 2016 (11)

Instructor of Record – CRP 456/556 AE 556, GIS Programming and Automation, 4 hours/week

Fall 2018 (22)
Fall 2017 (9)
Fall 2016 (17)
Fall 2015 (18)
Fall 2014 (17)
Fall 2013 (11)
Fall 2012 (13)

Graduate Committees

Rishikumar Suresh Kumar (MS; co-chair)

Ongoing

Vitor Martins (PhD)

Ongoing

Victoria Walker

Ongoing

Timothy Sklenar (PhD; co-chair)

Ongoing

Daniel Dvorjak (MCRP)

2018

Ahmed Abdelaty (PhD)

2017

Samuel McDeid (MS)

2017

Marina Reasoner (MCRP)

2017

Carolina Bermudez (MS, Development of a remote sensing protocol for inventorying cover crop adoptions)

2016

Stephen Rashid (MCRP, Promoting Access to Public Transit: A Predictive Model)

2016

Arindam Roy (MCRP, Identifying Vacant and Underutilized Parcels Suitable for Students Living)

2016

Mohammad Rafayet Hossain (MCRP, A Study of Crop Residue Coverage in the State of Iowa and its Importance to Urban Water Supplies)	2015
Jason Patton (PhD, Comparison of SMOS vegetation optical thickness data with the proposed SMAP algorithm)	2014
Teaching Assistant – To Professor Lee Burras in IALL 461 Assisted instruction and evaluation of Introduction to GIS field class.	Summer 2005
Teaching Assistant – To Professor Lee Burras in IALL 402 Lectured and led fieldwork for one day of Watershed Hydrology and Surficial Processes field class.	Summer 2004
<i>Colorado State University, Fort Collins, CO</i>	
Teaching Assistant – To Professor Jim Loftis in CBCC 192 Prepared and led lab classes, held office hours, and administered all grades for the freshman class, Strategies of Engineering Design.	Fall 2001 Fall 2000
Teaching Assistant – To Professor Ramchand Oad in CB 464 Prepared and led lab classes, held office hours, and administered homework grades for the senior class, Soil and Water Engineering.	Spring 2001

PUBLICATIONS AND PRESENTATIONS

Refereed Publications:

- Gelder, Brian K., Sklenar, T, R. Cruse, D. Herzmann, D. James, K. Gesch, and J. Laflen. 2018. The Daily Erosion Project - Daily Estimates of Water Runoff, Soil Detachment, and Erosion. *Earth Surface Processes and Landforms*. 43:5:1105-1107. doi:10.1002/esp.4286.
- Abdelaty, Ahmed, Attia, Osama, Jeong, H. David, and Gelder, Brian K. Dynamic Pavement Delineation and Visualization Approach Using Data Mining. In Press. *Journal of Computing in Civil Engineering*.
- Choi, J., Yang, F., Stepanauskas, R., Cardenas, E., Garoutte, A., Williams, R., Flater, J., Tiedje, J.M., Hofmockel, K.S., **Gelder, B.** and Howe, A., 2016. Strategies to improve reference databases for soil microbiomes. *The ISME Journal*
- M. D. Tomer, K.M.B. Boomer, S.A. Porter, **B.K. Gelder**, D.E. James, and E. McLellan. 2015. Agricultural Conservation Planning Framework: 2. Classification of Riparian Buffer Design Types with Application to Assess and Map Stream Corridors. *Journal of Environmental Quality*. 44:768-779.
- S. Khanal, R.P. Anex, **B.K. Gelder**, C. Wolter. 2014. Nitrogen Balance in Iowa and the implications of corn-stover harvesting. *Agriculture, Ecosystems, & Environment*. 183:21-30.
- C. Anderson, R. Anex, R. Arritt, **B. Gelder**, S. Khanal, D. Herzmann, and P. Gassman. 2013. Regional Climate Impacts of a Biofuels Policy Projection. *Geophysical Research Letters*. 40(6):1217-1222.
- S. Khanal, R.P. Anex, **B.K. Gelder**, P. Dixon, and P. Caragea. 2012. Cropping Pattern Choice with Proximity to Ethanol Production and Animal Feeding Operations. *Journal of Biofuels, Bioproducts, and Biorefining*. 6(4): 431-443.
- **B.K. Gelder**, R.P. Anex, T.C. Kaspar, T. J. Sauer, and D. L. Karlen. 2011. Estimating Soil Organic Carbon on Glacial Till Plains of Central Iowa Using Aerial Imagery and Soil Surveys. *Soil Science Society of America Journal*. 75: 1821-1928.
- **B.K. Gelder**, A.L. Kaleita, and R.M. Cruse. 2009. Estimating Mean Field Residue Cover Using Satellite Imagery and Automated Management Unit Determination. *Agronomy Journal*. 50:365-370.
- **B.K. Gelder**, R.M. Cruse, and A.L. Kaleita. 2008. Automated Determination of Management Units for Precision Conservation. *Journal of Soil and Water Conservation*. 63:273-279.
- **B.K. Gelder**, R.M. Cruse, and X.Y. Zhang. 2007. Comparison of Track and Tire Effects

of the Planter Tractor on Corn Yield and Soil Properties. Transactions of the ASABE. 50:365-370.

- R. Cruse, D. Flanagan, J. Frankenberger, **B. Gelder**, D. Herzmann, D. James, W. Krajewski, M. Kraszeski, J. Laflen, J. Opsomer, and D. Today. 2006. Daily Estimates of Rainfall, Water Runoff, and Soil Erosion in Iowa. Journal of Soil and Water Conservation. 60:431-437.

Published Proceedings & Reports

- Gelder, B., R. Cruse, D. Flanagan, D. James, D. Herzmann. 2016. The Daily Erosion (and Runoff) Project: Summary and Lessons Learned. International Conference on Precision Agriculture. St. Louis, MO.
- Gelder, B., R. Cruse, D. Flanagan, D. James, D. Herzmann. 2016. The Daily Erosion Project: An Overview and Summary. AgroEnviron, West Lafayette, IN.
- B. K. Gelder. 2015. Automation of DEM Cutting for Hydrologic/Hydraulic Modeling. Iowa Highway Research Board Report No. TR-631.
- Khanal S, R.P. Anex, **B.K. Gelder**, P. Dixon, P. Caragea. 2010. Association of Cropping Pattern with Proximity to Confined Animal Feeding and Ethanol Plants. Proceedings of the Iowa Academy of Science 122nd Annual Meeting, April 16-17, Lamoni, IA.
- C. Wortman, M. Helmers, **B. Gelder**, L. Morton, D. Devlin, C. Barden, S. Anderson, R. Broz, T. Franti, T. Regassa, P. Shea, M. Tomer, L. Frees, and D. Griffith. 2008. Targeting of Watershed Management Practices for Water Quality Protection. Heartland Regional Water Quality Coordination Initiative – University of Nebraska RP195.
- **B. Gelder**, J. Loftis, M. Koski, B. Johnson, and L. Saito. 2003. Eutrophication of Reservoirs on the Colorado Front Range. Colorado Water Resources Research Institute Completion Report No. 194.

International Invited Presentations

- "The Daily Erosion Project: Real time soil and water resource inventory". 2017. Presentation to Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, Harbin, China.
- "Iowa Daily Erosion Project 2.0: Real time soil and water resource inventory". 2015. Presentation to the International Symposium 2015 on Surface Soil Value and Erosion: Science, Technology, and Policy." Seoul, Korea.
- "Performance of a Passive, Small-Plot Runoff Collector System under Laboratory and Field Conditions." 2006. Presentation to Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, Harbin, China.
- "Remote Sensing of Field Level Management Practices." 2006. Presentation to Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, Changchun, China.

Domestic Invited Presentations

- "Soil Erosion and The Daily Erosion Project" 2016. Presentation to North Central Regional Water Network Science 2 Success Conference. Lincoln, NE.
- "The Daily Erosion Project/Ag Conservation Planning Framework" 2016. Presentation to Osher Lifetime Learning Institute (College for Seniors), Ames, IA.
- "Soil Health" 2015. Presentation to Missouri Farmers Markets Association Annual Meeting, Columbia, MO.
- "Precision Conservation Technology at ISU: Iowa Daily Erosion Project, I-FARM, and the Future." 2007. Presentation to Heartland Regional Water Coordination Roundtable, Nebraska City, NE.
- "Using Remote Sensing to Identify Vulnerable Areas and Target BMPs: Iowa Daily Erosion Project." 2007. Presentation to Heartland Regional Water Coordination Roundtable, Nebraska City, NE.

Published Abstracts

- Gelder, B., R. Cruse, D. Flanagan, D. James, and D. Herzmann. The Daily Erosion (and Runoff) Project: Summary and Lessons Learned. 2016 AWRA Summer Specialty
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Conference: GIS & Water Resources. Sacramento, CA.

- Gelder, B., R. Cruse, D. Flanagan, D. James, D. Herzmann, and J. Laflen. IDEP2: A real time soil moisture, erosion, and runoff inventory. 2014 ASABE/CSAE Annual Meeting. Montreal, Canada.
- Gelder, B.K., and D. James. Automated Hydrologic Enforcement of High Resolution Topography. 2014 ASABE/CSAE Annual Meeting. Montreal, Canada.
- Gelder, B.K., and D. James. Automated Hydrologic Enforcement of High Resolution Topography. 2014 AWRA Spring Specialty Conference: GIS & Water Resources. Salt Lake City, UT.
- Gelder, B.K., R. Cruse, D. James, D. Herzmann, J. Laflen, J. Opsomer, J. Frankenberger, D. Flanagan, W. Krajewski. IDEP: A Real Time Soil Moisture, Erosion, and Runoff Inventory. 2014 AWRA Spring Specialty Conference: GIS & Water Resources. Salt Lake City, UT.
- Gelder, B.K., and D. James. Hydrologic Enforcement of LiDAR Derived DEMs. 2013 American Society of Agricultural and Biological Engineers Annual Meeting. Kansas City, MO.
- Gelder, B.K. and D. James. Adaptive Hydrologic Enforcement of High Resolution Topography. 2012 American Water Resources Association Annual Meeting. Jacksonville, FL.
- Gelder, B.K. Adaptive Hydrologic Enforcement of LiDAR-based Digital Elevation Models. 2012 SWCS Annual Meeting, Fort Worth, TX.
- Gelder, B.K. and D. James. Hydrologic Enforcement of LiDAR for Targeted Conservation. 2012 21st Century Watershed Technology Conference and Workshop: Improving Water Quality and Environment, Bari, Italy.
- Gelder, B.K. Iowa Daily Erosion Project. 2012 SWCS Annual Meeting, Fort Worth, TX.
- Gelder, B.K. Adaptive Hydrologic Enforcement of High Resolution Topography. 2012 American Water Resources Association Spring Specialty Conference. New Orleans, LA.
- Gelder, B.K., C. Anderson, R. Arritt, P. Gassman, D. Herzmann, and R. Anex. Environmental Impacts of Continental Scale Biofuel Production. 2011 American Society of Agronomy Annual Meeting, San Antonio, TX.
- Gelder, B.K., C. Anderson, R. Arritt, P. Gassman, D. Herzmann, and R. Anex. Climatological Impacts of Biofuel Production. 2010 American Society of Agronomy Annual Meeting, Long Beach, CA.
- Gelder, B.K., R. Cruse, R. Anex, and H. Olson. Water Footprint of Various Biofuel Crops. 2010 American Society of Agronomy Annual Meeting, Long Beach, CA.
- Tomer, M., D. James, J. Bean, B. Gelder, and T. Moorman. Locating Potential Sites for Nutrient Interception Practices in a Tile-Drained Watershed Using Lidar Data. 2010 American Society of Agronomy Annual Meeting, Long Beach, CA.
- Gelder, B., R. Cruse, and R. Anex. Information Centric Natural Resource Management. 2010 Soil and Water Conservation Society Annual Meeting. St. Louis, MO.
- Gelder, B. and R. Anex. Estimating Soil Organic Matter Using Aerial Imagery and Soil Surveys. 2009 American Society of Agricultural and Biological Engineers Annual Meeting, Reno, NV.
- Gelder, B. Adaptation of the WEPP Model for Yield Variability Prediction. 2008 Soil and Water Conservation Society Annual Meeting, Tucson, AZ.
- **Gelder, B.K.**, R.M. Cruse, and A.L. Kaleita. Enhancing Landsat Estimates of Residue Cover Using Vegetative Indices. 2007 American Society of Agricultural and Biological Engineers, Minneapolis, MN.
- **Gelder, B.K.**, R.M. Cruse, and A.L. Kaleita. Analysis of Multi-Temporal Remote Sensing of Crop Residue. 2006 American Society of Agronomy Annual Meeting, Indianapolis, IN.
- **Gelder, B.K.**, R.M. Cruse, and A.L. Kaleita. Targeting Erosion Control Using Remote Sensing. 2006 Soil and Water Conservation Society Annual Meeting, Keystone, CO.

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- **Gelder, B.K.**, A.L. Kaleita, and R.M. Cruse. Remote Sensing of Field Level Management Practices. 2006 American Society of Agricultural and Biological Engineers Annual Meeting, Portland, OR.
 - **Gelder, B.K.**, and R.M. Cruse. Analysis of a GIS/Remote Sensing Watershed Model. 2005 American Society of Agronomy Annual Meeting, Salt Lake City, UT.
 - **Gelder, B.K.** Erosion and Runoff Modeling Using Remotely Sensed Tillage Data. 2005 Soil and Water Conservation Society Annual Meeting, Rochester, NY.
 - **Gelder, B.K.** Radar and Infrared Remote Sensing for Tillage Determination. 2005 American Society of Agricultural Engineers Annual Meeting, Tampa, FL.
 - **B.K. Gelder**, R.M. Cruse, J.M. Laflen, J. Opsomer, W. Krajewski, M. Kraszeski, D. Herzmann, D. James, D. Flanagan, J. Frankenberger, and D. Todey. Daily Estimates of Soil Erosion in the State of Iowa. Proceedings of ISCO 2004 - 13th International Soil Conservation Organisation Conference – Brisbane, July 2004.

Professional Presentations

- “Environmental Implications of Biofuel Production on a Central Iowa Watershed.” 2007 SWCS:WNC Impacts of Increased Bio-fuel Production on the Midwest Landscape, Dubuque, IA.
- “Remote Sensing Techniques to Target Conservation Efforts at the Field Level and Beyond.” 2006 SWCS Managing Agricultural Lands Conference, Kansas City, KS.
- “Root Length Density and Diameter of Three Grass Species.” 1999 American Society of Agricultural Engineers Annual Meeting, Toronto, Canada.

Professional Posters

- “Residue Cover Detection for Runoff and Soil Erosion Estimation.” 2013 ESRI User Conference, San Diego, CA.
- “Hydrologic Enforcement of LiDAR Derived DEMs.” 2013 ESRI User Conference, San Diego, CA.
- “Automated Hydrologic Enforcement of High Resolution Topography.” 2012 AWRA Spring GIS Conference, New Orleans, LA.
- “Information-Centric Natural Resource Management” 2009 SWCS Science 2 Solutions Conference, Des Moines, IA.
- “Estimating In-Field Yield Variability Using Computer Models” 2009 Iowa State University Bio-Century Research Farm Opening Day, Ames, IA.
- “Soil Organic Matter (OM) Mapping with Aerial Photos and SSURGO” 2008 Iowa State University GIS Day, Ames, IA.
- “Estimating Residue Cover Using Automatically Determined Field Boundaries and Tillage Indices” 2006 Remote Sensing and Crop Residue Survey Workshop, New Orleans, LA.
- “Tillage Detectives” 2005. Iowa State University GIS Day, Ames, IA.

Professional Review

- Reviewed Proposal No. 04-00553 for USDA Small Business Innovation Research Project Title: Improved Marketing Strategies for Innovative Soil Management Products.
- Peer reviewer for Applied Engineering in Agriculture, ASABE Transactions, Soil Science Society of America Journal, and Remote Sensing

LEADERSHIP EXPERIENCE

- Iowa Section, American Society of Agricultural and Biological Engineers
Vice Chair, Nominating (2012-2013)
Chair (2011-12)
Vice Chair, Programs (2010-11)
Secretary/Treasurer (2008-2010)
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Nominating Committee member (2007, 2013-14)

- American Society of Agricultural and Biological Engineers
Young Professional Council At-Large Member (2009)
- Agronomy Graduate Organization
President (2003)
Graduate Student Senator (2004-2005)
Recycling Chair (2005)
- Agricultural Engineering Graduate Organization
Treasurer (2006)

LICENSURE/MEMBERSHIPS

- Iowa Engineer in Training #14484
- American Society of Agronomy - 1997
- Soil Science Society of America – 1997
- American Society of Agricultural and Biological Engineers - 1999
- Soil and Water Conservation Society – 2002
- American Water Resources Association - 2011