

Talbot John Brooks, GISP

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Spatial Technologies (Geographic Information Systems, Remote Sensing, and GPS)

Professional Positions

- Director, Center for Interdisciplinary Geospatial Information Technologies, Delta State University (2005-Present). Function as department chair, reporting directly to the Dean, College of Arts and Sciences. Teach at the undergraduate and graduate levels, conduct sponsored research and development activities, perform service to the University and profession, and administer all aspects of the Center. Responsible for the creation of geospatially-oriented academic and training programs. Created the first master's degree program for geospatial technologies accredited as an applied science (Southern Association of Colleges and Schools). The Center is primarily self funded at an annual rate of approximately \$1.2M.
- IPA Detailee, Federal Emergency Management Agency (temporary appointment, Feb-Aug 2012). Assist with creation of geospatial policy and operational procedures for FEMA. Conduct research and simulation activities related to implementation of the US National Grid as an area management system under the direct supervision of the Director, National Integration Center.
- Consultant, Gerson Lehrman Group (2008-Present). Provide subject matter expertise-based consultation to venture capital and investment firms about trends and activities in the geospatial industry.
- Research Professional, Department of Geography, Arizona State University, (2000-2005). Taught at the undergraduate and graduate levels, conducted sponsored research and development activities, performed service to the industry and profession, and supported the computing research needs of the Dept. Developed an undergraduate GIS certificate program (18 semester hours) in 2002 and gained approval and accreditation of a 1-year long professional master's degree program in 2004.
- Research Technician, Remote Sensing and Environmental/Plant Dynamics Group, U.S. Water Conservation Research Laboratory, U.S. Dept. of Agriculture, Agricultural Research Service (1993-2000). Conducted research and development activities related to remote sensing and climate change, created and maintained instrumentation packages, supervised the day-to-day collection of data for assigned experiments.

Leadership Service Within the Geospatial Industry

- National Geospatial Advisory Committee (2013-2016). Appointed by Secretary of Interior Salazar.
- President, Geospatial Information and Technology Association (2013). President-Elect (2012), Treasurer (2011), Board of Directors (2006-present), Strategic Planning Committee (2004-2005), Education Committee Chair (2005), Arizona Chapter President (2003-2004), Arizona Chapter Board of Directors (2000-2003), Member since 1995.
- Board of Directors, GIS Certification Institute (2012-2014). GITA representative.

- Chair, Technical User's Group, Mississippi Coordinating Council for Remote Sensing and GIS (2009-Present). Develop consensus-driven geospatial standards for state government, advise senior state agency executives about the technical aspects of geospatial technologies, and assist with policy development.
- Board of Directors, Mississippi Delta Technology Association (2005-2007).

Emergency Services

First Responder Positions

- Chief Engineer, Bolivar County Volunteer Fire Department, MS (2010-Present). Deputy Chief of Department (2006-2008), Assistant Chief (Battalion 1, 2008-2010), Engineer (2005-2008). BCVFD is the second largest fire department in MS, serving 38,000 residents with 9 stations, 27 companies, and 125 volunteer firefighters.
- Instructor (contract), National Fire Academy (2011-Present). Subject matter expert responsible, in part, for the development of the Standard of Cover 6-day course and the Introduction to Geospatial Technologies for the Fire Service 2-day course. Principle instructor.
- GIS Support (volunteer), Phoenix Fire Department/Maricopa County E911, AZ (2000-2005). Volunteered time and effort to assist Phoenix Fire Department and Maricopa County E911 with the implementation of addressing and parcel data.
- Captain, US Army Reserve, Medical Service Corps/Civil Affairs (1993-2006).
- Firefighter (volunteer), Henrietta Volunteer Fire Department, NY (1989-1993).
- Medic (volunteer), Rochester Institute of Technology Ambulance, NY (1989-1993).
- Firefighter (paid), Wareham Fire Department, MA (1986-1989).

Leadership Service Within the Emergency Services Sector

- National Fire Protection Association Technical Committee for Data Exchange for the Fire Service (2010-Present). This committee is charged with developing a plan to assist fire departments with implementing technology and the authoring of a standard which enables seamless data transfer, including geospatial components, among all operational and analytic elements of the fire service.
- Member, National Association for Search and Rescue (2005-Present). Assisted with alpha course development for fundamentals of land search and rescue management (with Dr. Donald Cooper). Provide basic land navigation and map reading exercises for various emergency response organizations on a volunteer basis.
- Mississippi Emergency Management Agency (volunteer). Act as one of the operations group directors for scalable implementation of geospatial services during a time of crisis.

Volunteered Services, Time, and Effort for Significant Events or Crisis

- April 2011 Tornado Outbreak. Provided direct geospatial support for Mississippi Emergency Management.
- 2011 Mississippi River Flood. Provided direct geospatial support to Yazoo-Mississippi Delta Levee District, FEMA, Mississippi Levee District, and numerous other state and local agencies.
- Tōhoku Tsunami (2011). Created English-language-based USNG base maps and MGRS atlases for CA TF #1 for pre-deployment planning use.

- Haiti Earthquake (2010). Worked with partners to integrate data from CrisisMappers/USHAHIDI, Google/GeoEye, ESRI, Harvard University, and numerous humanitarian relief agencies to create printable letter-sized map products for use in the field. Created approximately 70,000 map sheets in 96 hours. Partnered with USGS for distribution through EROS Data Center.
- Chilean Earthquake (2010). Prepared letter-sized USNG-based maps to support entities deploying to Chile. Partnered with USGS for distribution through EROS Data Center.
- American Samoa Tsunami (2009). Created USNG grids for search and recovery efforts for FEMA.
- Hurricane Dolly (2008). Created USNG maps and atlases for south Texas coast and distributed through USGS EROS Data Center.
- Hurricane Eduardo (2008). Created USNG maps and atlases for the central Texas coast and distributed through USGS EROS Data Center.
- Tropical Storm Fay (2008). Assisted Florida Emergency Management and Mississippi Emergency Management with flood and evacuation mapping tasks, performed flood map analysis tasks on demand.
- Hurricane Gustav (2008). Provided GIS assets and services to Mississippi Emergency Management at the forward command post and state emergency operations center.
- Hurricane Ike (2008). Provided support to a broad spectrum of agencies which including FEMA Urban Search and Rescue (TN TF #1), USGS, CenterPoint Energy, and Texas Emergency Management.
- Tropical Storm Alberto (2006). Assisted Florida Emergency Management with inundation maps.
- Hurricane Katrina (2005). Assisted Mississippi Emergency Management with establishing and using geospatial technologies to respond to and recover from Hurricane Katrina.
- Hurricane Rita (2005). Assisted Bolivar County, MS with damage assessment mapping and provided base maps to neighboring jurisdictions.
- 2004 Tempe Presidential Debate (Bush v. Kerry). Provided 3D modeling for line of sight analysis, portable GIS enabled devices which tracked field units and allowed them to retrieve building blue prints on demand, and provided common operational picture to the Incident Command Center (Federal) and the Operations Center (State/Local).

Education

- B.S., Biology, Rochester Institute of Technology, Rochester, NY (1993)
- M.S., Plant Biology, Arizona State University, Tempe, AZ (1998)

Professional Certifications

- GIS Professional, GIS Certification Institute
- Firefighter (MS, NY, and MA)
- Emergency Medical Technician (NY, expired)
- Fire Service Instructor (NFPA 1041)

Languages

- French
- American Sign Language

Training by Industry

Geospatial Information Technologies

- ERDAS Imagine I and II
- ESRI Courses: Introduction to ArcGIS I, Introduction to ArcGIS II, Creating and Managing Geodatabases, ArcSDE Administration for SQL Server (advanced course), Scripting with Python, Introduction to Programming ArcObjects with VBA
- SANS Institute: Securing Windows

Emergency Services

- Certified Volunteer Firefighter/Firefighter I (MS, NY, MA)
- Firefighter II (NY, MA)
- Hazardous Materials Technician (NY)
- Automobile Extrication (MS, NY, MA)
- Foam Operations (MS, NY, MA)
- Fire Officer (MA)
- Pumps and Hydraulics (MA, NY)
- Ladder Company Operations (MA)
- Explosives and Ordnance Awareness (MA)
- ICS 100, 200, 300, 400, 700, and 800 (National)
- Emergency Medical Technician (NY)
- Advanced Cardiac Life Support (NY)
- Certified Nursing Assistant (NY)
- Fire Service Instructor, NFPA 1041-1

Software Skills

ArcGIS (ArcInfo) including Spatial Analyst, Network Analyst, 3D Analyst, ArcLogistics, Business Analyst, Geostatistical Analyst, ArcPublisher, ArcScan, Data Reviewer, Maplex, Image Analyst, Publisher, TerraGo Publisher, Tracking Analyst, and Military Analyst extensions (3.0, 3.3, 8.0, 8.1, 9.0, 9.3, 10.0, and 10.1 pre-release). ArcGIS Image Server. ArcGIS Server including Flex, Java, SOAP, REST, WFS, and WMS (9.3 and 10.0). ArcIMS. ArcSDE for SQL Server. SQL Server (2000, 2007). ArcHydro, Local government, Water Utilities, Transportation, and Address geodatabase models from ESRI. TerraGo Toolbar, Publisher, and Composer. Microsoft Office (Word, Excel, Publisher, Access, Groove, InfoPath, Outlook, and OneNote). Erdas Imagine. GeoMedia. USHAHIDI. Windows operating systems: NT, XP, Vista, 2007, 2010 (Desktop and Server). Unix operating systems: HPUX, True64, UWIN, and Linux (Red Hat). Programming and scripting: KML, KMZ, XML, GML, HTML, AML, Pearl, Java, C, FORTRAN (77, 90/95, Fujitsu), Python, VB. Adobe CS Professional. TechSmith:

Camtasia Studio and SnagIt. Autodesk Civil 3D, Maya, and 3D Studio Max (2010). Google Earth, Community Viz.

Recent Honors and Awards

- 2nd Place, Best Press Copy, Atlas or Map Series, ESRI International User's Conference (2011)
- ESRI Special Achievement in GIS (With Yazoo-Mississippi Delta Levee District, 2011)
- Mississippi Legislature Joint Resolution providing commendation for service to community and profession (2010, House Concurrent Resolution No. 107)
- 3rd Place, Best Press Copy, Atlas or Map Series, ESRI International User's Conference (2010)
- Bolivar County Firefighter of the Year (2011)
- Best Speaker Award GITA Annual Conference 29 and 31 (2007, 2 awards in 2009)
- ESRI Special Achievement Award in GIS (2006)
- Named one of the industry's "Top 50 to Watch" by GPS World (May 2007)

Recent Grants and Contracts

- Brooks TJ and Boone R. (2013). A State-Wide Hazard Mitigation Update: Infrastructure Interdependencies. Mississippi Emergency Management Agency. \$213,000.
- Brooks TJ. Document Management Using Geospatial Technologies for Rural Civil Engineering. Civil Solutions Services. \$30,000.
- Brooks TJ. An Addressing Schema for Tallahatchie E-911 and NextGen Services. Tallahatchie County, MS. \$9,250.
- Brooks TJ (2012). Contracted research and development. Federal Emergency Management Agency. \$70,868.
- Brooks TJ (2012). Web mapping services for the Yazoo-Mississippi Delta Levee District. Yazoo-Mississippi Delta Levee District. \$40,000.
- Brooks TJ (2012). A letter-sized atlas of US military installations. Department of the Army (sub-contracted through TerraGo Technologies). \$74,000.
- Brooks TJ (2012). GeoPDF Training. Department of the Army (sub-contracted through TerraGo Technologies). \$78,000
- Brooks TJ (2011). Automated feature delineation for topographic map production. USGS. \$90,000.
- Brooks TJ (2011). A proposal to create a war-fighter atlas for Afghanistan. Department of the Army. \$314,000.
- Brooks TJ (2011). A spatial database for conservation. National Audubon Society and the Lower Mississippi Conservation Commission. \$15,000.
- Brooks TJ (2011). Implementing the US National Grid. USGS. \$100,000.
- Brooks TJ (2011). Wetlands delineation for topographic map production. USGS. \$25,000
- Brooks TJ, Austin R, DiSera D, and Samborski R (2011). Geospatially Enabling Community Collaboration (GECCo). US Department of Homeland Security. \$110,000.
- Brooks TJ (2011). Implementing the US National Grid. Indiana Dept. of Homeland Security. \$8,700
- Brooks TJ (2010). A state-wide atlas for emergency response. Missouri Emergency Management Agency and Missouri Army National Guard. \$29,000.

- Brooks TJ (2010). Towards improved civil-military cooperation: USNG. USGS. \$100,000.
- Brooks TJ (2010). A public participatory GIS. Yazoo-Mississippi Delta Levee District. \$54,000.
- Brooks TJ (2010). A hazard mitigation plan for Mississippi. In partnership with Neal-Schaeffer. Mississippi Emergency Management Agency. \$88,000.
- Brooks TJ (2010). A regional GIS for northwestern Mississippi. Three Rivers Planning and Development District. \$70,000.
- Brooks TJ (2009). Implementing geospatial technologies for Mississippi Emergency Management Agency. Mississippi Emergency Management Agency. \$50,000.
- Brooks TJ (2009). Addressing the Greater Jackson area. Central Mississippi Planning and Development District.
- Brooks TJ (2009). An atlas for the National Capital Region. US Dept. of Defense. \$9,000.
- Brooks TJ (2009). Planning for a regional GIS for northwestern Mississippi. Three Rivers Planning and Development Agency. \$40,000.
- Brooks TJ (2008). Technology planning for levee management. Yazoo-Mississippi Delta Levee District. \$40,000.
- Brooks TJ (2008). Building curriculum for geospatial standards implementation. USGS. \$25,000.
- Brooks TJ (2008). Introducing the US National Grid. USGS. \$218,000.
- Brooks TJ (2008). Improving E911 services for Attala County. Attala County. \$11,750.
- Brooks TJ (2008). Use of GIS for tactical situations: active shooter scenario. Mississippi Office of Homeland Security. \$15,000
- Brooks TJ (2008). Improving E911 services for Carroll County. Carroll County. \$6,500.
- Brooks TJ (2008). Improving E911 services for Washington County. Washington County. \$7,500.
- Brooks TJ (2007). The Center for Interdisciplinary Geospatial Information Technologies at Delta State University: A Continuation. (originally funded in 2005 for \$900,000). Hearin Foundation. \$600,000.

Courses Taught

- Introduction to Geospatial Information Systems and Science (undergrad/grad)
- Advanced Geospatial Information Systems and Science (undergrad/grad)
- Geospatial Mathematics, Statistics, and Algorithms (grad)
- Remote Sensing (undergrad/grad)
- Remote Sensing of Water (grad)
- Remote Sensing of the Environment (grad)
- Spatial Solutions for Natural Resource Issues (undergrad)
- Business Geographics (undergrad/grad)
- Community Growth (undergrad/grad)
- Special Topics: Scientific Programming (FORTRAN) (undergrad/grad)
- Programming for GIS (undergrad)
- Photogrammetry (grad)
- GIS Capstone (undergrad/grad)
- Thesis (grad)

- Plant Biology Laboratory (undergrad)
- Standard of Cover (National Fire Academy)
- Basic GIS for the Fire Service (National Fire Academy)

Recent Significant Invited Speaking Engagements

Brooks TJ (2012). United Nations Office for Outer Space Affairs (UNOOSA), Platform for Space-based Information for Disaster Management and Emergency Response (SPIDER) Technical Advisory Mission to Vietnam. Hanoi, Vietnam.

Brooks TJ (2012). GECCo and ROADIC: Collaborative Infrastructure Protection Using Geospatial Technologies. Keynote address provided to the Geospatial Information and Technology Association of Japan. Tokyo, Japan.

Brooks TJ (2012). United Nations Office for Outer Space Affairs (UNOOSA), Platform for Space-based Information for Disaster Management and Emergency Response (SPIDER) Technical Advisory Mission to Mozambique. Maputo, Mozambique.

Brooks TJ (2012). Citizens as Sensors. Keynote address provided to the Geospatial Information and Technology Association of Australia-New Zealand. Melbourne, Australia.

Brooks TJ (2012). Crisis management, mapping, and the US National Grid. Presented as an agency-wide training session to the National Geospatial Intelligence Agency. Web broadcast.

Brooks TJ (2011). Navigating the Disaster. Presented as a national training session for GIS professionals at the US Dept. of Homeland Security and Federal Emergency Management Agency. Web broadcast.

Brooks TJ (2010). Crisis mapping and GIS: How not to get lost and eaten by crocodiles. Keynote address provided to the Geospatial Information and Technology Association of Australia-New Zealand. Brisbane, Australia.

Brooks TJ (2009). Geospatial data infrastructures. A 3-day workshop presented to various geospatial data stakeholders within the government of the United Arab Emirates. Dubai, UAE.

Brooks TJ (2008). Crisis mapping: Lessons learned from the front lines of Katrina. European Defense Geospatial Intelligence Conference. London.

Brooks TJ (2007). Understanding and implementing the US National Grid. Presented to the Mapping Science Committee, National Academy of Science.

Brooks TJ and T Terry (2005). A New Kind of Map Could Help Emergency Response. Interview with Dan Charles, National Public Radio as aired on "Weekend Edition".

Recurring Workshop Series

- Geospatially Enabling Community Collaboration. Provided by the Geospatial Information and Technology Association. This 2-day workshop promotes the identification of common data

needs and the means for sharing them in preparation and response to crisis. Taught as part of the primary instruction team for Tampa, Charlotte, Dallas/Ft. Worth, Phoenix, Oakland, Minneapolis, and Seattle.

- The US National Grid. Day 1 of 2 provides instruction to geospatial professionals about the use and construction of US National Grid maps and atlases. The second day expands the audience to include emergency responders and includes instruction and practical experience in map reading and land navigation. Primary instructor for more than 60 offerings across the nation in the past 6 years.

Standards (2)

Plaughner EP, Brooks TJ, Blackwell H, Cieri L, Hodges V, Bailey A, Blankenship D, Cieri E, Hartberger JP, Ierley S, LaVecchia LA, Moore JW, Price MJ, Schottke J, Smalley J, Middleton J, Morgan P, Schmidt D, Shoemaker R., and Thies CK (2012). A guide to building and using digital information. National Fire Protection Association Code 951. (*In final review*)

Plaughner EP, Brooks TJ, Blackwell H, Cieri L, Hodges V, Bailey A, Blankenship D, Cieri E, Hartberger JP, Ierley S, LaVecchia LA, Moore JW, Price MJ, Schottke J, Smalley J, Middleton J, Morgan P, Schmidt D, Shoemaker R., and Thies CK (2012). A standard for data exchange for the fire service. National Fire Protection Association Code 950. (*In final review*)

Major White Papers (2)

Brooks TJ (2009). Spatial Technologies and the Common Operating Picture. A special report for the Mississippi Emergency Management Agency. 176pp.

DiSera D, Austin R, Samborski R, and Brooks TJ (2008). The Interdependencies of Infrastructure. A whitepaper of the Geospatial Information and Technology Association.

Trade Articles (7)

Brooks TJ (2011). GITA and CEPA (Coahoma Electric Power Association) Forge Partnership. *Electric Transmission and Distribution World*. Fall 2011. 20.

Brooks TJ (2007). Getting on the same page. *Firehouse Magazine*, January, 40-42.

Brooks TJ (2006). Introducing the US National Grid. *Bulletin of the International Association of Emergency Managers*, 23 (6) p. 6

Brooks TJ (2006). Affordable Geospatial Technologies for Disaster/Emergency Response. *Bulletin of the International Association of Emergency Managers*, 23 (7) pp. 1,10

Brooks TJ (2006). Use of GIT During the Response Phase of Hurricane Katrina. *Bulletin of the International Association of Emergency Managers*, 23 (9) pp. 17-22

Brooks TJ (2005). Responding to Katrina: A Personal Account. *Bulletin of the Association of American Geographers*, 40 (10) p. 10

Brooks TJ (2005). Predicting Katrina's Storm Surge Using ArcScene. *ArcUser*, October-December Issue

Commissioned Studies

Barton A, Reid L., and Brooks TJ (2011). *Unsung River: The Lower Mississippi River Natural Heritage Corridor*. National Audubon Society. New York, New York.

Brooks TJ and Boone R (2010). A hazard mitigation plan for Mississippi. A sponsored project for the Mississippi Emergency Management Agency. Portions available online at <http://www.msema.org/about/mitigation.html>

Peer-Reviewed Publications (26)

Brooks TJ and Swaminathan S (2011). Integrating the Paper and Digital Environments for Crisis/Emergency Response: Lessons Learned. *Proceedings of Global Spatial Data Infrastructures 12*. Singapore, Malaysia.

Porteous F, Hill J, Ball AS, Pinter PJ, Kimball BA, Wall GW, Adamsen FJ, Hunsaker DJ, LaMorte RL, Leavitt SW, Thompson TL, Matthias AD, Brooks TJ, and Morris CF (2009). Effect of free air carbon dioxide enrichment (FACE) on the chemical composition and nutritive value of wheat grain and straw. *Animal Feed Science and Technology*. 149: 322-332.

Cheng L, Leavitt SW, Kimball BA, Pinter PJ, Ottman MJ, Matthias A, Wall GW, Brooks TJ, Williams DG, and Thompson TL (2007). Dynamics of labile and recalcitrant soil carbon pools in a sorghum free-air CO₂ enrichment (FACE) agroecosystem. *Soil Biology and Biochemistry*. 39: 2250-2263.

Grant RF, Kimball BA, Wall GW, Triggs JM, Brooks TJ, Pinter PJ, Conley MM, Ottman MJ, LaMorte RL, Leavitt SW, Thompson TL, and Matthias AD (2004). Modeling elevated carbon dioxide effects on water relations, water use, and growth of irrigated sorghum. *Agronomy Journal*. 96:6 1693-1705.

Triggs JM, Kimball BA, Pinter PJ, Wall GW, Conley MM, Brooks TJ, LaMorte RL, Adam NR, Ottman MJ, Matthias AD, Leavitt SW, and Cervený RS (2004). Free-air CO₂ enrichment effects on the energy balance and evapotranspiration of sorghum. *Agricultural and Forest Meteorology*. 124: 63-79.

Derner JD, Johnson HB, Kimball BA, Pinter PJ, Polley HW, Tischler CR, Boutton TW, LaMorte RL, Wall GW, Adam NR, Leavitt SW, Ottman MJ, Matthias AD, and Brooks TJ (2003). Above- and below-ground responses of C₃-C₄ species mixtures to elevated CO₂ and soil water availability. *Global Change Biology*. 9:452-460.

Brooks TJ, Wall GW, Pinter PJ Jr., Kimball BA, LaMorte RL, Leavitt SW, Thompson TL, Mathias AD (2001). Acclimation response of spring wheat in a free-air CO₂ enrichment (FACE) atmosphere with variable soil nitrogen regimes. 3. Canopy architecture and gas exchange. *Photosynthesis Research*, 66: 97-108.

- Grant RF, Kimball BA, Brooks TJ, Wall GW, Pinter PJ, Hunsaker DJ, Adamsen FJ, LaMorte RL, Leavitt SW, and Thompson TL (2001). Modeling interactions among carbon dioxide, nitrogen, and climate on energy exchange of wheat in a free air carbon dioxide experiment. *Agronomy Journal*, 93, 638-649.
- Kimball BA, Morris CF, Pinter PJ, Wall GW, Hunsaker DJ, Adamsen FJ, LaMorte RL, Leavitt SW, Thompson TL, Matthias AD, and Brooks TJ (2001). Elevated CO₂, drought, and soil nitrogen effects on wheat grain quality. *New Phytologist*. 150: 295-303.
- Leavitt SW, Pendall E, Paul EA, Brooks T, Kimball BA, Pinter PJ, Jr., Johnson HB, Matthias A, Wall GW, and LaMorte RL (2001). Stable-carbon isotopes and soil organic carbon in wheat under CO₂ enrichment. *New Phytologist*, 150, 305-314.
- Pendall E, Leavitt SW, Brooks TJ, Kimball BA, Pinter PJ Jr, Wall GW, LaMorte RL, Wechsung G, Wechsung F, Adamsen FJ, Matthias AD, Thompson T (2001). CO₂ stimulates soil microbial respiration. *Basic and Applied Ecology*, 2:193-201.
- Triggs JM, Kimball BA, Conley MM, Brooks TJ, LaMorte RL, Pinter PJ Jr., Wall GW, and O'Brien CC (2001). Effects of Free-air carbon dioxide enrichment (FACE) and water stress on the energy balance and evapotranspiration of sorghum. Symposium on Global Change and Climate Variations, Proceedings of the American Met. Society, Albuquerque, NM.
- Conley MM, Kimball BA, Brooks TJ, Hunsaker DJ, Wall GW, Pinter PJ, Jr., Adam NR, LaMorte RL, Leavitt SW, and Triggs JM (2000). CO₂ enrichment increases water-use efficiency in sorghum. *New Phytologist*, 151, 407-412.
- Hunsaker DJ, Kimball BA, Pinter Jr. PJ, Wall GW, LaMorte RL, Adamsen FJ, Leavitt SW, Thompson TW, and Brooks TJ (2000). CO₂ enrichment and soil nitrogen effects on wheat evapotranspiration and water use efficiency. *Agricultural Forest Meteorology* (104)2:85-100 (2000).
- Ottman MJ, Kimball BA, Pinter PJ Jr., Wall GW, Vanderlip, RL, Leavitt SW, LaMorte RL, Matthias AD, and Brooks TJ (2000). Elevated CO₂ increases sorghum biomass under drought conditions. *New Phytologist*, 150, 261-273.
- Pinter PJ Jr., Kimball BA, LaMorte RL, Wall GW, Hunsaker DJ, Adamsen FJ, Frunmau KFA, Vugts HF, Hendrey GR, Lewin KL, Nagy J, Johnson HB, Leavitt SW, Thompson TL, Matthias AD, and Brooks TJ (2000). Free-Air CO₂ Enrichment (FACE): Blower effects on wheat canopy microclimate and plant development. *Agriculture and Forest Meteorology* 103(4), 319-333.
- Rellig MC, Wright SF, Kimball BA, Pinter PJ Jr., Wall GW, Adam NR, LaMorte RL, Ottman M, Leavitt SW, Mathias A, Thompson T, Williams D, and Brooks TJ (2000). SHORT COMMUNICATION: Elevated carbon dioxide (free-air carbon enrichment, FACE) and irrigation effects on water stable aggregates in a *Sorghum* field: a possible role for arbuscular mycorrhizal fungi. Submitted to *Global Change Biology*.

- Sinclair TR, Pinter PJ, Jr., Kimball BA, Adamsen FJ, LaMorte RL, Wall GW, Hunsaker DJ, Adam NR, Brooks TJ, and Garcia RL (2000). Leaf nitrogen concentration of wheat subjected to elevated CO₂ and either water or N deficits. *Agriculture, Ecosystems And Environment*, 79 (1), 53-60.
- Wall GW, Brooks TJ, Adam NA, Cousins A, Triggs J, Kimball BA, Pinter PJ Jr., Ottmann MJ, Leavitt SW, Matthias AD, Williams DG, and Webber AN (2000). Elevated atmospheric CO₂ improved sorghum plant water status by ameliorating the adverse effects of drought. *New Phytologist*, 152:231-248.
- Wechsung F, Garcia RL, Wall GW, Kartschall T, Kimball B A, Michaelis P, Pinter PJ, Jr., Wechsung G, Grossman-Clarke S, LaMorte RL, Adamsen FJ, Leavitt SW, Thompson TL, Matthias AD, and Brooks TJ (2000). Photosynthesis and conductance of spring wheat ears: field response to free-air CO₂ enrichment and limitations in water and nitrogen supply. *Plant, Cell and Environment*, 23(9):917 (2000).
- Kimball BA, LaMorte RL, Pinter PJ Jr., Wall GW, Hunsaker DJ, Adamsen FJ, Leavitt SW, Thompson TL, Matthias AD, and Brooks TJ (1999). Free-air CO₂ enrichment and soil nitrogen effects on energy balance and evapotranspiration of wheat. *Water Resources Research*, 35, 1179-1190.
- Leavitt SW, Pendall W, Paul EA, Kimball BA, Brooks TJ, Pinter PJ Jr., and Johnson H (1999). Carbon isotope estimation of carbon turnover in the 1995-1997 FACE wheat experiments. *New Phytologist*, 305-314.
- Matthias A D, Leavitt SW, Thompson TL, Kimball BA, Pinter PJ, Jr., Wall GW, Rauschkolb RS, Ottman RL, Roth RL, Brooks TJ, Adam NR, LaMorte RL, Wechsung G, Wechsung F, Adamsen FJ, Williams DG, Nakayama FS, Hunsaker DJ, Watson J, White SA, and Welzmler J (1999). Free-air CO₂ enrichment effects on wheat and sorghum at Maricopa, Arizona, USA. *In International Symposium on Carbon Dioxide and Vegetation - Advanced International Approaches for Absorption of Carbon Dioxide and Responses to Carbon Dioxide*. National Institute of Environmental Sciences in Tsukuba, Ibaraki, Japan. March 18, 1999.
- Wall GW, Brooks TJ, Adam NR, Kimball BA, Pinter PJ Jr., LaMorte RL, Adamsen FJ, and Leavitt SW (1999). Acclimation response of spring wheat in a free-air CO₂ enrichment (FACE) atmosphere with variable soil nitrogen regimes. 2. Acclimation of wheat leaf photosynthesis. *Photosynthesis Research*, 66:79-95 (2000).
- Idso CD, Idso SB, Idso KE, Brooks TJ, Balling RC (1998). Spatial and temporal characteristics of the urban CO₂ dome over Phoenix, Arizona. 23rd Conference on Agricultural and Forest Meteorology, *American Meteorology Society*, 46-48.

Please note that some works pertaining to homeland security or defense matters are not included in this listing.

Abstracts for meetings available on request.