RESEARCH, APPLIED TECHNOLOGY, EDUCATION & SERVICES
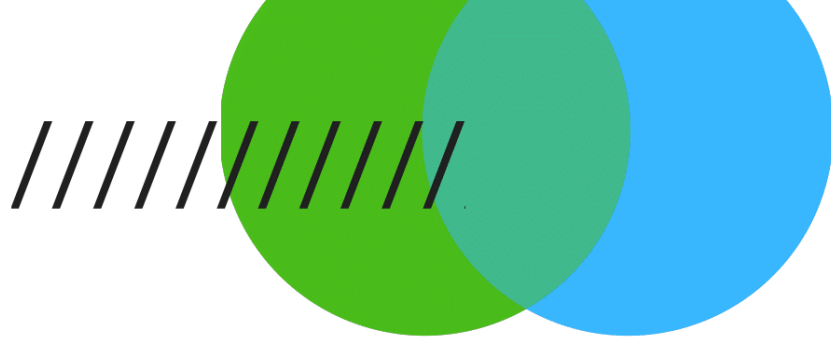
CAPABILITIES

RESEARCH, APPLIED
TECHNOLOGY
EDUCATION AND SERVICE

MISSION

RATES, Research, Applied Technology, Education, and Service is a 501(c)3 Not-for-Profit Corporation formed to promote and coordinate the collaborative and cooperative use of technology by and among colleges, high schools, public schools, community school districts, public and school libraries, health care facilities, government offices, businesses, health and educational professionals, other educational and community service organizations and community residents for the benefit of the collaborating organizations, their clients, and community residents.

SERVICES

Research, Applied Technology, Education, and Services (RATES), Inc. offers advanced information technology facilities and related services, including event based and real-time data acquisition and control systems with dynamic data analytics, to participating organizations, either directly or through third party providers, to address environmental and public safety issues with local, regional, and national significance and ensure regulatory compliance. With access to shared databases and through partnerships with institutions of higher learning, regulatory agencies, and regional public service departments, RATES' provides in-service training and professional development programs and supports multidisciplinary and collaborative research. RATES' serves as liaison between academic, commercial, governmental and non-governmental entities to establish and manage cooperative public service programs (e.g. Stormwater Task Force, Flood Response and Resiliency Network).

LOCATIONS

TX P.O. Box 697, Edinburg, TX 78540
For information contact: Jodi Lees, jelees@ratesresearch.org | (956)-540-9384

NY P.O. Box 843, Potsdam, NY 13676
For information contact: Amber LaFountain, alafount@ratesresearch.org | (281)-261-4369

LEADERSHIP

Andrew N.S. Ernest, Ph.D., P.E., BCEE, D.WRE. | *Board Member.*
Professor, Civil Engineering, University of Texas Rio Grande Valley.
President & Chief Executive Officer, Open Environment, PLLC.

David C. Bonner, Ph.D. | *Board Member.*
President & Chief Executive Officer AANet.
Director of Sage Technology Initiatives.

Talissa A. Altes, MD. | *Board Member.*
Professor of Clinical Radiology, Chairperson, MU Health Care.

Javier Guerrero, M.S., EIT. | *Board Member.*
Director of Water Studies, University of Texas Rio Grande Valley.
Liaison, Lower Rio Grande Valley TPDES Stormwater Taskforce.

Hollis Rutledge | *Board Member.*
Founder, President and Owner of Hollis Rutledge & Associates Inc.

Jodi E. Lees | *Chief Financial Officer.*
Research, Applied Technology, Education, and Services, Inc.

Patrick O'Brien, P.M.P. | *Chief Operating Officer.*
Research, Applied Technology, Education, and Services, Inc.

Christopher Fuller, Ph.D. | *Chief Research Officer.*
Research, Applied Technology, Education, and Services, Inc.

CORPORATE EXPERIENCE

RATES' environmental engineering and research practitioners offer a wealth of experience and qualifications obtained through a combination of large scale research initiatives and service oriented programs.

SERF:

The Shoreline Environmental Research Facility (SERF) research strategies are aligned with those of national significance. Specifically, SERF's programmatic research theme is similar to that proposed by the National Science Foundation (NSF), entitled "Collaborative Large-Scale Engineering Analysis Network for Environmental Research", or CLEANER. CLEANER is an initiative for collaborative research to support adaptive and sustainable environmental management, with the ultimate objective of facilitating a dynamic network for national and international coastal margins research and policy-making. SERF stresses sensor development, deployment, and applications for data collection (both geo-referenced fine-scale spatial surveys and fixed-point timeseries), information synthesis, and analysis for integrative predictive whole coastal ecosystem modeling based on in-situ continuous, periodic, and episodic monitoring.
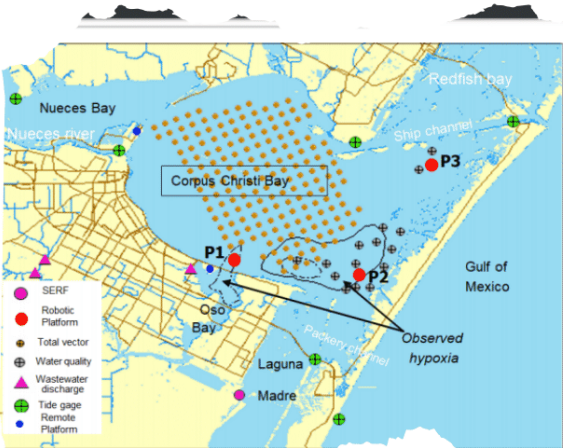
REON:

The River and Estuary Observatory Network is a real-time observation and monitoring network. REON enables continuous monitoring of physical, chemical, biological and atmospheric data from New York's Hudson, Mohawk, and St. Lawrence River watersheds via an integrated network of sensors, robotics, mobile monitoring and computational technology. The first generation of REON I floating sensor platforms, or "B" series, first deployed in 2008, has provided the technological foundation for REON II, an expanded network of deployed Real Time Hydrologic Stations (RTHS) and REON water quality sensors. REON's continuous data informs scientists, research analysts and students regarding dynamic water flows, constituent transport and other ecosystem health indicators.

WATERS

W T I

The Water Analysis, Training, Education and Research Services analytical laboratory was established as a cooperative partnership between Western Kentucky University, Mammoth Cave National Park, the City of Bowling Green, and various local municipalities, and water, wastewater and stormwater utilities. By delegating personnel, equipment and other resources into a shared service entity, each partner is able to avail itself of the combined capacity of the overall WATERS infrastructure, the scope of which would have been otherwise out of reach. This "Farmers Cooperative" laboratory serves a combined capacity development and regulatory compliance mission by further providing a technician training and certification platform.

The Water Training Institute was established to address the nationwide workforce shortfall of qualified treatment plant operators due to factors including the en masse retirement of baby boomers and the tightening of regulatory requirements regarding the hands-on experience required prior to licensure. A Hybrid Experiential and Distance Learning Educational Model (HEDLEM) is used to target rural areas hardest hit due to the lack of educational and experiential opportunities available to them within a reasonable proximity. A blue-collar equivalent to the Service Core Of Retired Executives (SCORE), Encourage Every Young Operator with Retired Experience (EEYORE) provides mentoring for new recruits, while a Utility Network (UNet) was established to provide experiential locations. Strategically located Community and Technical College partners provide the regional instructional delivery, allowing for both succession planning and career advancement through the combined provision of a both academic credits and state-specific, and state-approved, certification and licensing hours.
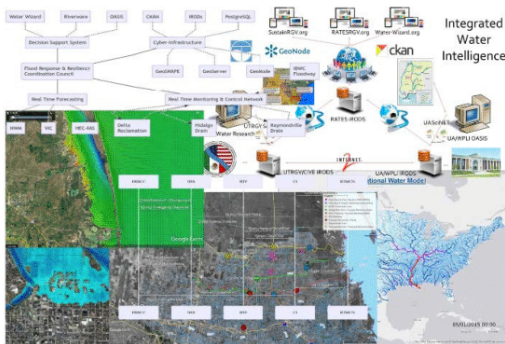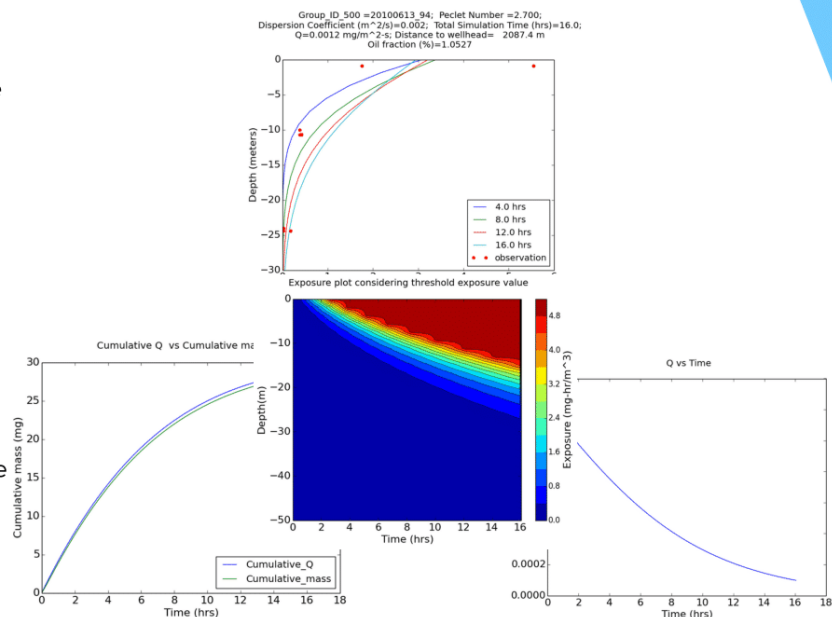
L T S T F

The Lower Rio Grande Valley Texas Pollutant Discharge Elimination System Stormwater Task Force (LTSTF) is a joint effort to develop a proactive regional approach to stormwater management. Our goals are to reduce stormwater pollution, protect the natural environment and benefit the community. The LTSTF is actively involved in Low Impact Development (LID), a tailored course of civil and development that works with the surrounding natural territory to best manage stormwater, in the effort to create functional, effective stormwater drainage; hosts the Stormwater Management Conference, an annual forum and discussion featuring leading researchers and studies on the latest in innovative development on stormwater management; and, in cooperation with participating municipalities and counties, promote innovative Best Management Practices stressing the latest in research and innovation in stormwater management outreach, as well as informative information for homeowners and businesses.

RIO GRANDE VALLEY
stormwater
MANAGEMENT

FRRN

The Lower Rio Grande Valley Flood Response and Resiliency Network (FRRN) is a regional collaborative effort to develop a real-time stage height and stream flow monitoring network that is coupled with a near-real-time flood forecasting tool and integrated decision support system. Flood Early Warning System components of the FRRN provide actionable intelligence required to develop and implement effective flood protection plans and flood responses. The structure of the FRRN integrates hydrologic engineering and social science expertise with regional planning, response, and decision-making entities in a structured, efficient, and representative format that maximizes the potential for leveraging regional synergies.

WATER WIZARD

Water Wizard is a Decision Support Framework developed specifically to enable engineers, managers, planners and other decision makers of small and mid-sized water, wastewater and watershed management systems to maximize productivity and efficiency. Water Wizard was conceived as a Rules-Based Decision Support System that provided recommended actions to operational decisions using a combination of tacit (empirical) knowledge gleaned from expert focus groups and implicit (mechanistic) knowledge encoded from process theory. The Water Wizard ecosystem has expanded to include a Learning Management System, along with an evolving suite of "Wizards" that include Water Distribution System (WDS) Decontamination Guidance; WDS Instrumentation and Operational Guidance; Water & Wastewater Utility Rate Analysis; Economic Consequence Analysis for Disruptions in Water Service, Flooding, Drought and Inter basin Transfers; Real-Time Flood Damage Forecasting; Flood Response Coordination; and more.

WCEMT

The Water Column Exposure Modeling Toolbox (WCEMT) is a set of modeling tools developed to meet the needs of Natural Resource Damage Assessments (NRDA) for viable methods to assess ecological impacts of significant marine oil spills based on limited empirically obtained petroleum chemistry data. The developed modeling tools estimate water column exposures of Total Petroleum Hydrocarbon (TPH) and 50 Polycyclic Aromatic Hydrocarbon compounds (PAH50) resulting from the entrainment and dissolution of surface oil into the upper water column and subsequent transport/and or ultimate fate of the relevant oil fractions. These tools can be used together to determine petroleum hydrocarbons exposure of fish eggs in the water column. The vertical transport models for crude oil and/or fish eggs are based on the fundamental advection-diffusion equation.
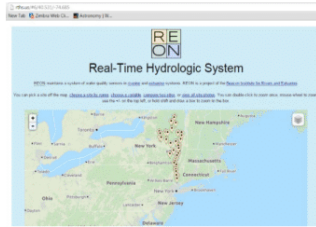
FACILITIES & EQUIPMENT

Figure A1 REON web interface (www.rths.us) with links for data visualization and downloading
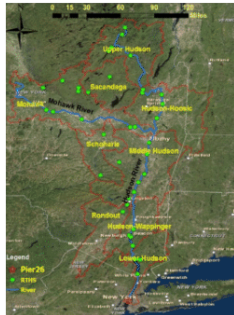

Figure A2 Distribution of REON in sub-watersheds of the Hudson River

Figure A3 Standard REON RTHS station Installation showing precipitation gauge, meteorological package, and solar panel

Figure A4 Replacement of prototype standard water quality sonde at field testing node located near Wappingers

RATES maintains and operates the River's and Estuaries Observatory Network (REON) comprised of 40 active web accessible hydrologic monitoring stations (Figure A1) distributed throughout all Hudson River Basin (36,000 km2) sub-water sheds (Figure A2). Standard REON nodes are configured to continuously measure meteorological (liquid precipitation, barometric pressure, wind speed and direction, air temperature, and relative humidity) and hydrologic conditions (stage height and/or elevation, water temperature) (Figure A3). REON development stations are equipped with prototype water quality sondes (Figure A4) necessary for field evaluations. Three (3) stations located in the Hudson River Tide Water at Albany, Newburgh, and West Point, NY are equipped with Teledyne RDI Workhorse Acoustic Doppler Current Profilers (ADCP) providing continuous 3-dimensional water velocities profiles to supporting hydrodynamic studies.

Specialized field instrumentation and equipment inventory includes:
⬜ In-situ instrumentation
    o SeaBird CTDs
    o Aanderaa Optodes
    o WETLabs ECO fluorometers
    o Teledyne RDI ADCPs
    o Sequoia Scientific Laser In-Situ Scattering Transmissometers

⬜ Instrument platforms
  o SeaSciences Acrobat: a towed-undulating instrument array that carries a payload including Seabird CTD, Aanderaa Optode, Wetlabs ECO Fluorometer, LISST-100. Integrated data collection is provided through an in-house developed Matlab interface that enables synchronous acquisition of geo-referenced data (aka mobile robotic underlaying platform).

  o YSI Eco Mapper Autonomous Underwater Vehicle.

  o Three (3) moored robotic vertical profilers supporting real time collection of water quality and water current profiles.

⬜ Research vessels
  o 30 ft. aluminum pontoon boat with twin outboards equipped with electronic vessel information system, GPS, radar, and state-of-the-art Garmin ClearVu Scanning Sonar. This vessel is also equipped with a 5.5kW generator, chargerinverter, multiple cranes, ADCP mounts, and a heated and cooled6X10 cabin. The configuration of this vessel allows us to operate in nearly any environmental condition for prolonged periods and with a multitude of instrument configurations.
  o 29 ft. inboard vessel equipped with GPS, echosounder, Teledyne RDI, 5kW generator and a 6-person cabin.
  o 21 ft. outboard utility/survey vessel equipped with GPS, echo sounder, ADCP mount, and overhead A-frame with winch.

⬜ Service vehicles to support mobilization of equipment
    o Pickups (½ ton - 1 ton, Qty 4)
    o Cargo van, ¾ ton, Qty 1
    o Mobile Command Center to support remote field operations
    o Various trailers to support mobilizations

MOBILE ROBOTIC UNDULATING PLATFORM

RATES developed a state-of-the-art instrumentation system, Mobile Robotic Undulating Platform (MRUP), for realtime acquisition and 4-D (latitude, longitude, depth and time) mapping of synchronized hydrodynamic and water quality measurements in riverine, estuarine and coastal environment. This system acquires and visualizes data measured by submersible sensors on an undulating tow-body (Acrobat LTV-50HB, by Sea Sciences Inc.) deployed behind the research vessel (see Figure B1). Submersible sensors include dissolved oxygen sensor, Chl-'a' sensor, Doppler current profiler, colored dissolved organic matter, particle size analyzer (LISST), Conductivity, temperature and depth sensor. In addition, a Global Positioning System (GPS) is used to geo-reference the synchronized measurements. In addition, MRUP Graphical User Interface (see Figure B2) allows real-time display of each measured parameter intensity (measured value relative to a pre-set peak value) along the transect route and thereby, guides in implementing adaptive sampling to capture the event of interests (e.g., salt wedge, oil spill plume). Figure B3 displays some example MRUP measurements. The MRUP is suitable for operating in water depths up to 60 m. This system has been deployed in different natural environments to provide datasets for supporting ecosystem restoration, oil spill response and preparedness, safe navigation and other activities related to riverine, estuarine and coastal environmental management.

Figure B2.: MRUP real-time data acquisition and visualization GUI

Figure B1: Research vessel (left) and Tow-body (right) to carry instrument suite
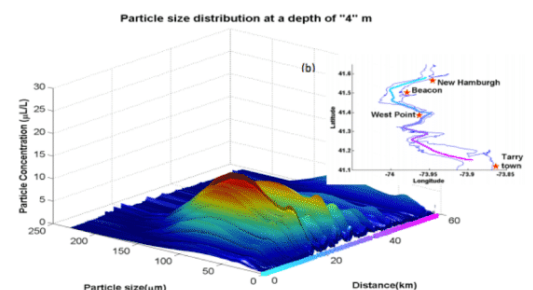

Figure B3. Example MRUP measurements: a) Salt-wedge (top), b) sediment plume (bottom) Capture in the Hudson River and Estuary, New York on June 01, 2010.

HIGH FREQUENCY RADAR

Left to right: a) HF-radar antenna (left) b) Mobile HF-radar unit (Center) & c) Inside of mobile unit (right) which contains the data acquisition and processing system along with other necessary components.

RATES' inventory includes short-, medium-, and long-range HF-Radar (CODAR) systems previously deployed and operated to provide surface current data along the Texas coast from High Island to Corpus Christi. Data from these systems was made available to the public via the NOAA National Data Buoy Center (https://hfradar.ndbc.noaa.gov/)

to support vessel navigation, spill response, and search-and-rescue operations. These systems are currently available for installation to provide critical surface current data for off-shore and inland coastal waters. In Texas, prime deployment areas include the Port of Brownsville and South Padre Island where HF Radar coverage is lacking.
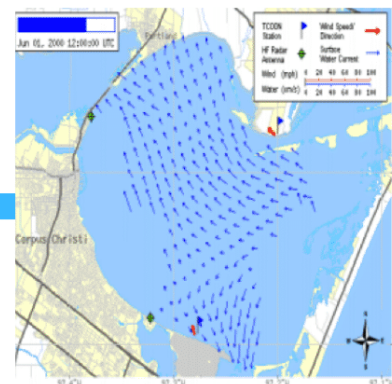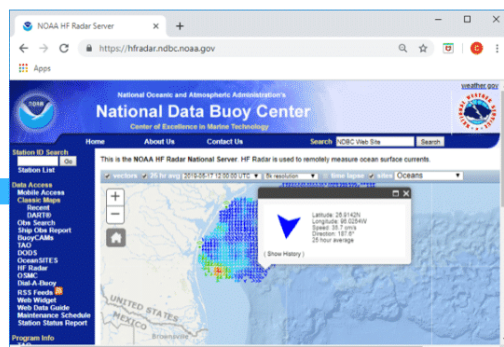
RATES facilities include a 3,000 ft 2 high-bay (Figure A5) used to for the fabrication, and mobilization of large monitoring systems (e.g. moored robotic profiling systems, RTHS station, and specialized research equipment). The high-bay area is equipped with large and meso-scale test tanks, pressure vessel (for hydrostatic testing of submersible instruments). RATES' also occupies an additional 5,500 ft 2 that include laboratories for electronic and optical system development, wet chemistry and biology, and general microscopy.

Figure A5 Construction of moored robotic platform in "Old Main" high bay

Existing laboratory equipment facilities include:

- Perkin-Elmer LS50B fluorescence spectrometer
- Beckman-Coulter Z2 Particle Counter/Size Analyzer
- Assorted USB Spectrometers
- Olympus phase contrast microscope/with video
- Olympus dissecting microscope/with video
- Analytical balances
- Laboratory grade water
- Laminar flow hood
- Chemical Fume Hood
- Aquatic toxicity- continuous flow chambers
- Centrifuge
- Autoclave
- Incubator

RATES CYBER INFRASTRUCTURE

The RATES Network Operations Center (NOC) in Colton, NY houses the data-management Cyber Infrastructure (CI). This includes assorted servers and software which automatically interface directly with each RATES-operated real-time data collection platform, process all incoming data for archival in SQL databases, and enable web-based data dissemination. A redundant, off-site backup system ensures that data collection and dissemination continue in the event of any planned or unplanned disruptions of the primary NOC.

TALISSA ANN ALTES, MD

PROFESSIONAL PREPARATION

Clarkson College of Technology	Potsdam, NY	Electrical Engineering	B.S. 1981
Massachusetts Institute of Technology	Cambridge, MA	Electrical Engineering	M.S. 1986
University of California, San Diego	San Diego, CA	Biology	Post Baccalaureate 1992
University of Washington	Seattle, WA		M.D. 1996
University of Virginia	Charlottesville, VA	Biomedical Engineering	M.S. 2000

APPOINTMENTS

Faculty Appointments:

09/15- present	Professor of Radiology, University of Missouri, Columbia, MO
02/08-12/15	Associate Professor of Radiology, University of Virginia, Charlottesville, VA
01/08-12/11	Assistant Professor, The Hospital of the University of Pennsylvania, Pennsylvania, PA
09/05-12/07	Staff Radiologist, The Children's Hospital of Philadelphia, Philadelphia, PA
10/03-12/04	Assistant Professor of Radiology, University of Cincinnati College of Medicine, Cincinnati OH

Hospital and Administrative Appointments:

09/15-present	Chair of Radiology, University of Missouri, Columbia, MO
12/11-06/13	Interim Associate Division Head, Thoracoabdominal Radiology, University of Virginia, Charlottesville, VA
11/09-01/16	Vice Chair of Clinical Research, University of Virginia, Charlottesville, VA
04/08-01/16	Section Head, Pediatric Radiology, University of Virginia, Charlottesville, VA
01/07-12/07	Director of Clinical Research, Department of Radiology, The Children's Hospital of Philadelphia, Philadelphia, PA
09/05-12/07	Staff Radiologist, University of Pennsylvania, Philadelphia, PA
01/05-12/07	Staff Radiologist, Children's Hospital of Philadelphia, Philadelphia, PA
10/03-12/04	Staff Radiologist, Shriners Hospital for Children, Cincinnati, OH
10/03-12/04	Staff Radiologist, University of Cincinnati Hospital, Cincinnati, OH
10/03-12/04	Staff Radiologist, Cincinnati Children's Hospital, Cincinnati, OH
01/03-01/16	Staff Radiologist, University of Virginia Hospital, Charlottesville, VA

PRODUCTS

Relevant Products

Other Significant

1. **Altes TA**, Mugler JP, Ruppert K, Tustison NJ, Gersbach J, Szentpetery S, Meyer C, de Lange EE, Teague WG, 2015 Oct 29. Clinical Correlates of Lung Ventilation Defects in Children with Asthma, JACI, pii: S0091-6749(15)01335-4. doi: 10.1016/j.jaci.2015.08.045. PMID: 26521043
2. **Altes TA**, Mata J, de Lange EE, Brookeman JR, Mugler III JP, 2006 Dec. Assessment of Lung Development using Hyperpolarized Helium-3 Diffusion MR Imaging, *JMRI*; 24(6): 1277-1283.
3. Altes T.A.*, Power P.L., Knight-Scott J., Rakes G., Platts-Mills T.A.E., de Lange E.E., Alford B.A., Mugler J.P. III, Brookeman J.R. 2001. Hyperpolarized ^{3}He lung ventilation imaging in asthmatics: Preliminary results. *J Magn Reson Imaging*, 13: 378-384.
4. Wang C, **Altes TA**, Mugler JP 3rd, Miller GW, Ruppert K, Mata JF, Cates GD Jr, Borish L, de Lange E. 2008 Jul 28. Assessment of the lung microstructure in patients with asthma using hyperpolarized (3) He diffusion MRI at two time scales: Comparison with healthy subjects and patients with COPD. J Magn Reson Imaging. (1):80-8.
5. Mugler JP 3rd, **Altes TA**, Ruset IC, Dregely IM, Mata JF, Miller GW, Ketel S, Ketel J, Hersman FW, Ruppert K. 2010 Dec 14. Simultaneous magnetic resonance imaging of ventilation distribution and gas uptake in the human lung using hyperpolarized xenon-129. Proc Natl Acad Sci U S A. 107(50):21707-12. Epub 2010 Nov 22

SYNERGISTIC ATIVITIES

1. Technology and human health: As an electrical and biomedical engineer and a physician, I work at the intersection of technology and human health. The focus of my research has been developing new methods for detecting and understanding disease through imaging. Prior to entering medicine, I was an electrical engineer and designed radio and satellite systems for military applications. I feel my engineering background contributes to my success in research because I have an understanding of the physics of various technologies and can "speak the same language" as the physicists and research scientists. In research I bring the clinical acumen to identify potential applications for new disease detection techniques and the proven ability to design and manage clinical trials involving cutting-edge technologies. As a clinician researcher, I have published over 80 peer reviewed manuscripts; been PI, coPI or site PI on 7 NIH funded grants, 5 industry sponsored projects, and 6 foundation supported grants; and given over 70 invited lectures.
2. Leadership: Prior to assuming the position of Chair of Radiology at the University of Missouri 1 year ago, I was the Vice Chair of Research, Medical Director of MRI Research, and Division Director of Pediatric Radiology at the University of Virginia (UVa). As Vice Chair of Research, I was responsible for mentoring research faculty, creating and sustaining the departmental infrastructure to support research, and developing the vision for our research division. The UVa research division was highly successful. UVa Radiology and Radiation Oncology was ranked 17th in the country for NIH funding in 2014 according to the Blue Ridge Institute for Medical Research, quite an improvement from 39th in 2009 when I assumed the role of vice chair. As the Medical Director of the UVa MRI Research facility I was responsible for managing the day-to-day operations of our three MRI scanners dedicated to research and the associated personnel.
3. Education: As Division Director of Pediatric Radiology, I mentored clinical faculty and residents, and managed a very busy clinical service. I was honored to receive the excellence in teaching award from the UVa radiology residents for my creation of a *Physics of Radiology for Residents* lectures series for the radiology residents.

David C. Bonner, Ph.D.

PROFESSION PREPARATION

Ph.D. in Mathematics, November 1989, State University of New York at Albany. Thesis entitled "Circle actions on simply connected manifolds."
M.S. in Mathematics, November 1984, State University of New York at Albany. Topic entitled "Do finite cyclic actions determine circle actions?"
M.A. in Physics, December 1980, Wayne State University, Detroit MI. Thesis entitled "Fourier analysis of voice patterns."
B.S. in Mathematics, June 1979, State University of New York at Plattsburg. Honors essay entitled "Sard's theorem."
B.A. in Physics, December 1977, State University of New York at Plattsburgh. Honors essay entitled "The Physics of Rainbows."

APPOINTMENTS

1997-Present	**President and CEO**, Adirondack Area Network (AAN), 10 Empire State Boulevard Castleton, NY 12033.
2000-2015	**President and CEO**, AdminMonitor, Inc. 1210 San Antonio, Suite 203, Austin, TX 78701
2008-2011	**Ad Hoc Graduate Faculty**, The University of Kansas, 1450 Jayhawk Blvd., Lawrence, KS.
2000-2011	**Board of Directors,** Hudson Mohawk Area Health Education Center, 1, Broad Street Plaza, Glens Falls, NY 12801.
2002-2010	**Board of Directors**, National Kidney Foundation of North Eastern New York, 99 Troy Road, East Greenbush, NY.
2002-2005	**Medical Advisory Board of NKF NENY**, 99 Troy Road, East Greenbush, NY.
1997-2001	Adirondack Area Network (AAN) & The Sage Colleges (TSC), Troy, NY.
	Appointed member to the Tri-County Fiber Project
	Faculty appointment at Stratton Veterans Affairs Medical Center
1995-2001	TSC, Troy, NY
	Director of Sage Technologies Initiatives
	AAN- Board of Governance Director
	Appointed member to the Albany Medical College, Albany Medical Center, Stratton Veterans Affairs Medical Center Telemedicine Committee and Technology Initiative Group
1994-1996	**Department Chairperson**, Math. and Comp. Sci. Dept., TSC, Troy, NY
1993-2001	**Associate Professor**, Math. and Comp. Sci. Dept., TSC, Troy, NY.
1991-1993	**Assistant Professor**, Math. and Comp. Sci. Dept., TSC, Troy, NY.
1989-1991	**Visiting Research Fellow**, Institute for Advanced Studies, Australian National University, Canberra, Aus.
1986-1989	**Assistant Professor**, Math. and Comp. Sci. Dept., TSC, Troy, NY.
1981-1985	**Legislative Aide**, New York State Senate, Albany, NY.
1980-1986	**University Fellow**, Department of Mathematics, State University of New York at Albany, Albany, NY.

PRODUCTS

Relevant Products
Smith, H., **Bonner, D.**, Ryckewaert, L, Dhingra, R. (2009) "Proton Pump Inhibitors and Pain", Pain Physician, 12(6).
Tejinder, S., **Bonner, D**., Pohl, H., (2000) "Technology breakthroughs in education for minimally invasive surgery," The Society of Laproendoscopic Surgeons.
Lamphear, Marcia. (1998) "Schools, Hospitals get System for Internet, Teleconferencing," The Press Republican.
Moorse, Alan (1998) New Network Offers Opportunities to North Country," Capital District Business Review.
Wood, Sylvia (1998) "Telecommunications Improved," Albany Times Union.

Other Significant

Killips, Tom (1998) "New Network Program Unveiled at the Sage Colleges," The Troy Record.
Pohl, Henry (1998) "The next best thing to being there," Center News, Albany, NY.
Bonner, D., Ford, F. (1997) "The Adirondack Area Network," Video Conferencing Insight, UK.
Bonner, D., Neale, J., (1996) "Technologics Planning and Implementations for the Small College," Presented for ASCUE (Association of Small Computer Users in Education).
Bonner, D., Hammere, J., Neale, J., Synnott, K. (1993) "Technologics Planning and the Small College," Presented at the 26th Annual Conference, ASCE (Association of Small Computer Users in Education)

SYNERGISTIC ACTIVITIES

Outstanding Citizen Commendation in Recognition for receiving the National Kidney Foundation's Kim M. Healy Gift of Life Leadership Award, New York State Assembly Citation, Assemblywoman Teresa R. Seward, 113th AD. May 10, 2007.
Rural Community Networking, Distance Learning, Telemedicine- The Adirondack Area Network, Invited to testify, Federal Communications Commission, 706 Joint Board, Public Hearings (Lowel, MA), May, 22, 2000.
Distance Learning, Telemedicine, and Community Networking, Invited speaker, Texas A&M University, Corpus Christi, TX, Oct 30 – Nov. 4, 1998.
Partnerships in Technologies, Invited speaker and consultant, The American University, Government Agencies and other organizations (Guatemala City, Guatemala), July 1998.
Symposium on Educational Technology, Invited CIOs, Technologist and Educators, Cornell University, NYSERNet, &NYS Board of Reagents (New York, NY), April 1998.

ANDREW N.S. ERNEST, PH.D., P.E., BCEE, D.WRE

PROFESSIONAL PREPARATION

Ph.D. in Civil Engineering, December 1991. Dissertation title: Mathematical Model of Particle Mediated Transport in Aquatic Systems, Texas A&M University (College Station, Texas)
M.S. in Civil Engineering, May 1985. Specialization: Groundwater transport modeling and structural analysis, University of Southwestern Louisiana (Lafayette, Louisiana)
B.S. in Civil Engineering, May 1984. Emphasis: Computational methods in structural analysis and bridge design, University of Southwestern Louisiana (Lafayette, Louisiana)

APPOINTMENTS

2016-Present	**Professor**, Civil Engineering, The University of Texas Rio Grande Valley (Edinburg, Texas)
2009-Present	**President** and **CEO**, Open Environment, PLLC (Bowling Green, Kentucky)
1997-Present	**Partner,** Ernest & Sons Civil and Environmental Engineering Consultants, (Austin, Texas)
2016- 2018	**Chair**, Civil Engineering, The University of Texas Rio Grande Valley (Edinburg, Texas)
2012- 2016	**Professor**, Civil, Construction and Environmental Engineering, and **Director**, Environmental Institute, The University of Alabama (Tuscaloosa, Alabama)
2003- 2012	**Associate Dean**, Ogden College of Science and Engineering, and **Director,** Center for Water Resource Studies, Western Kentucky University (Bowling Green, Kentucky)
1991-2003	Various appointments: **Assistant Professor**, **Associate Professor** & **Chair,** Environmental Engineering; **Founding Operations Director**, Coastal Oilspill Simulation System; **Founding Director**, South Texas Environmental Institute; **Founding Director**, Center for Research Excellence in Science and Technology: Research on Sustainability of Semi-Arid Coastal Areas; Texas A&M University - Kingsville

PROFESSIONAL CERTIFICATIONS

- **Professional Engineer**. Texas (**#83476**) and Kentucky (**#24824**)
- **Board Certified Environmental Engineer**. **American Academy of Environmental Engineers**, (#02-20050).
- **Diplomate, Water Resource Engineer**. American Academy of Water Resource Engineers.

PRODUCTS

Relevant Products

Ernest, A. N. S., "Water Training Institute: A Path to a Sustainable Workforce", Association of State Drinking Water Administrators 25th Annual Conference, Pittsburgh, Pennsylvania, Association of State Drinking Water Administrators, 10/2010

Ernest, A. N. S., J. R. Fattic, N. -B. Chang, S. Chitrapu, and K. P. Davenport, "WRMT Case Study: GIS With Rule Based System", 2010 Annual Conference & Exposition, Louisville, Kentucky, American Society for Engineering Education, 06/2010.

Ernest, A. N. S., "Water/Wastewater Technician Training Institute: A Model for Adoption and Replication", Association of Boards of Certification Annual Conference, Jacksonville, Florida, Association of Boards of Certification, 01/2010.

Ernest, A. N. S., J. R. Fattic, J. Kays, A. Cranford, C. Wade, and K. Andrew, "Water/Wastewater Technician Training Institute: The First Year Retrospective", WEFTEC 2009, Orlando, Florida, Water Environment Federation, pp. 7787-7801, 01/2009.

Ernest, A. N. S., J. R. Fattic, and S. Reid, "An Integrated Systemic Approach to Developing a Professional Water and Wastewater Workforce", 2008 ASEE Annual Conference & Exposition: American Society for Engineering Education, 22/06/2008

Other Significant

Chang, N. -B., N. P. Pongsanone, and **A. N. S. Ernest**, "A rule-based decision support system for sensor deployment in small drinking water networks", Journal of Cleaner Production, vol. 29-30, pp. 28 -37, 7/2012.

Chang, N. -B., N. Prapinpongsanone, and **A. N. S. Ernest**, "Optimal Sensor Deployment in a Large-scale Complex Drinking Water Network: Comparisons between a Rule-based Decision Support System and Optimization Models", Computers & Chemical Engineering, 4/2012.

Ernest, A. N. S., J. R. Fattic, and G. Xing, "A Decision Support System for Managing Water Distribution Systems Decontamination", Water Security Conference 2011, Nashville, Tennessee, American Water Works Association, 09/2011.

Chang, N. -B., N. P. Pongsanone, and **A. N. S. Ernest**, "Comparisons between a rule-based expert system and optimization models for sensor deployment in a small drinking water network", Expert Systems with Applications, vol. 38, issue 8, pp. 10685 -10695, 8/2011.

Ernest, A. N. S., J. R. Fattic, N. -B. Chang, S. Chitrapu, and K. P. Davenport, "WRMT Case Study: GIS With Rule Based System", 2010 Annual Conference & Exposition, Louisville, Kentucky, American Society for Engineering Education, 06/2010.

SYNERGISTIC ACTIVITIES

Commissioner, Kentucky Environmental Quality Commission, appointed by Governor Ernie Fletcher, 26 July 2005.
Board Member, Kentucky Board of Certification of Wastewater System Operators, 22 September 2005;
Who's Who Among America's Teachers, 2002-2005
Member Steering Committee, Kentucky Division of Waters Capacity Development
Member Steering Committee, Kentucky Watershed
Member Advisory Committee, Mammoth Cave International Biosphere Reserve.

CHRISTOPHER B. FULLER, Ph.D.

PROFESSIONAL PREPARATION

Ph.D. in Civil Engineering. 2011, Texas A&M University (College Station, Texas).
M.S.in Environmental Engineering, 1996, Texas A&M University (Kingsville, Texas)
B.S. in Biology, 1989, Texas A&M University (College Station, Texas)

APPOINTMENTS

2019-Present	Chief of Research, Research Applied Technology Education Services
2018-2019	Senior Project Manager, KAS Environmental Science and Engineering
2017-2018	Senior Oceanographer, Fugro USA Marine, Inc., Houston, TX. Assistant
2012-2017	Research Professor, Civil and Environmental Engineering, Clarkson University
2009-2019	Research Engineer, Research Applied Technology Education and Services
2009-2012	Research Engineer, Civil & Environmental Engineering, Clarkson
2007-2008	University Project Manager, Fugro-GEOS, Houston, TX
2003-2007	Research Associate, Civil Engineering, Texas A&M University
1998-2007	Operation Manager, Coastal Oil Spill Simulation System
1997-1998	Compliance Engineer, Coastal Oil Spill Simulation System
1994-1996	Research Assistant, Texas A&M University at Kingsville
1992-1994	Technician, Jordan Laboratories, Corpus Christi, TX
1990-1992	Laboratory Technician, Texas A&M College of Medicine

PRODUCTS

Relevant Products

Kirkey, W.D., Bonner, J.S. **Fuller, C.B**. (2018) Low-cost submersible turbidity sensors using low-frequency source light modulation. *IEEE Sensors Journal, 18(22),* 9151-9161. DOI: 10.1109/JSEN.2018.2869368.

Islam, M.S., Bonner, J., **Fuller, C**., Kirkey, W. (2016) Understanding impacts of an extreme Episodic event on the Hudson River and Estuary, *Environmental Engineering and Science,* accepted for publication.

Billuri, M., Bonner, J.S., **Fuller, C.B**, Islam, M.S. (2014) Impact of natural cationic polymers on charge and clarification of microalgae suspensions, *Environmental Engineering Science,* doi:10.1089/ees.2014.0301.

Fuller, C.B., Bonner, J.S., Islam, M.S., Ojo, T., Page, C.A., Kirkey, W.D. (2013) Estimating colloidal concentration using acoustic backscatter, *IEEE Sensors Journal,*13(11), p. 4546-4555. doi:10.1109/JSEN.2013.2268537.

Fuller, C.B., Bonner, J.S., Islam, M.S., Ojo, T., Page, C.A., Kirkey, W.(2013) Estimating sub-surface dispersed oil concentration using acoustic backscatter response, *Marine Pollution Bulletin,*70, 140-146, http://dx.doi.org/10.1016/j.marpolbul.2013.02.025.

Other Significant

Sterling, M., Bonner, J., Ernest, A., Page, C., **Fuller, C**., Autenrieth, R. (2005). Application of fractal aggregation and vertical transport model to aquatic sol-sediment systems. *Water Research,* 39(9), 1818-1830.

Fuller, C. Bonner, J., Ernest, A., McDonald, T., and McDonald, S. (2004) Comparative Toxicity of Oil, Dispersant, and Dispersed Oil to Texas Marine Species, Environmental Toxicology and Chemistry, 23.12, 2941-2949.

Simon, M.A., Bonner, J.S., Page, C.A., Townsend, R.T., **Fuller, C.B**., Mueller, D.C. and Authenrieth, R.L. Evaluation of Two Commercial Bioaugmentation Products for Enhanced Removal of Petroleum from a Wetland, Ecological Engineering 22 (2004): 263-277

Bonner, J., Page, C., **Fuller, C.** Meso-scale testing and development of test procedures to maintain mass balance. Marine Pollution Bulletin, 47 (2003), 406-414.

Page, C. Bonner, J. S., Sumner, P. L., McDonald, T. J., Autenrieth, R. L., **Fuller, C. B.** (2000a). Behavior of a chemically-dispersed oil and a whole oil on a near-shore environment. Water Research, 34(9), 2507-2516.

SYNERGISTIC ACTIVITIES

Taylor, E., Bonner, J., Nelson, R., **Fuller, C.**, Kirkey, W., Cappelli, S. (2015) Development of and in-situ total phosphorus analyzer. Oceans'15 MTS/IEEE Washington D.C., October 19-22.

Fuller, C., Bonner, J., Islam, S., Kirkey, W., Ojo, T. (2011). Estimating sub-surface dispersed oil concentration using acoustic backscatter response. Monitoring the Aquatic Environment Using Sensor Technologies, Automation and Analytical Management Group, Royal Society of Chemistry, London, Great Britain, Oct. 19, 2011)

Billuri, M., Bonner, J., **Fuller, C.** (2011) Influence of shear and pH on flocculation of Chlorella cells using chitosan. 1st Annual International Conference Algal Biomass, Biofuels and Bioproducts. July 17-29. St. Louis, U.S.A.

Fuller, C., Islam, M., Bonner, J., Ojo, T. and Kirkey, W. (2011). Field evaluation of the applicability of using acoustic backscatter data for surrogate suspended solids concentration measurements, ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico, USA, Februar 13-13, 2011.

6/2007 NSF-Pan-American Sensors for Environmental Observatories (PASEO) Workshop, Ocean Current Measurements with CODAR HF-Radar, Bahia Blanca, Argentina

Collaborators (13)
Autenrieth, R.L. (TAMU); Billuri, M. (Clarkson); Bonner, J.S. (Research Applied Technology Education Services); Cappelli, S. (Clarkson); Ernest, A. (University of Texas Rio Grande Valley); Islam, M.S. (USGS); Kirkey, W. (Clarkson); McDonald, T.J. (TAMU); McDonald, S. (TAMU); Nelson, R. (Clarkson); Ojo, T. (Unknown); Page, C.A. (TAMU); Taylor, E. (Clarkson)

Graduate Advisors:
Doctoral Students Supervised (1)
        Billuri, M. (Clarkson University)

Masters Students Supervised (1)
        Elysia Taylor (Clarkson University)

JAVIER GUERRERO, E.I.T., MS

PROFESSIONAL PREPARATION

Ph.D. in Environmental Engineering May 2019. Texas A&M University, Kingsville, (Kingsville, Texas)
M.S. in Environmental Engineering, 2007. Texas A&M Kingsville, (Kingsville, Texas)
B.S. in Engineering Technology, 1992. University of Houston-Downtown (Houston, Texas)

APPOINTMENTS

2016- Current	**Director** of Water Studies, Civil Engineering, The University of Texas Rio Grande Valley (Edinburg, Texas)
2002-2016	**Research Engineering Associate III,** Environmental Engineering Department, Institute for Sustainable Energy & the Environment, Texas A&M University, Kingsville, (Kingsville, Texas)
1998-2002	**Designer, Environmental Coordinator and Subdivision Coordinator**, Engineering Department, City of McAllen (McAllen, Texas)
1996-1998	**Principal**, Water and Wastewater Utility Construction, RGV Environmental Services, Inc. (Edinburg, TX)

PRODUCTS

Relevant Products

Founded, Lower Rio Grande Valley (LRGV) TPDES Stormwater Task Force – Facilitate the organization of a coalition of 17 local governments. Project topics: Stormwater management, non-point source pollution, watershed protection, estuary program initiatives, and flood drainage initiatives, 1998.

Founded, LRGV Sports Complex and Municipal Parks Environmental Council – Coalition of 16 local governments represented by Parks and Rec Directors. Project topics: Low Impact Development and Green Infrastructure planning and implementation, 2014.

Founded, Lower Laguna Madre Estuary Program Partnership. Project is in the planning stages, strategic fund development funded by the Texas General Land Office, and encompasses 6 counties, 2015

Developed of a Regional Watershed based Stormwater Management Plan pursuant to the Texas Commission on Environmental Quality's (TCEQ's) TPDES MS4 program. The plan was adopted by 16 MS4s in the LRGV.

Founded, LRGV Low Impact Development Outreach, Education and Research Demonstration Site program. Comprised of over thirty (30) Best Management Practice (BMP) demonstration facilities located at 11 sites throughout the **Arroyo** Colorado Watershed. BMPs included green roofs, permeable pavements, rain gardens, bioretention features and rain harvesting systems. Monitoring of the sites is ongoing.

Other Significant

Sanchez A**.**, **Guerrero J.**, Jones, Kim D., "Lower Rio Grande Valley Low-Impact Development Implementation and Education Quality Assurance Project Plan – Monitoring and Sampling", Federal ID#99614615 & Federal ID99614616, February 2014.

Sanchez, A., **Guerrero, J.**, Jones, Kim D., "Lower Rio Grande Valley Low-Impact Development Implementation and Education Quality – Phase II Final Report", Federal ID#99614616, TCEQ Project Contract 582-11-10076, January 2016.