Annual Report

Center for the Management, Utilization & Protection of Water Resources

www.tntech.edu/research/centers/wrc

Fiscal Year July 1, 2014 through June 30, 2015

Programmatic Report

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Programmatic Report

I. Introduction

The Center for the Management, Utilization and Protection of Water Resources (CMUPWR) has been undergoing changes to its infrastructure and mission aimed at making it more productive and efficient at targeting relevant water-research areas that are earning funding in today's research marketplace. Now focusing its efforts in water-energy nexus, water-food nexus, water quality and sustainable wastewater management, biodiversity and sustainability, and enabling technologies—which are emerging as leading topics among federal agencies and in water resource conferences—the CMUPWR is aligning faculty from across campus to better reach these areas. The following list encompasses the new research focus areas and the faculty working in them:

a. Biodiversity and Sustainability
   Dr. Brad Cook, Biology
   Dr. Hayden Mattingly, Biology
   Dr. Phil Bettoli, Biology
   Dr. Brian Carver, Biology
   Dr. Joshua Perkin, Biology
   Dr. Donald Walker, Biology

b. Water Quality and Sustainable Wastewater Management
   Dr. Tania Datta, Water Center/Civil and Environmental Engineering
   Dr. Alfred Kalyanapu, Civil and Environmental Engineering
   Dr. Justin Murdock, Biology
   Mr. Dan Dodson, Water Center

c. Water-Energy Nexus
   Dr. Laura Arias-Chavez, Chemical Engineering
   Dr. Ehsan Languri, Mechanical Engineering
   Dr. Milad Esfahani, post-doc

d. Water-Food Nexus
   Dr. G.K. Stearman, Water Center/Agriculture
   Dr. Michael Best, Agriculture
   Dr. Brian Leckie, Agriculture

e. Enabling Technologies and Tools (including GIS, experimental infrastructure and support, computational simulations, and visualization and virtual reality)
   Ms. Yvette Clark, Water Center (GIS Capabilities)
   Mr. Kevin Liska and the iCube staff (Virtual Reality)
   Dr. Alfred Kalyanapu, Civil Engineering
   Dr. Ehsan Languri, Mechanical Engineering (Modeling)

The CMUPWR promotes and fosters interdisciplinary research and development in solving societal and industrial problems associated with water and environment management and sustainability, which are issues of critical importance to the region, the State of Tennessee and the world at large, to:

- Research and develop innovative solutions to current knowledge and technology barriers associated with safe and sufficient water resources and natural ecosystems
- Develop transformational technologies and tools in support of integrated system involving water-land-energy-agriculture interactions
- Through aggressive global outreach support industry and state/federal agencies and communities in water analysis, resources management and applications
- Support TTU academic programs through student and faculty development and laboratory infrastructure access
- Play a vital role in economic and rural community development of the State of TN and nation at large

II. Deliverables

a. Improving the Student Experience: The CMUPWR supports undergraduate and graduate students from a variety of fields by providing them with hands-on research experiences led by qualified faculty. Through these experiences, students earn valuable hands-on research and analytical skills, public-speaking skills, and networking opportunities by presenting their findings at professional conferences. Several CMUPWR students earned awards and recognitions for their efforts at presenting their research this fiscal year. Please see Section IVa below.

b. Transform Technology: The CMUPWR continuously seeks ways to improve its faculty's access to the latest technology. Whether through improving its Environmental Quality Lab (EQL) capabilities or encouraging its faculty's use of the iCube virtual reality technology available on campus, the CMUPWR promotes constant technological advancement in the pursuit of its mission.

This year, the EQL renewed its Tennessee State Certification through February 2018. Every three years, the EQL is recertified by the Tennessee Department of Environment and Conservation Laboratory Certification Office.

c. Expanding Financial Resources and Modernize Infrastructure:
One of the CMUPWR's main focuses is to increase external funding received by its faculty. By exploring and growing networking and interdisciplinary collaboration opportunities, the CMUPWR's director plans to further that intent and build new leads that will grow funding successes.

d. 2014-2015 Graduates
1. Doctoral Degrees: 1
2. Master's Degrees: 9

III. Collaborative Efforts (Internal and External)

Bharat Soni, the Vice President for Research and Economic Development, is establishing interdisciplinary teams from across campus to work toward the CMUPWR's new research focus areas. He is gathering faculty from a wide array of departments, ranging from biology to civil engineering, to make the CMUPWR more effective in earning funding by focusing on water research areas that are relevant in today's arena. The fruits of these teams should be revealed in increased external funding.

The CMUPWR has initiated and developed an excellent collaborative relationship with the Environmental Science Division at Oak Ridge National Laboratory (ESD/ORNL). In this respect, two symposia, one at ORNL and one at TTU, were organized to promote exchange of research ideas between researchers. We have made significant progress in linking researchers on both entities and are exploring collaborative sponsored research prgram proposals.

IV. Faculty Awards, Service and Productivity

a. Faculty and Student Recognition and Awards

Civil engineer Alfred Kalyanapu was invited to present "Flood Modeling Challenges and Advances in the 21st Century: Use of GPU Technology, Monte Carlo Methods and Geo-Spatial Analysis for Realistic Predictions" at the Oak Ridge National Lab, Environmental Sciences Division, in October 2014.

Students of environmental engineer Tania Datta received the following recognition and awards:

Rebekah Nichols (CEE undergraduate student) received the 2014 URECA! Grant to conduct research during the summer of 2014.

Amirsalar Rabbani Esfahani (CEE graduate student) won second prize for his technical poster titled "Experimental investigation on the chemical reduction of nitrate, phosphate and sulfate from stormwater runoff using aluminum powder," at the 2014 KY/TN Water Professionals Conference, held in Chattanooga in July 2014.

Oluwadare J. Oladapo (CEE graduate) and Rebekah Nichols (CEE undergraduate) won third prize for their technical poster titled "Development of a Holistic Decision-Making Tool for Sustainable Management of Organic Fraction of Municipal Solids Waste" at the 2014 KY/TN Water Professionals Conference, held in Chattanooga in July 2014.

Melissa Moffet (CEE undergraduate student) won the 2014 KY/TN American Water Works Association Scholarship.

Rebekah Nichols (CEE undergraduate student) won the 2014 KY/TN Water Environmental Federation Scholarship.

Researchers investigate novel ways to repopulate brook trout native to the Southern Appalachian Mountains in a project sponsored by the Tennessee Wildlife Resources Agency and the U.S. Forest Service and led by biology professor Brad Cook and master's student T.J. Johnson (shown on the right).

Prarthana Pradhan (CEE undergraduate student) won the 2014 KY/TN Water Environmental Federation Scholarship.

Juliet Ohemeng-Ntiamoah has received the AAUW International Fellowship. This is a prestigious one year fellowship. Her name is listed on the AAUW's website at http://www.aauw.org/article/aauws-2015-16-fellowships-and-grants-awardees/. Juliet is a graduate student working with Dr. Tania Datta. The American Association of University Women (AAUW) is the nation's leading voice promoting equity and education for women and girls. Since AAUW was founded in 1881, its members have examined and taken positions on the fundamental issues of the day — educational, social, economic, and political. AAUW provides one of the world's largest sources of funding for graduate women and the awards are highly competitive. This exceptional group of women and nonprofit organizations will receive over $3.7 million to carry on AAUW's legacy of scholarship, research, and action. During the award year, the recipients will pursue graduate studies and community projects to empower women and girls in the United States and around the globe.

Juliet Ohemeng-Ntiamoah won student poster competition in graduate student category at the 24th Water Resources Symposium at Montgomery Bell State Park, organized by Tennessee Section of American Water Resources Association (TNAWRA). They had strong competition from graduate students from various universities including University of Tennessee-Knoxville, University of Memphis, Middle Tennessee State University and Tennessee State University.

b. University, Professional and Community Service Activities

- University and Department Services

  Civil engineer Alfred Kalyanapu has served on the University's Stormwater Management Committee and the Sigma Xi Nominating Committee since Spring 2014 and the Renaissance Spectrum Engineer Award Committee since Spring 2013.

  Environmental engineer Tania Datta has served on the Department of Civil and Environmental Engineering's Research and Graduate Affairs Committee, Facilities Committee and as Laboratory Safety Coordinator. She is also the faculty advisor for TTU's Engineers Without Borders student chapter and faculty co-advisor for the Water Professionals student chapter. Within the University, she is a contributing member of the SACSCOC Compliance Committee, focusing on developing Students Achievement report, and serves as TTU's Sigma Xi Membership Committee Chair and TTU's URECA! Grant Reviewer

Professional Services

Alfred Kalyanapu holds memberships with the American Society of Civil Engineers (ASCE), American Geophysical Union, Environment and Water Resources Institute, American Society of Engineering Education, Sigma Xi Honor Society, the American Association for the Advancement of Science, the ASCE Computational Hydraulics Committee, the Tennessee American Water Resources Association Section Committee, and the ASCE Technical Committee on Rain Water Harvesting. Kalyanapu also provided a technical review for "Water Engineering with the Spreadsheet: Water Resources Calculations Using Excel" and was a conference proceeding reviewer for the 2014 and 2015 EWRI World Water Congress

Tania Datta is serving as the ad-hoc vice chair of the Water Environment Federation's (WEF) Residuals and Biosolids Committee and has served as the task force vice chair for the WEF Volunteer of the Future focus group, under the Committee Leadership Council during 2014-2015. She is also an active member of WEF's Literature Review, Program and Residuals and Biosolids Committee. Dr Datta served as the assistant moderator for WEFTEC 2014, Session 606: Biosolids Management.

Scholarly Services

Alfred Kalyanapu is a reviewer for the Journal of American Water Resources Association, International Journal of Disaster Risk Reduction and the Journal of Hydrologic Engineering. He also provided technical reviews for the "Water Engineering with the Spreadsheet: Water Resources Calculations Using Excel."

Tania Datta is a reviewer of several peer-reviewed journals. During 2014-2015, she reviewed a total of six manuscripts from the ASCE Journal of Environmental Engineering, Bioresource Technology and Environmental Engineering and Science Journal.

Outreach

Kalyanapu was an activity coordinator for the Engineering a Future event, which is designed to promote engineering career choices among middle school girls.

During 2014-2015, Tania Datta lead an activity for the 2014 Engineering a Future event and served as judge at the 60th Annual Cumberland Plateau Regional

Science and Engineering Fair, hosted by TTU, held on March 22nd, 2014 and TTU's 2014 Student Research Day.

- This year, the lab saw a significant increase in testing for bacterial analysis in private drinking water supplies. The lab staff tested 423 individual samples from a total of 325 individual customers. The lab customer base encompasses counties throughout the mid-state area. The EQL is the only facility in the Upper Cumberland area that provides certified bacterial testing for private drinking water supplies. The lab also advises clients on the need and types of treatment systems available when bacteria are present in drinking water supplies. The bacterial testing provided by the CMUPWR's lab has a direct impact on improving the health of those individuals who use the lab's services.

c. Professional Activity Summary

1. Journal Publications Published

- Phil Bettoli: 2

Warren, L., and P.W. Bettoli. 2014. Natural reproduction by stocked muskellunge in a middle Tennessee river system. Southeastern Naturalist 13:506–514.

Cole, A.J., and P.W. Bettoli. 2014. Thermal ecology of subadult and adult muskellunge in a thermally enriched reservoir. Fisheries Management and Ecology 21:410-420.

- Alfred Kalyanapu: 3

Ahmadisharaf, E., A.J. Kalyanapu, and E.-S. Chung. 2015. Evaluating the effects of flood duration and velocity on selection of flood management alternatives using mult-criteria decision making. Water Resources Management 29(8):2543-2561.

Bhuyian, Md. N.M., A.J. Kalyanapu, and F. Nardi. 2014. An approach for digital elevation models (DEM) correction by improving channel conveyance. Journal of Hydrologic Engineering doi: 10.1061/(ASCE) HE.1943-5584.0001020.

Kalyanapu, A.J., D.R. Judi, T.N. McPherson, and S.J. Burian. 2014. Annualized risk analysis approach to recommend appropriate level of flood control: Application to Swannanoa River watershed. Journal of Flood Risk Management doi: 10.1111/jfr3.12108.

- Milad Esfahani: 1

Esfahani, M.R., J.L. Tyler, H.A. Stretz, and M.J.M. Wells. 2015. Effects of a dual nanofiller, nano-TiO2 and MWCNT, for polysulfone-based nanocomposite membranes for water purification. Desalination 2015:47-56.

2. Conference Publications Published

- Phil Bettoli: 1

Churchill, T.N., and P.W. Bettoli. 2015. Species conservation profile for spotted bass Micropterus punctulatus. Pages 35-41 in M. Allen and J. Long, editors. Black Bass Diversity: Multidisciplinary Science for Conservation. American Fisheries Society Symposium 82, Bethesda, Maryland.

- Tania Datta: 1

Reardon, R., T. Datta, and C. Stacklin. 2014. Advancing resource recovery — The next generation of technologies.IWA Conference on Global Challenges: Sustainable Wastewater Treatment and Resource Recovery, October 26-30, Kathmandu, Nepal.

3. Book Chapters

- Tania Datta: 1

Reardon, R., T. Datta, and C. Stacklin. 2014. The next generation of resource recovery technologies. In Water Environment Federation Special Publication — Moving Towards Resource Recovery Facilities.

4. Presentations

- Phil Bettoli: 1

Bevelhimer, M., J. Spaulding, P.W. Bettoli, and C. Scherelis. August 2014. Not all challenges are natural: Collecting telemetry and hydroacoustics data in a heavy-traffic semi-industrial waterway. Annual Meeting of the American Fisheries Society, Quebec City, Quebec, Canada.

- Brad Cook: 1

Johnson, T.C., S.B. Cook, and J.A. Henegar. February 19-20, 2015. Assessment of Southern Appalachian brook trout propagation for restoring Tennessee populations. Tennessee Chapter of the American Fisheries Society Annual Meeting, Chattanooga, Tennessee.

- Tania Datta: 5

Kalyanapu, A., Datta, T., Dodson, D., Bynum, K. and Harrington, B. (2015). A Collaborative Effort towards Real-time Water Quality Equipment Demonstration at Falling Water River, Tennessee. Tennessee American Water Resources Association, Montgomery Bell State Park, TN.

McClellan, G.E., & Datta, T. (2015, April). An Approach Towards Linking Diversity of Polyphosphate Accumulation Organisms to Improved Functional Stability of the Enhanced Biological Phosphorus Removal Process. Tennessee American Water Resources Association, Montgomery Bell State Park, TN.

McClellan, G.E., Datta, T., & Stewart, R. (2015, June). Can a More Diverse Polyphosphate Accumulating Organisms Community Improve Functional Stability of the Enhanced Biological Phosphorus Removal Process? Association of Environmental Engineering and Science Professors (AEESP) Conference, Yale University, New Haven, CT.

Ohemeng-Ntiamoah J., Moffet M. & Datta T. (June, 2015). Linking Complex Organic Feedstock Characteristics To Microbial Metabolic Activities In Anaerobic Co-digesters. Association of Environmental Engineering and Science Professors (AEESP) Conference, Yale University, Connecticut.

Oladapo. O., Nichols, R. & Datta, T. (2014). Development of a Holistic Decision-Making Tool for Sustainable Management of Organic Fraction of Municipal Solids Waste. 2014 Water Professional Conference, Chattanooga, Tennessee.

- Alfred Kalyanapu: 8

Ahmadisharaf, E., and A.J. Kalyanapu. July 20-23, 2014. Evaluation of dam failure risk variation due to temporal changes in reservoir inflows. 2014 Water Professionals Conference, Chattanooga, Tennessee.

Ahmadisharaf, E., and A.J. Kalyanapu. 2015. Investigation of the impact of streamflow temporal variation on dam overtopping risk: Case study of a high-hazard dam. World Environmental and Water Resources Congress.

Alamdari, N., A.J. Kalyanapu, D.B. George, and Y. Clark. September 23-25, 2014. Improvement of AnnAGNPS model performance by using weighted average runoff curve number. 2014 Water Professionals Conference, Chattanooga, Tennessee.

Alamdari, N., Y. Clark, A.J. Kalyanpu, D.B. George, E. Brady, and C. Annis. September 23-25, 2014. Watershed Quality Index (WQI) Tool: Demonstration on the Obed River Watershed, TN. Tennessee Stormwater Association, Murfreesboro, Tennessee.

Bhuyian, Md N.M., A.J. Kalyanapu, and F. Hossain. 2015. Estimating relative impacts for difference sources of digital elevation models for flood consequence assessment for extreme flood events. World Environmental and Water Resources Congress.

Dullo, T., and A.J. Kalyanapu. 2015. Calibration of levee breach: A case study on New Madrid Floodway, Illinois, USA. World Environmental and Water Resources Congress.

Thornton, J., Y. Clark, D.B. George, T. Datta, N. Alamdari, and A.J. Kalyanapu. 2015. Modeling impacts of land use/land cover change of Obed River Watershed using Watershed Quality Index (WQI) model. World Environmental and Water Resources Congress.

Thornton, J.C., Md. N.M. Bhuyian and A.J. Kalyanapu. July 20-23, 2014. Lidar compared to other geometric data in HEC-RAS. 2014 Water Professionals Conference, Chattanooga, Tennessee.

- Rob Kissell: 1

  Johnston, S., and R. Kissell. May 4-7, 2015. Status and distribution of the long-tailed weasel (Mustela frenata) in Arkansas. Southeastern Association of the Fish and Wildlife Agencies Furbearer Working Group.

- Hayden Mattingly: 2

  Boersig, T., III, H.T. Mattingly, and J.W. Johansen. January 2015. Life history of the Obey crayfish, Cambarus obeyensis, an endemic crayfish of the Cumberland Plateau. American Fisheries Society Southern Division Annual Meeting, Savannah, Georgia.

  Johansen, J.W., and H.T. Mattingly. January 2015. Population densities and habitat use of Cambarus pristinus, a crayfish of management concern from the Cumberland Plateau in Tennessee. American Fisheries Society Southern Division Annual Meeting, Savannah, Georgia.

- Justin Murdock: 5

  Henderson, K.A., J.N. Murdock, M.A. Locke, R.E. Lizotte Jr. November 21, 2014. The association between water depth, algal assemblages, and hypoxia in agricultural lakes. Tennessee Academy of Sciences Annual Meeting, Morristown, Tennessee.

  Henderson, K.A., J.N. Murdock, M. Locke, and R. Lizotte. May 17-21, 2015. Drivers of algal biomass and productivity in intensively managed agricultural streams. Society for Freshwater Science National Meeting, Milwaukee, WI.

  Hix, L., and J.N. Murdock. May 17-21, 2015. Effects of pH on Didymosphenia geminate distribution, metabolism, and phosphorus uptake. Society for Freshwater Science National Meeting, Milwaukee, WI.

  Murdock, J.N., M.A. Locke, R.E. Lizotte Jr., F. Douglas Shields Jr., and K.A. Henderson. November 21, 2014. Nutrients, suspended sediment, and hydrology interact to regulate dissolved oxygen in agricultural lakes and streams. Tennessee Academy of Sciences Annual Meeting, Morristown, Tennessee.

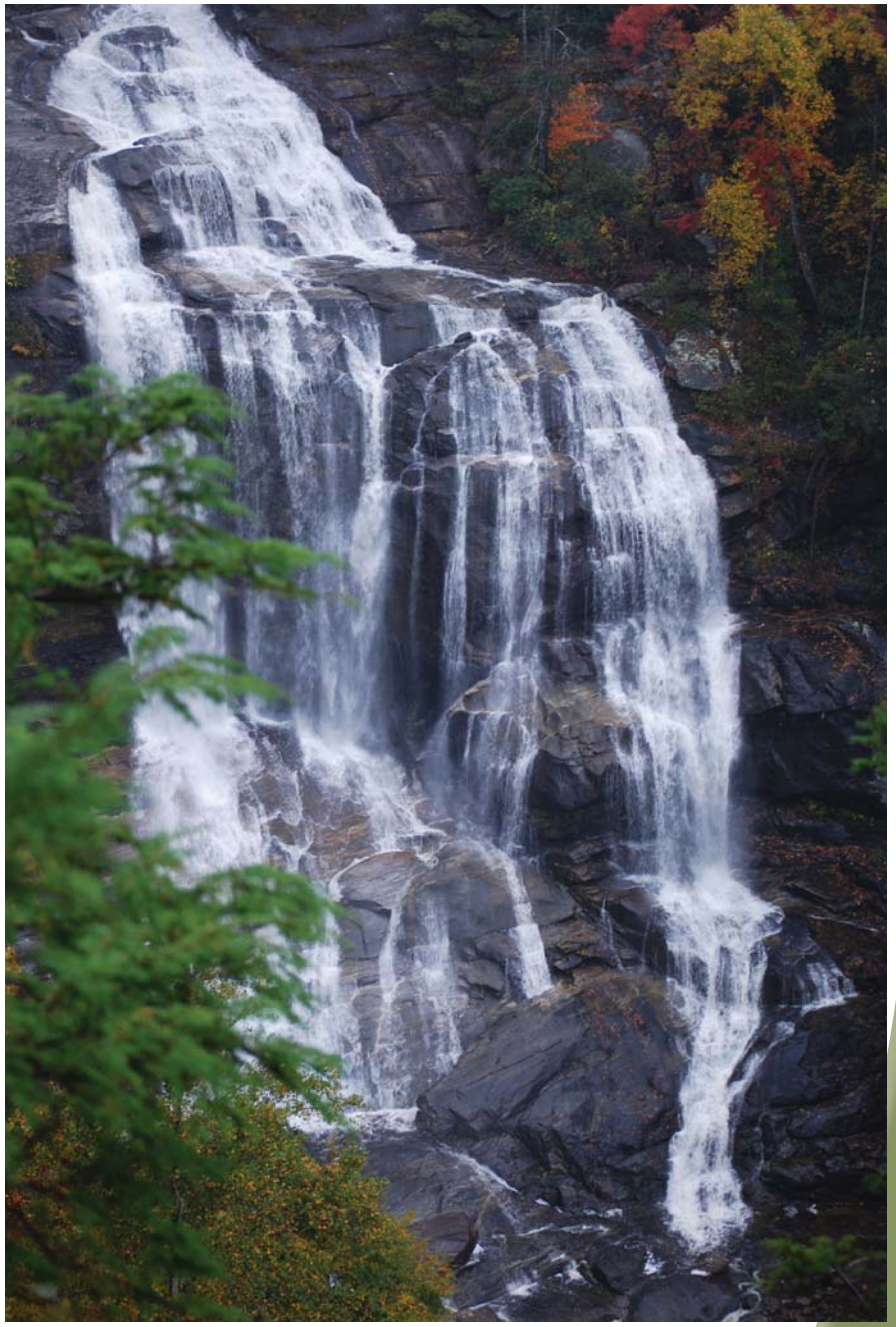
  Murdock, J.N., N. Knorp, and L. Hix. May 17-21, 2015. Macroinvertebrate structural and consumption responses to Didymosphenia geminata mats in the upper Tennessee River watershed. Society for Freshwater Science National Meeting, Milwaukee, WI.

5. Research Proposal Reviewer

   - Alfred Kalyanapu: 2

6. Journal Reviews

   - Alfred Kalyanapu: 2



Water Center Graduates 2014-2015

August 2014

Md Bhuyian
M.S., Civil and Environmental Engineering
Thesis Title: "A GIS-based Approach for Digital Elevation Models (DEM) Correction to Derive Bathymetric Data with Improved Conveyance"
Advisor: Dr. Alfred J. Kalyanapu

Justin Spaulding
M.S., Biology
Thesis Title: "Behavioral Thermoregulation of Fishes in Relation to Heated Effluent from a Power Plant on the Cumberland River, Tennessee"
Advisors: Dr. Phillip W. Bettoli and Dr. Mark S. Bevelhimer

Kayron Tevepaugh
M.S., Chemistry
Thesis Title: "New Nitrogen Based Extractants for Separation of Minor Actinides from Lanthanides"
Advisor: Dr. Dale Ensor

Rachel West
M.S., Chemistry
Thesis Title: "Characterization of Amidoxime Compounds for Extraction of Uranium from Seawater"
Advisor: Dr. Dale D. Ensor

December 2014

Nasrin Alamdari
M.S., Civil and Environmental Engineering
Thesis Title: "Development of Weighted Curve Number Approach and Watershed Quality Index Tool Using ANNAGNPS: An Obed River Watershed Case Study"
Advisor: Dr. Alfred Kalyanapu

Bari Dorris
M.S., Biology
Thesis Title: "Ciliates as Potential Sources of Biodiesel"
Advisor: Dr. John Gunderson

Grant Scholten
M.S., Biology
Thesis Title: "Evaluating the Spawning Habitat and Cumulative Effect of Catch and Release Fishing Mortality of Sauger in Old Hickory Lake, Tennessee"
Advisor: Dr. Phillip W. Bettoli

May 2015

Kate Henderson
M.S., Biology
Thesis Title: "The Association Among Water Depth, Algae, and Hypoxia in Agricultural Lakes"
Advisor: Dr. Justin Murdock

Amirsalar Rabbani Esfahani
M.S., Civil Engineering
Thesis Title: "Experimental Investigation of Nitrate Removal Using Zero Valent Aluminum Particles"
Advisor: Dr. Tania Datta

Milad Rabbani Esfahani
Ph.D., Engineering
Thesis Title: "Humic Acid Foulig on an Ultrafiltration Membrane: Toward Nanocomposite-Based Self-Cleaning Membranes"
Advisor: Dr. Holly Stretz

Graduate Student Support

M.S.

Nasrin Alamdari	Civil and Environmental Engineering
Nowfel Mahmud Bhuyian	Civil and Environmental Engineering
Bari A. Dorris	Biology
Amirsalar Esfahani	Civil and Environmental Engineering
Thomas Johnson III	Biology
Suzanne Johnston	Biology
Grace McClellan	Civil and Environmental Engineering
Oluwadare Oladapo	Civil and Environmental Engineering
Matthew Padgett	Biology
Josey Ridgway	Biology
Grant Scholten	Biology
Justin Spaulding	Biology
Kayron Tevepaugh	Chemistry

Ph.D.

Ebrahim Ahmadisharaf	Civil and Environmental Engineering
Mieko Camp	Environmental Sciences, Biology
Milad Esfahani	Chemical Engineering
Md. Nowfel Bhuyian	Civil and Environmental Engineering
Juliet Ohemeng-Ntiamoah	Civil and Environmental Engineering
Chengye Song	Computer Science
Abel Woldemichael	Civil and Environmental Engineering

Core Faculty

Dr. Tania Datta	Environmental Engineering
Dr. G. Kim Stearman	Agriculture

Associate Faculty

Dr. Pedro Arce	Chemical Engineering Chair and Professor
Dr. Phillip Bettoli	U.S. Geological Survey – Biological Resources Division/Tennessee Cooperative Fishery Research Unit
Dr. Jeff Boles	Chemistry Chair
Dr. Tammy Boles	Environmental Chemistry
Dr. Andrew Callender	Chemistry
Dr. Jesse Carrick	Chemistry
Dr. Brian Carver	Biology
Dr. Laura Arias Chavez	Chemical Engineering
Dr. Dan Combs	Biology
Dr. Nathan Conner	Agriculture
Dr. Brad Cook	Biology, Interim Chair and Professor
Dr. Dale Ensor	Chemistry
Dr. John Gunderson	Biology
Dr. Evan Hart	Earth Sciences
Dr. John Harwood	Chemistry
Dr. David Huddleston	Civil and Environmental Engineering
Dr. Carla Hurt	Biology
Dr. Alfred Kalyanapu	Civil and Environmental Engineering
Dr. Shawn Krosnick	Biology
Dr. Ehsan Languri	Mechanical Engineering
Dr. James Layzer	U.S. Geological Survey – Biological Resources Division/Tennessee Cooperative Fishery Research Unit
Dr. H. Wayne Leimer	Earth Sciences
Dr. Peter Li	Earth Sciences
Dr. Edward Lisic	Chemistry
Dr. Hayden Mattingly	Biology and School of Environmental Studies Interim Director
Dr. Justin Murdock	Biology
Dr. Francis Otuonye	Associate Vice President for Research and Graduate Studies
Dr. Jennifer Pascal	Chemical Engineering
Dr. Joshuah Perkin	Biology
Dr. Jeffrey Rice	Chemical Engineering
Dr. Tom Roberts	Biology
Dr. Robby Sanders	Chemical Engineering
Dr. Holly Stretz	Chemical Engineering
Dr. Jeannette Wolak	Earth Sciences

Research Specialists
Ken Morgan

Research Assistant II
Kendall Moles

Academic Support Associate IV
Cole Harty

Postdoctoral Research Associate
Milad Esfahani

Analytical Laboratory

Manager
Dan Dodson

Laboratory Staff
Michael Kuley, Research Assistant II
Phillip Burr, Academic Support Associate IV
Student Assistants

GIS Laboratory

R&D Engineer
Yvette Clark

GIS Staff
Student Assistants

Financial Support Saff
Mary Williford, Financial Analyst
Sandra Dodson, Administrative Associate III
Glenda Shanks, Academic Support
Associate III (employed through March 13, 2015)
Student Assistants

Editorial Office

Editor
Amy Knox

Editorial Staff
Student Assistants