Barry F. Beck 2020 Sinkhole Conference Student Scholarship Recipients

Lijun, Tian
Ph.D. student
University of Texas at San Antonio

I am a 5th year Ph.D. student in the Environmental Science and Engineering Program of University of Texas at San Antonio. Before coming to UTSA, I received an M.S. degree in Quaternary Geology, Institute of Geology and Geophysics, Chinese Academy of Sciences, 2014; and B.S. degree in Geographic Science, Lanzhou University, 2010.

When I studied at Lanzhou University, I had various field trips across northwest China - from Qilian mountain glacier to the terminal lakes, from Tibet Plateau to Badain Jaran Desert. I was also involved in some research projects about climate proxies such as loess-paleosol sequence, tree ring, and lacustrine deposit. My undergraduate thesis is about the excavation results of Dadiwan archaeological site. These experiences led me to a keen interest in hydrology and paleoclimate reconstruction.

During my M.S. study in CAS, my research focuses on controls on the oxygen isotopic variability of meteoric precipitation, drip water, and calcite deposition at two caves in China. I have monitored Shihua Cave in Beijing and Baojinggong in Guangdong with monthly sampling for three years. Base on the contrast results of the two caves located in North and South China, we have a new perspective on the interpretation of Chinese speleothem δ18O record.

When I came to UTSA to pursue a Ph.D. degree in the ESE program, the study and research experience in Center for Water Research at UTSA provided me with advanced training in water research and technology. Edwards Aquifer which provides groundwater supplies for more than two million people in central Texas faces both water quantity and quality problems. I believe the geochemistry and isotope tools could provide most useful information to solve the hydrogeological problems. That is why I choose these research subjects and methods for my Ph.D. dissertation.

During my study in UTSA, I'm participating in many karst related fieldworks: routinely monthly sampling surface water and groundwater for two years in Upper Cibolo Creek Watershed; cave hydrology monitoring and speleothem sample collection in Texas and Virginia caves; fluorescent dye tracing in Cave Without A Name and Devil's Sinkhole. I also have many research field trips back to China: a two-month field trip in Tibet for paleo-lake level research and a two-week field trip in Southwest China for dating the ages of Tiankengs.
My main research interests include:

(a) Geochemical evolution of aquifer system: hydrochemical and isotope tracers of groundwater sources and surface water-groundwater interactions in Karst aquifers; geochemical modeling to investigate the inter-formation flow.

(b) Geochronologic methods for karst landforms: reconstruct paleo-lake shorelines over the Tibetan Plateau (OSL technique to date quartz/feldspar grains of sandy layers and U-Th technique to date tufa deposits of shorelines); evolving history and formation mechanisms of extremely large karst collapses (Tiankengs) in China (paleomagnetic stratigraphy to date cave sediments and cosmogenic 36Cl technique to date the exposure age of limestone).

(c) Besides the karst hydrogeology, I also have research interest in stable isotope clues to the formation and evolution of sea ice in the Arctic and Antarctic.

Lumongsod, Regina Martha
MS Student
University of the Philippines National Institute of Geological Sciences

I am currently an Instructor and master's student (MS Geology) at the University of the Philippines National Institute of Geological Sciences (UP-NIGS), the Center of Excellence in Geology in the Philippines. I was a former research assistant for a project on active tectonics and coastal hazards. I have taught general geology, geomorphology, computer methods in geology, and field methods and technical drawing. My current research is on karst geomorphology, particularly on sinkholes, limestone-bearing formations, and geographic informations system (GIS). My research interests include coastal geomorphology, planetary geology, karst hydrogeology, and GIS applications in geology.

Moore, Brittiny
MS Student
Texas State University

At the age of 13, during an annual family vacation, my grandparents took me to see my first show cave. Before this trip, I could have never imagined that an entirely different world existed underneath our very feet. War Eagle Cavern in Arkansas was adorned with stalactites, stalagmites, and still dripping drapery. It was from this vacation that I decided I wanted to study caves.

A graduate of Western Kentucky University, I majored in geology and minored in geography and journalism writing. While obtaining a bachelor's degree in geology, I concentrated on karst environments and successfully completed an honors thesis project focused on analyzing cave roof stability. This project included the use of geographic information systems and case studies to provide evidence of an increased frequency in bedrock collapse sinkholes. This project received publication in The Professional Geologist journal.

I am now a graduate student at Texas State University, where I am continuing my studies in karst environments. My current research project focuses on the effect of land use policies on the health of karst systems. This project includes policy analysis, utilization of the Karst Disturbance Index, and a statistical analysis. During my studies at Texas State University, I have also begun a research project that is concentrated on policy issues with groundwater and surface water interactions, with a focus on sinkhole filling in the Edwards Aquifer recharge zone.

Currently employed part-time with the City of Austin. I work as an environmental conservation information specialist. When not working or in class, I am a volunteer with several organizations, am a freelance writer for the Texas Parks and Wildlife Magazine, and an avid researcher. Outside of my academic research, I am currently conducting a sinkhole analysis in Puerto Rico with two other colleagues.

After graduation with a master's degree, I would like to continue working for the City of Austin as a geologist with the city's new sinkhole initiative. The initiative is focused on preserving and conserving sensitive recharge features that are currently affected by urbanization. Ultimately, I plan to continue with higher education by obtaining my PhD in geological sciences with a research project focused on the environment and society.

Robinson, Tonian
Ph.D. student
University of South Florida

My professional goals are to obtain an academic position that will enable me to become a mentor for students who might never have considered career paths in STEM. Growing up on the island of Jamaica, surrounded by beautiful tropical landscapes; I developed an early appreciation of nature. My first experience studying aspects of nature came shortly after migrating to the United States at age 15.I worked with an ecologist for the Roche Program at William Paterson University during the summer before my senior high school year, I studied the effects of temperature on the metabolism of ants. To this date, I can still recall the enthusiasm in giving my first scientific presentation of this work that laid the foundation for my present passion for science.

As a sophomore at Rutgers State University, my career trajectory changed when I joined the Rutgers-Newark Geophysics research group as a part-time research assistant. Working with the Geophysics research group provided me with access to mentors, research experience, and the confidence that I could become successful in STEM. By participating in research for nearly three years, I was able to improve my technical skills for both lab and fieldwork. I primarily worked on a Strategic Environmental Research and Development Program (SERDP) project. For SERDP, I performed analytical experimentations on rock sub-cores to correlate their electrical properties to the hydrogeological properties controlling fluid transportation.
As an undergraduate research assistant at Rutgers-Newark, I presented findings at the Research Experience for Undergraduates (REU) Symposium, Geological Society of America (GSA) Conference, and American Geological Union (AGU).

Today I am a Ph.D. student at the University of South Florida; my studies involve the precursory detection of sinkholes using Interferometric Synthetic Aperture Radar (InSAR) images. I am currently analyzing the spatial patterns of time-series data points, showing subsidence, for three locations in West-central Florida. These time-series points were processed using the persistent-scatterer InSAR method. In this study, we aim to prevent the loss of lives and infrastructure by adding InSAR data to assess sinkhole activities in the highly vegetated West-central, Florida. My team and I plan to advocate for long term observations over

the sinkhole prone areas to provide information about ongoing threats of collapse.

As a woman of color introduced to the sciences through outreach programs in high school, I plan to be involved in similar efforts for local high school students. As the Outreach Coordinator for the USF Geoscience Graduate Student Organization (GGSO), I plan to provide early exposure in STEM fields to students who have "untapped potential." Each year, we will be providing hands-on activities at schools in the Tampa Bay area that offer the geosciences as STEM focus areas. By introducing these students to role models, I hope to help someday increase diversity in STEM. I also aspire to create programs to involve K-12 students of color in outdoor activities to increase minority participation in the geosciences. I believe my love for geoscience is somehow connected to how much time I spent in the outdoors.

Rodriquez-Medina, Elienisse
PhD student
University of Puerto Rico, Mayagüez

My name is Elienisse Rodríguez Medina, I was born and raised in Puerto Rico. After high school, I choose to do a bachelor's degree in chemistry at University of Puerto Rico, Mayagüez Campus. As an undergraduate student, I had the opportunity to do an internship for the WaterCAMPWS research center at the University of Illinois, Urbana-Champaign Campus. This program gave me the opportunity to work with Professor John Shapley and his group on "Tracking the Fate of Nitrogen in Catalytic Nitrate Reduction". Through this research I become fascinated with Environmental Engineering field because I can implement and investigate potential solutions to avoid or minimize impacts and risks that could cause water contamination of the environment and welfare of people. For this reason, I decided to do a master's degree in Environmental Engineering at the University of Wisconsin in Madison. There, I worked with Dr. Daniel Noguera on a thesis project entitled "Operation of lab-scale reactors aimed at obtaining pure cultures of Candidatus Accumulibacter phosphatis". Currently, I am an Environmental Engineering and Water Resources PhD student at the University of Puerto Rico, Mayagüez Campus. I work with Dr. Ingrid Padilla on my research project titled "Dynamic Distribution and Potential Exposure of Contaminant Mixtures in Karst Waters Systems". Through this research I have the opportunity to perform laboratory work, as well as field work. For this project I performed planning, coordination, and collection of tap-water and groundwater samples from superfund sites (potential contaminated areas) following IRB protocols. After, performing chemical extraction of Phthalates and Chlorinate Volatile Organic Compounds on these samples, I follow modified US EPA analytical methods. Also, I had the opportunity to do another research project, different from my thesis. This project was in the field and consisted of characterizing fate and transport properties in kart aquifers under different hydrological conditions. Through this project dyes where injected in a spring, where water flows within a cave, and is located in the karst northern area of Puerto Rico.

My career interests are to finish my PhD with the skills and abilities needed to face the labor world, and to increase my scientific and professional skills by expanding my knowledge not only in the areas I plan to specialize in, but also in other areas. I want to improve my communication skills and do networking with people inside and outside my study area. As well as pursue my long-term goal which consists of being able to impact communities by applying water-quality knowledge.

Salinas, Robert
MS student
University of Texas at San Antonio

My academic career has been focused on the study of karst environments and groundwater contamination. I chose this field because of the important economic, scientific, and recreational resources which cave and karst aquifers represent to the State of Texas. I recently graduated from the University of Texas at San Antonio (UTSA, Dec. 2018) with a Bachelor of Science in geology. Due to overwhelming support from faculty well as that of Raba Kistner Environmental Inc., where I worked as an interning geological scientist, I decided to pursue a master's degree at UTSA as well. Having taken part in several research studies focused on water quality (Minority Science and Engineering Improvement Program, Geoscience Pathways Program, and the Louis Stokes Alliances for Minority Participation), as well as having had the invaluable opportunity to work with Southwest Research Institute, I felt that I was in a particularly strong position to continue my education, strengthen my interests, and further expand my knowledge. Currently I am investigating water quality and water quantity conditions at the research ranch, C.L. Browning Ranch, within the Honeycut Hollow watershed as well working to define and characterize gravel dunes within the Medina River. Upon graduation I hope to use my gained experience to address the ever-increasing water resource concerns here in San Antonio and the greater South Texas region as an environmental geologist.

Torres Torres, Norma I.
PhD student
University of Puerto Rico, Mayagüez

Having been born in an island surrounded by water and unique natural resources, I have always been interested in protecting the environment and developing tools to improve the quality of our resources. This interest led me to pursue a bachelor's degree in Civil Engineering and Surveying at the University of Puerto Rico, Mayagüez (UPRM) in August 2005. At UPRM, I developed and improved key skills that have made me a better professional, including: critical thinking, leadership, ability to communicate effectively, both in Spanish and English, and the capacity to work in multicultural environments. I participated in many extracurricular activities, involving active participation in the student chapter of professional societies, taking strong leadership roles, participating in several competitions, and conducting undergraduate research. These experiences and efforts led me to be the recipient of multiple awards, including the Tau Beta Pi Outstanding member award and the Department of Energy, Savannah River Research Scholarship. In 2012, I completed two bachelor's degrees, one in Civil Engineering and one in Surveying, graduated with honors, and received the Department's Medal of Honor for most accomplished graduating student.

My interests in karst water systems began while working as an undergraduate researcher in 2011 under the supervision of Dr. Ingrid Padilla. With the initial tasks of collecting and compiling contamination data, I started to analyze the spatial and temporal extent of groundwater contamination in the northern karst region of Puerto Rico using GIS and statistical methods. I then began to see the high vulnerability of karst groundwater systems to contamination and its potential impacts to public health. Given the many questions to answer in the research, my interest in learning about the different problems that affect our water resources, and my desire to develop better tools to solve these problems, I decided to pursue graduate studies in Environmental and Water Resources Engineering at UPRM.

My doctoral research aims at developing spatial and temporal correlational structures and geostatistical models to predict the impact of hydrogeological and anthropogenic factors on the dynamic distribution and potential exposure of contaminants in karst aquifers. It focuses on CVOCs, phthalates, and nitrates due to their ubiquity and potential ecologic and health impacts. I have presented my work at several meeting, including the SRP Annual Meeting (2012, 2015), AGU Fall Meeting (2012, 2015, 2016), KWI Meeting (2016), and the IAH Congress (2016). I have published in the Proceedings of the KWI 2016 Meeting (2018), Environmental Pollution (2018), and Environmental Earth Sciences (2019), among others.

During my graduate career, I have received multiple awards, including travel grants to present my research work in different conferences (AGU Fall Meeting 2012, KWI 2015), the PROTECT Individual Development Plan Award (2016; 2017), Phi Kappa Phi Honor Society Outstanding Academic Merits (2016), and prestigious fellowships from the NSF Graduate Research Fellowship Program (2013-2017) and Ford Foundation Dissertation Fellowship (2018). My academic preparation, my research experience and passion for environmental engineering, gives me the tools to help the society to have better education and quality of life.

Williams, Gabriella
PhD student
University of Sheffield

I am a second year Geotechnics PhD student working on a project titled "Investigation of sinkhole triggering processes." The project is a collaboration between the University of Sheffield and the British Geological Survey.
My background is in Civil Engineering, I completed an integrated Masters degree in 2018. During my studies I developed an interest in geotechnical engineering and sought out experience with geotechnical engineering consultants. I spent two summers with civil engineering consultants - in the geotechnics department of Atkins, Derby in 2016 and in the structures department of AECOM, St Albans in 2017 - where I worked on producing desk studies of soil and groundwater conditions using borehole logs, trial pits and historical maps. I learned how results accrued are applied to the design of foundations and earth structures. My work on creating ground profiles was my introduction to the importance of understanding geology in civil engineering, and this later influenced my choice of degree specialization and research career plans.

I developed a particular interest in engineering geology and hydrology following these placements. My optional Masters modules included areas such as surface water chemistry and mixing processes, hydrogeology, advanced geotechnical testing methods and flood risk management. There are often crossovers in these topics in that they require an understanding of the mechanical interaction between soil, rocks and water at different scales. I became interested in how engineers must use their understanding of these interactions

to develop infrastructure that both maintains natural ground and water processes, in a way that does not damage the environment, while mitigating hazards caused by the environment.

For my Masters dissertation, I investigated the mechanics of debris flows using a photoelastic flume. The aim of the project was to generate particle interaction data which could be used to find links between theoretical analyses of debris flow behaviour and actual recorded bulk behaviour.

Following my Masters I wanted to remain doing research in the area of natural hazards, and started my PhD in the area of sinkholes in 2018. The broader focus of the PhD is to understand how sinkholes form and collapse by creating a conceptual model incorporating data which will be generated during the PhD. This data includes predicted groundwater flow patterns found by geophysical ground investigation methods and hydrological methods; and rock strengths and degradation thereof when exposed to groundwater.

I have spent my first year learning about the geology of karst areas and applying my knowledge to an area of interest to create an initial conceptual model. I have also begun using geophysics tools to investigate the ground conditions beneath depressions, and plan to use them later to map locations of faults and buried valleys which control the flow of groundwater. I will conduct lab experiments on rocks of the area to determine the rates of dissolution and strength degradation in the predicted groundwater conditions. As with my previous research, I aim to use this PhD as an opportunity to integrate data from different methods of investigation or analysis.