

# Undergraduate Research Conference 2014

## Submission Form

Project Title: **Water Quality of Lanana Creek within the Nacogdoches Area**

Semester and Course of Project Completion: **CHE 475: Summer 2013, Fall 2013, Spring 2014**

Name of Student(s) (list all authors up to five): **Tania Benavides**

Student ID number (list all authors up to five): **20057395**

Student's Major (list all authors up to five): **Chemistry**

Student's Email (list all authors up to five): [benavidetn@titan.sfasu.edu](mailto:benavidetn@titan.sfasu.edu)

Student's Academic Classification (list all authors up to five): **Senior**

Faculty Sponsor's Name: **Dr. Michael A. Janusa**

Faculty Sponsor's Home Department: **Chemistry & Biochemistry**

Faculty Sponsor's Email Address: [janusama@sfasu.edu](mailto:janusama@sfasu.edu)

Please insert the student-authored abstract *first*, followed by faculty letter of recommendation below.

### **Abstract**

Lanana Creek is one of two springs that surround Nacogdoches, TX. Lanana Creek starts southwest of Lake Naconiche, conjoining with several other bodies of water along its path, and becomes part of the Angelina River. This body of water eventually ends in the Gulf of Mexico which may contribute to the dead zone. Contaminants in water may be of small concentration; however, prolonged exposure could produce many negative effects. To prevent further contamination, the source of the contamination must be identified through testing the water for contaminants. Some possible sources of contamination may be from fertilizers and pesticides used in rural farms around the area.

Lanana Creek flows directly past the retention ponds that the inhabitants use as a water source, and the water from Lanana Creek is a major contributor to that source. This is of great concern as many use this source to sustain themselves as well as their children. Prolonged exposure to contaminants could have an effect that causes debilitating conditions such as: Giardia, Norovirus, Legionella, Salmonella, and Hepatitis A, just to name a few. Aside from the obvious health risks this contaminated water could produce, there are also the social risks like the inability for low income areas to have their water sources treated properly.

The experiment consists of obtaining samples from eight different locations along Lanana creek and testing for different metals and ions for possible introduction into the creek due to contamination. Two samples from each sight were collected: one for anion testing and one for metal testing. The eight sampling sites consist of NE Stallings Drive, SE Stallings Drive, Martin Luther King Blvd., Park Street, Martinsville Street, Starr Avenue, Austin Street, and Main Street. Samples are filtered to remove residue as only the dissolved species in the water will be analyzed. Samples that are to be analyzed for metals are acidified with nitric acid and refrigerated to avoid absorption or precipitation of metals in the sample after collection. Metal analysis was tested using the Inductively Coupled Plasma-Optical Emission Spectrometer (ICP) for the following species: arsenic, lead, iron, nickel, zinc, cadmium, chromium, and copper. Anion analysis was conducted using an ion chromatography (IC) for the following species: fluoride, chloride, nitrite, bromide, nitrate, sulfate, and phosphate.

Data has been collected since Aug 2013 to the present approximately twice a month. An interesting result involves a large increase in nitrate and sulfate levels during September for the sites of NE Stallings Dr, Starr Ave., Martinsville St., and Austin St. There could be a possible contamination due to the use of fertilizers and pesticides because the SFA's Azalea Garden is near these locations. Possible run off may have occurred during rain storms around this time. Further research around these sites needs to be conducted to determine the actual source of contamination on the creek.

## Letter of Recommendation



# STEPHEN F. AUSTIN STATE UNIVERSITY

## **Department of Chemistry & Biochemistry**

P.O. Box 13006 SFA Station · Nacogdoches, Texas 75962-3006

phone: 936.468.3606 · fax: 936.468.7634 · [www.sfasu.edu/chemistry](http://www.sfasu.edu/chemistry)

Jan. 27, 2014

Dear Committee:

I am quite pleased to write on behalf of Tania Benavides, Chemistry major at Stephen F. Austin State University. I have had the pleasure of collaborating with Tania on a project involving a study on how Nacogdoches impacts the water quality of Lanana Creek.

This research is aimed at quantitatively investigating the water quality of Lanana creek by analyzing specific concentrations of suspected pollutants. Specifically, the research is creating a baseline for the creek's water quality involving the determination of selected heavy metals and ions that can be used later for controlling/modifying the urban runoff.

Tania has worked on this project since July 2013 and will continue to collect data for approximately one year. Tania has done an excellent job and is an excellent research assistant; an individual that I fully trust. She has made great progress on the research with very little guidance by me. I appreciate all the hard work she has done in developing the protocols necessary for the project and her dedication to collecting and analyzing samples on a regular basis.

Tania has my full support for this project as evident by appointing her lead investigator on the project. During the spring 2014 semester, Tania will not only continue with this project, she will be the lead investigator and will supervise two other undergraduate students on the project.

Sincerely yours,

Michael A. Janusa, Ph.D.

Professor and Chair, Chemistry & Biochemistry