



## **Clemson-NASTT Student Chapter**

**Annual Report – 2018**

**Faculty Adviser:**

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### **1. Introduction**

Affiliated with NASTT, the Clemson Student Chapter was founded in February of 2013 and since then its imperative purpose has been to familiarize, engage, and recruit students and faculty at Clemson University in trenchless-related activities. The specific intent of the student chapter is to promote trenchless education and provide networking opportunities within the general field of trenchless technology. We had an engaging year of activities with good participation. This report provides a detailed review of the activities undertaken by Clemson-NASTT student chapter members in the year 2018. Details on the scheduled events for the rest of the year are also presented.

### **2. A Graduate-level Course on Trenchless Technologies**

A graduate-level course called “Underground Construction” is being taught for the sixth time at Clemson University in Fall 2018 semester and it has been very well received and appreciated. The content of this course is divided into three parts:

- a) Design considerations for buried pipelines
  - Students learned about various loads (dead and live) on buried pipelines and fundamental procedures for designing both rigid and flexible pipelines;
  - Students also learned about the hydraulic design aspects of buried pipelines focusing on water distribution systems; and
  - Students designed water pipeline networks using a sophisticated genetic algorithm with the objectives of minimizing cost and maximizing system resilience.
- b) Underground infrastructure construction methods
  - Students are learning about various trenchless installation methods that include horizontal directional drilling, auger boring, pipe jacking, micro-tunneling, pilot-tube micro-tunneling, and guided vacuum boring;
  - Students are assigned to research and make presentations on unique trenchless installation projects that pushed the boundaries of trenchless construction methods; and

- Students are also expected to evaluate the suitability of various trenchless construction methods for a given project scenario.
- c) Underground infrastructure rehabilitation methods.
  - Students would learn about various rehabilitation and replacement methods that include CIPP, slip-lining, close-fit slip-lining, cement mortar lining, epoxy lining, and pipe bursting techniques.

### 3. No-Dig Show 2018

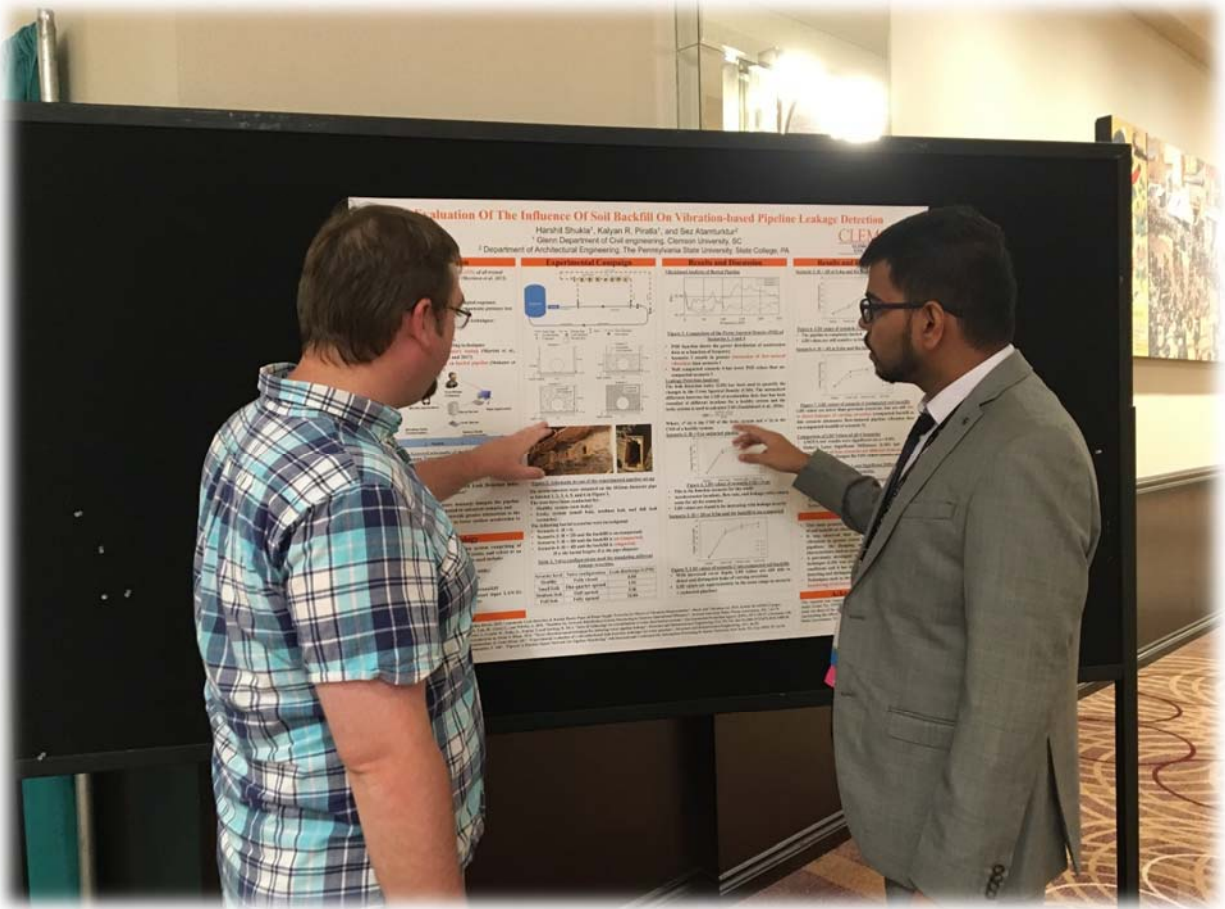
Attending the NASTT's 2018 No Dig show, five Clemson graduate students had the chance to participate in the conference to present, attend sessions and tracks as well as take part in exhibits and get to know the state-of-the-art advancements in Trenchless Technologies in Palm Springs, California March 25<sup>th</sup> through 29<sup>th</sup>. Students also served as volunteers helping the conference organizing team, and networked with several trenchless professionals. Picture 1 shows Clemson students outside the conference venue.



Picture 1. Clemson University students at 2018 No-Dig conference venue in California

#### 4. ASCE Pipelines Conference

Clemson student chapter had a presence at the ASCE Pipelines Conference held in Toronto, Canada from 15th to 18th of July. A research poster on pipeline leakage detection was presented (see Picture 2) and one graduate student got the opportunity to meet with professionals, developers, exhibitors, and engineers working in the pipeline industry.



Picture 2. Graduate student presenting his research poster at the ASCE Pipelines Conference in Toronto, Canada

## 5. Student Chapter Recruitment

### a. Annual Student Recruitment Event

We have focused on expanding the reach of our student chapter benefits to include several undergraduate students at Clemson University. As part of this vision, we conducted a recruitment event in Fall 2018 semester where trenchless construction methods were briefly discussed with Clemson students to recruit them into the student chapter. Several students showed interest and joined the student chapter as a result. Pictures 3 and 4 show the students being engaged during the recruitment event.



Picture 3. Students being recruited into the student chapter



Picture 4. Undergraduate students being recruited into the student chapter

b. Civil Department Fall Cookout Showcasing and Advertising

As part of student recruitment, we participated in the Fall cookout advertising (see Picture 5) and poster presentation event in Fall 2018 semester where trenchless construction methods were briefly discussed with Clemson students to educate and recruit them into the student chapter



Picture 5. Student chapter advertisement and recruitment at the Fall 2018 Cookout event

## 6. Field Visits

Students attended and witnessed a Pipe Bursting job in Greenville area that dealt with installing a 8” sewer main by bursting an existing line of in-situ aging pipe. This project was being done by McClam & Associates, Inc. for City of Greenville. The field engineer (Jesse) along with TT Technologies’ Brian Hunter discussed at length with all the visiting students the Pipe Bursting process and shared several interesting experiences from their past work as well as the challenges on installing such pipelines in the Carolinas. This jobsite visit has paved the way for addressing the trenchless technologies in class discussions and theoretical calculations and implications to a much better extent. Students actively asked questions on what they were experiencing and observing on the jobsite, and brought up challenges and opportunities that might have stood out for the field engineers and workers. Pictures 6 and 7 show Clemson students attending the Pipe Bursting jobsite.



Pictures 6. (a) Jesse and his co-worker interacting with Clemson students at Pipe Bursting jobsite; (b) Students watching the existing pipe in the entry pit of pipe bursting



Picture 7. Students watching the pipe-burst equipment

## 7. Trenchless Guest Lecture Series

Clemson-NASTT student chapter has scheduled to host four trenchless seminars in 2018. While three seminars have been completed, one seminar will be scheduled in the upcoming months. We invited industry professionals to speak about different topics related to underground infrastructure management. The speakers for this year include:

- a. ***Mr. Tony Putnam (Director of Utility Services, Clemson University)***. Mr. Putnam spoke about campus utility infrastructure systems focusing on asset management issues and interdependencies among utility infrastructure systems. Mr. Putnam has more than 29 years of experience in facilities management and his department at Clemson is specifically responsible for energy management, electrical distribution, energy plant operations, water distribution, wastewater treatment-plant operations, and underground utilities for University Facilities. He presented an owner's perspective of managing buried pipeline infrastructure. Picture 8 shows Mr. Putnam discussing utility infrastructure issues with Clemson students.



Picture 8. Mr. Tony Putnam

- b. ***Mr. John Walsh, SC Sales Manager for Ductile Iron pipe.*** Mr. Walsh is the sales manager for American Ductile Iron Pipe in South Carolina and he has several years of experience working in the pipeline industry. Picture 9 depicts Mr. Walsh lecturing about merits and limitations of steel and ductile iron pipes.



Picture 9. Mr. John Walsh discussing the design considerations for pipelines

- c. ***Mr. Seth Sanders and Mr. Jake Harber, Kleinfelder Company.*** Both Mr. Sanders and Mr. Harber spoke about some pressing pipeline issues and interesting projects they worked on in one of Dr. Piratla's classes. Picture 10 shows Mr. Sanders during his talk on pipeline design aspects.





Picture 10. Mr. Seth Sanders honing in on pipeline installation and relocation issues

## 8. Engineering Outreach Program

Exhibiting active presence in outreach programs, the student chapter took part in the engagement event in late-September 2018 where different programs of civil displayed an introduction to what fields of research they are focusing on. We also displayed posters of different conferences graduate student members had submitted. In addition, the members engaged in recruiting and walking through undecided college students how the trenchless technologies work and explained various aspects of their applications.



Picture 11. Graduate students expounding the applications and benefits of trenchless technology

## **9. Future Activities Planned**

We are planning on an industrial tour where students will be able to get to know how trenchless products are manufactured and/or installed. The training center of Picote Solutions, Inc. in Anderson, SC has been identified as a potential option for this industrial tour. Additionally, a guest lecture by Mr. Jake Saltzman of Picote Solutions, Inc., is expected in the upcoming months of this year. We will also encourage students to attend the 2019 No-Dig Conference in Chicago, IL from March 17<sup>th</sup> to 21<sup>st</sup>, 2019.

## **10. Acknowledgment**

The financial support offered by the North American Society for Trenchless Technology is greatly appreciated. The student chapter activities described in this report would not have been possible without the support of NASTT.