

Purdue NASTT Student Chapter Annual Report—October 2, 2018

1. Introduction

The Purdue NASTT Student Chapter was formally established as a Purdue student organization in November 2016. NASTT formally recognized the student chapter on April 2017.

Currently, the chapter has 30 members including 4 executive committee members.

The chapter's goals are:

- 1- To promote the topic of Trenchless Technology (TT) at Purdue University by providing, facilitating, and coordinating education, training, and research opportunities for students
- 2- To build relationships with TT professionals and entities from academia and industry to provide education and training to Purdue students
- 3- To give the opportunity for students interested in TT to be members of NASTT and to participate in NASTT activities.

The chapter's **Executive Committee** consists of:

Faculty Advisor



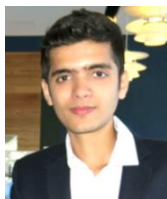
Dr. Dulcy Abraham
Professor, Civil Engineering

President



Saad Aljadhah
PhD Student,
Civil Engineering

Vice-President



Srinath Shiv Kumar
PhD Student,
Civil Engineering

Secretary



Jiannan Cai
PhD Student,
Civil Engineering

Treasurer



Mohamed Yamani
PhD Student,
Civil Engineering

Mr. Dan Liotti, CEO, Midwest Mole Inc. is the chapter's Industry Mentor.

Industry Mentor



Mr. Dan Liotti
CEO, Midwest Mole Inc.

2. Activities Completed (Spring 2017-Fall 2017)

Spring 2017 Call-out Event (February 8, 2017)

A call-out event was held to advertise the chapter for students and draw members in Spring 2017. Twenty (20) students attended the event. At the call-out event, a brief overview about Trenchless Technology and the role of NASTT was presented along with benefits of joining the student chapter. The presentation also included history about previous activities held at Purdue that were related to trenchless technology (course: CE 597 – Trenchless Technology for Underground Infrastructure Renewal, site visits to Midwest Mole yard, etc.).

2017 World Trenchless Day Celebration (September 28, 2017)

World Trenchless Day is a day of global celebration (commemorated on the fourth Thursday of September each year) that shines a spotlight on all of trenchless technology's benefits. September 28, 2017 was the World Trenchless Day. The chapter held a celebration event by setting up a table of coffee and snacks in the hallway of Lyles School of Civil Engineering at Purdue. Students were introduced to trenchless technology, NASTT, and the Purdue NASTT Student Chapter through discussions with chapter members at the table.



World Trenchless Day 2017 Celebration Event

Guest Lecture (October 19, 2017)

The first NASTT chapter guest lecture for the 2017-2018 academic year was held on October 19, 2017. The guest speaker was Dan Liotti, CEO of Midwest Mole, Inc., who is a Purdue alumnus and the 2015 *Trenchless Technology* Person of the Year. The lecture was titled “Trenchless Installation Methods”. The speaker gave a brief review of Auger Boring, Guided Boring, Pipe Jacking, Utility Tunneling and EPB Tunneling. The event also included a discussion with Mr. Liotti about job opportunities in the Trenchless market. More than thirty students attended the event.



Guest Lecture

Trenchless Installation Methods

A brief review of what is Auger Boring, Guided Boring, Pipe Jacking,
Utility Tunneling and EPB Tunneling

Dan Liotti
CEO, Midwest Mole Inc.

Bio: Dan Liotti is a civil engineering Purdue alumni (1985) who has over 30 years of experience in the world of Trenchless construction. He is the CEO of Midwest Mole, Inc., a Trenchless Technology contractor based in Greenfield, IN. Mr. Liotti is a registered professional engineer in Indiana and was named the 2015 Trenchless Technology Person of the Year. He is a past board member of NASTT (North American Society for Trenchless Technology). He also assisted in the development of Trenchless manuals with NUCA (National Utility Contractors Association). Midwest Mole is a leader in the trenchless technology industry offering a broad range of underground services for municipal, utility, highway, railroad and private sector customers. Midwest Mole have done many successful projects throughout the U.S. including a project at the Indianapolis Airport that was awarded the 2007 Trenchless Technology Project of the Year.

FREE PIZZA

Thursday, October 19 @ 5:30 p.m.
HAMP 1252



**NORTH AMERICAN SOCIETY FOR
TRENCHLESS TECHNOLOGY**
Purdue University Student Chapter

Attend to learn also about
JOB OPPORTUNITIES
in the Trenchless market



nastt@purdue.edu



www.boilerlink.purdue.edu/organization/NASTT

A copy of the flyer used to advertise the Guest Lecture event



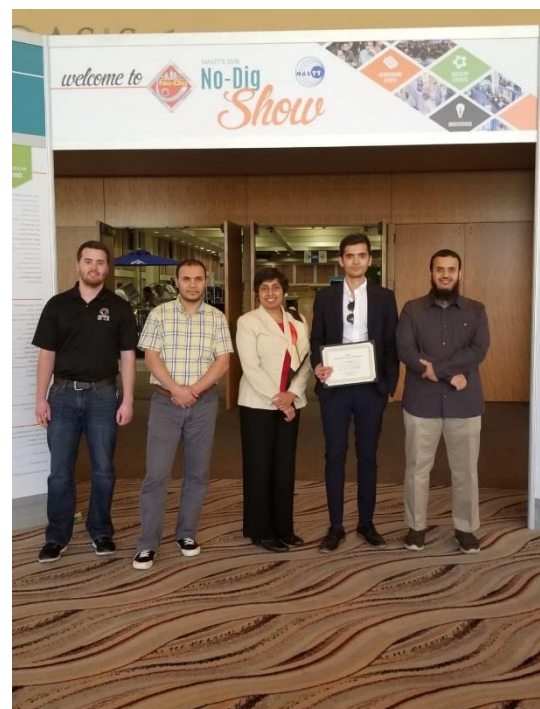
Photos of the Guest Lecture Event

3. Activities Completed (Spring 2018-Fall 2018)

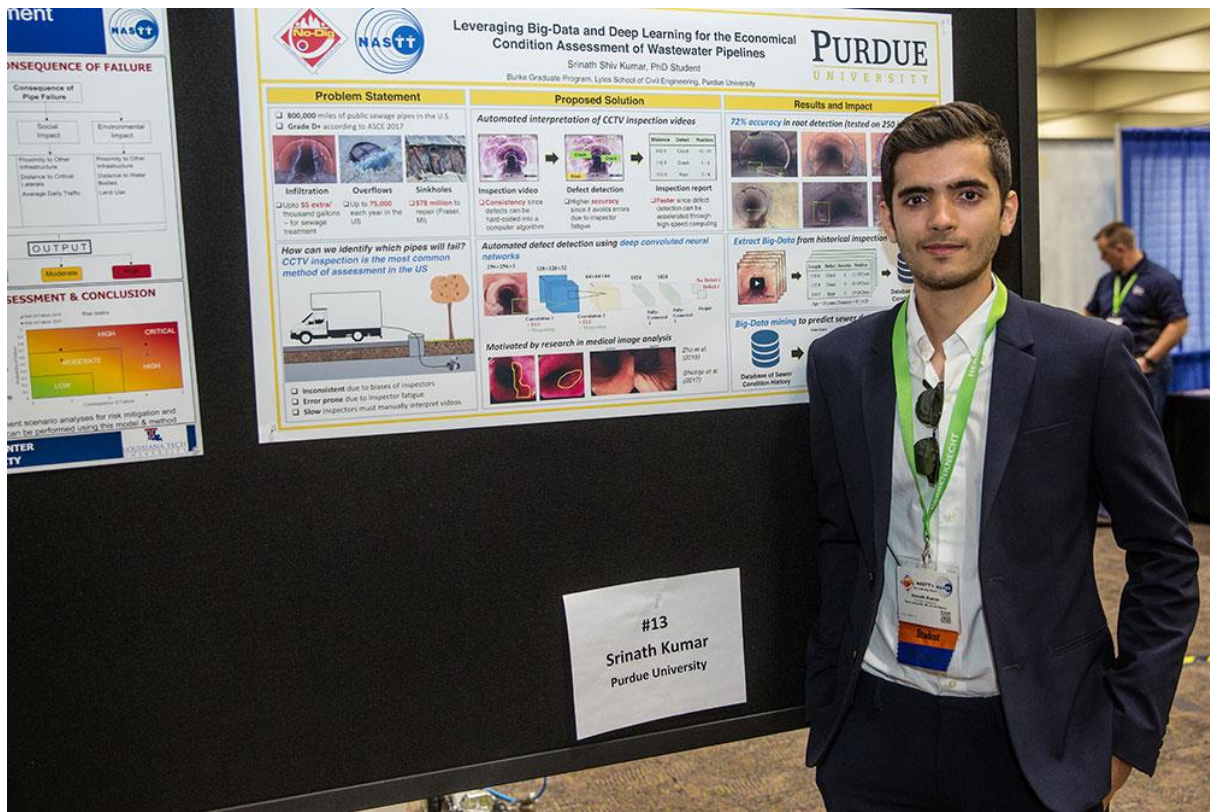
NoDig Show Participation (March 25-29, 2018)

Five members of the Purdue chapter attended the 2018 NoDig Show in Palm Springs, CA. Students performed volunteering work at the conference to help in managing the technical sessions. The Purdue chapter participated in the student chapters' presentation session with a presentation about the chapter's overview, activities, and plans. The students had the chance to attend the technical sessions and were introduced to many TT professionals from academia and industry. In addition, the NoDig large exhibition allowed the students to explore the leading companies in the filed underground utilities and to explore job and training opportunities in the TT industry.

The chapter's Vice President, Srinath Shiv Kumar, presented a technical paper in the 2018 NoDig conference titled "A Deep Learning Framework for Automated Defect Detection Using Sewer CCTV Videos" that was well received. The presentation of the paper facilitated the opportunity of building connections with entities in the industry to enhance the research project. Kumar also participated in the Student Poster competition and won the first place for his study titled "Leveraging Big-Data and Deep Learning for the Condition Assessment of Wastewater Pipelines".



Members of the Purdue Student Chapter attending the 2018 NoDig Show



Srinath Kumar Won the First Place in the Student Poster Competition

Fall 2018 Call-out Event (August 30, 2018)

At the call-out event of Fall 2018, a brief overview about Trenchless Technology and the role of NASTT was presented along with the benefits of joining the student chapter. The presentation also included an overview about the chapter's previous and planned activities along with a history of TT in Purdue. The objective of the callout event was to advertise the chapter for students and draw members in Fall 2018. As a result, twenty three (23) students sign up to be members of the student chapter.



Photos of the Fall 2018 Call-Out Event

2018 World Trenchless Day Celebration (September 27, 2018)

The chapter celebrated its second World Trenchless Day in September 27, 2018. Coffee and snacks were provided for students on a table in the hallway of Lyles School of Civil Engineering at Purdue. Students were introduced to TT, NASTT, and the Purdue NASTT Student Chapter through discussions with chapter members at the table. In addition, a brochure including an introduction to TT and NASTT was designed, printed, and distributed during the event. More than 50 students stopped by the table and got their copy of the brochure.



World Trenchless Day 2018 Celebration Event



A family of construction techniques for installing or rehabilitating underground infrastructure with minimal disruption to ground surface

Traditional Repair Method	Trenchless Repair Methods
	
<ul style="list-style-type: none"> • Utility installation • Utility inspection • Utility locating, mapping, and data management 	<ul style="list-style-type: none"> • Utility replacement and rehabilitation • Sub-surface utility engineering

Benefits of Trenchless Technology

- Environmentally Friendly**– minimal ecological disturbance
- Minimal Disturbance to Surroundings**– The footprint for a trenchless construction zone is smaller
- Saves Time**– projects using trenchless methods take less time to complete
- Saves Money**– less time with decreased disturbance leads to money savings

Examples of Trenchless Technologies



Microtunneling



Auger Boring



Horizontal Directional Drilling

BEFORE



AFTER

Cured-In-Place Pipe Lining





CCTV Inspection

Why NASTT ?

- Scholarship opportunities
- Site visits
- Guest lectures
- Leadership opportunities
- Networking opportunities
- Access to the World's Largest Online Trenchless Library Technical Papers
- Chance to participate in the annual No-Dig conference




NORTH AMERICAN SOCIETY FOR TRENCHLESS TECHNOLOGY
Purdue University Student Chapter



WORLD TRENCHLESS DAY
27.09.18

nastt@purdue.edu
www.boilerlink.purdue.edu/organization/NASTT

A copy of the brochure distributed in the World Trenchless Day 2018 event

4. Planned Activities (Fall 2018 - Spring 2019)

The chapter's future plan includes a variety of activities such as guest lectures, site visits, conference, etc. The chapter is in the process of organizing two more events in the current semester (**Fall 2018**):



1- **Site visit** to the Indy Deep Rock Tunnel project (October 2018)

This project built by Citizens Energy Group is a part of a 28-mile long network of 18-foot diameter deep rock tunnels being built 250-feet beneath the city of Indianapolis. The project objective is to reduce combined sewer overflows into area waterways by up to 97 percent. The site visit/tour will introduce the students to large pipeline tunneling projects and their planning, design, construction, and management.



2- **Guest Lecture** about *Subsurface Utility Engineering*. (November 2018)

USI Consultants has an extensive experience with utility coordination in highway projects. The guest lecture will include an overview of subsurface utility engineering, utility data management and coordination along with case studies, challenges, and lessons learned. The lecture will help students to learn about the trenchless technologies that are related to utility locating, mapping, and conflict resolution.

The tentative plan for **Spring 2019** is as follows:

- 1- Site Visit (February 2019)
- 2- Participating in Purdue Road School (March 2019)
Purdue Road School is an annual transportation conference and exhibition that includes topics and exhibitors related to underground utilities
- 3- Attending and participating in the NASTT's 2019 No-Dig Show in Chicago (March 2019). The chapter plans to have a larger number of students attending and participating in the upcoming NoDig show. Students will be encouraged to participate in the Student Poster competition and to volunteer in the conference.
- 4- Guest lecture (March 2019)

5. Potential Industry and Professional Relationships

One of the chapter's goals is to build relationships with professional entities and individuals from industry and academia. The chapter identified the following list of potential relationships:



- **RapidView IBAK** (Manhole and Pipeline Inspection Systems)

Suggested event:

- Facility Tour
- Demo-truck on-campus demonstration



- **Midwest Mole** (a Trenchless specialist based in Greenfield, IN)

Suggested event: Project or yard site visit



- **Indiana Department of Transportation (INDOT)**

Suggested event: Guest speaker about utility-related issues in INDOT projects



- **Dr. Tom Iseley** (NASTT 2017 Hall of Fame)
Suggested event: Guest lecture



- **Blood Hound** (an underground utility locating company)
Suggested events:
 - Guest lecture about utility locating, utility mapping, and utility inspection in addition to on-campus technology demonstration
 - Site visit

6. Research and Engagement Activities of Members

Number of Purdue NASTT Student Chapter members are conducting research and/or working on projects in the underground infrastructure domain. Some of the areas that students are involved in are:

- Underground utility mapping and locating
- Failure modes and condition assessment of small diameter pipes
- Water main breaks and leakages
- Defect detection in sewer pipes
- Energy loss of water main breaks
- Resilience of water supply networks

MS Thesis:

Prieston Lobo “*A Framework for The Detection of Utility Conflicts Using Geo-spatial Processing*”

Research Projects:

- INDOT, QC/QA of Utility Cut Repairs
- WaterRF, Condition Assessment of Small Diameter Ductile Iron Pipes
- WERF, Leveraging Big-Data and Deep Learning for Economical Condition Assessment of Wastewater Pipelines

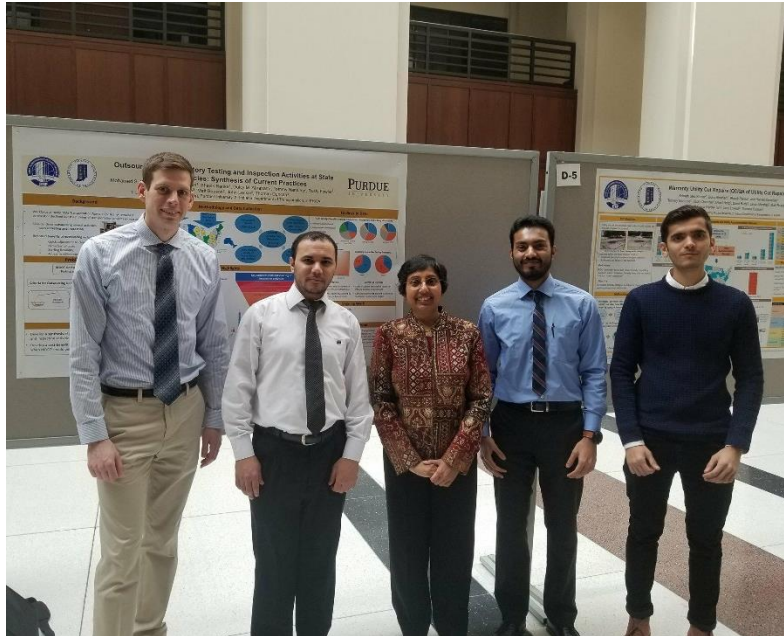
Journal Papers:

- **Srinath Shiv Kumar**, “*Automated Defect Classification in Sewer Closed Circuit Television Inspections Using Deep Convolutional Neural Networks*”, Automation in Construction, 2018

Conference Papers:

- **Srinath Shiv Kumar**, “*A Deep Learning Framework for Automated Defect Detection Using Sewer CCTV Videos*”, NoDig Show 2018
- **Srinath Shiv Kumar**, “*An Evaluation of the Failure Modes and Condition Assessment Technologies for Small Diameter Ductile Iron Pipes*” (WaterRF 4661), Construction Research Congress (CRC) 2018

- **Saad Aljadhai**, “*Quantifying the Resilience of Water Supply Infrastructure Systems: The Role of Infrastructure Interdependency*”, Construction Research Congress (CRC) 2018
- **Jiannan Cai**, “*Accurate Mapping of Underground Utilities: An Information Fusion Approach Based on Dempster-Shafer Theory*”, Construction Research Congress (CRC) 2018



Chapter’s members presenting their work on the project (QC/QA of Utility Cut Repairs) at INDOT

A screenshot of a web page from Trenchless Technology. The page features a navigation menu with options like 'MARKETS', 'APPLICATIONS', 'NEWS', 'COUNTRY', 'SUBSCRIBE', 'MORE TT', and 'EDUC'. Below the menu, a breadcrumb trail reads 'YOU ARE AT: Home » Applications » Condition Assessment » Purdue, Louisiana Tech University Present WaterRF #4661 Workshop at ACE 2017'. The main article title is 'Purdue, Louisiana Tech University Present WaterRF #4661 Workshop at ACE 2017'. The byline is 'BY TRENCHLESS TECHNOLOGY STAFF ON JUNE 8, 2017' and the category is 'CONDITION ASSESSMENT, NEWS'. The article text begins: 'In September 2016, Purdue University and Louisiana Tech University partnered on a research project (WaterRF #4661) with the objective to develop a manual of practice for condition assessment of small diameter (12-in. and smaller) ductile iron pipes.' To the right of the text is the 'ACE 17' logo. At the bottom, it states: 'From 1:30-4:30 p.m. June 13, the ongoing research activities will be presented in a workshop at the Philadelphia Marriott Downtown, Marriott Grand Ballroom Salon D, at AWWA ACE 2017.'

The work of the project (*WaterRF, Condition Assessment of Small Diameter Ductile Iron Pipes*) was presented in a workshop on Pipeline Condition Assessment at AWWA ACE 2017