



2022 Spring Senior Design Expo Poster Session

April 28, 2022

11 a.m. - 1 p.m.

Gym A, Academic Wellness Center

tntech.edu/engineering

**Tennessee Tech University
College of Engineering**

Joseph C. Slater, Ph.D., P.E.
Dean

William Eberle, Ph.D.
Interim Assistant Dean of Graduate Studies

Francis Otuonye, Ph.D.
Interim Assistant Dean of Research

Kumar Yelamarthi, Ph.D., P.E.
Associate Dean of Academic Affairs

Chemical Engineering

Renewable Carbon & Sustainable Process Alternatives: Lactic Acid Production from Fermentation-Derived Magnesium Lactate

- Advisor: Dr. Joseph J. Biernacki
- Sponsor: Tennessee Tech
- Project Team Members: Tyler Burden, Lauren Ennamorato, Katie Mealio, Emily Rhoton, and Bryson Stremmer

Novel Production of Biodiesel via Electrocatalysis Utilizing Bipolar Membrane Electrode Assembly Flow Cells

- Advisor: Dr. Cynthia Rice
- Sponsor: Tennessee Tech
- Project Team Members: Ann Brewer, Devon Cotter, Caroline Hibbett, Jaron Mack, Lela Manis, and Nathan Smith

Design and Analysis of Modified Biosynthetic

- Advisor: Dr. J. R. Sanders
- Sponsor: Tennessee Tech
- Project Team Members: Remonda Aziz, Austin Ivey, Spencer Legins, Ha Nguyen, Brianna Turner, Mayu Uno

Poly Vinyl Chloride Production

- Sponsor: Tempur-Pedic
- Project Team Members: Elizabeth Mitchell, Carter Powers, Hayden Suddeath, Ian Terrel, Thomas Terry, Chase Yancey

Space Technologies

- Sponsor: E. Fanin
- Project Team Members: Matthew Webb, Angelle Howard, Janani Achchillage, Laura Sanchez, Elizabeth Vaughn, Shanda Hughes

Hydrogen Reforming for Green Steel Production

- Advisor: Ms. S. Mirtes
- Sponsor: Hoeganaes
- Project Team Members: Toney, Viar, Clark, Bereda, Headrick

Joseph J. Biernacki, DRE, Lead Design Sequence Faculty
Holly Stretz, Ph.D., Interim Chair

Civil & Environmental Engineering

Structural and Site Design of LogiCore Corporation Headquarters,
Huntsville, AL

- Professional Mentors: Mr. Stephen Cotton, PE, Turnkey Processing Solutions; and Mr. Jack Southard, PE of Ardurra
- Civil Engineering Faculty: Dr. Badoe, Dr. Datta, Dr. Weathers, and Dr. Henderson
- Project Team Members: Carson Kennedy, Andrew Moore, Emma Cornell, Wesley Baxter, and Breanna Fowler

Design of a Replacement Bridge over Buffalo River on Perry County
State Route 13, Tennessee

- Professional Mentors: Mr. Eric Slayton, PE; Mr. Nick Kniazewycz, EI; Mr. Jesse Hoover, PE; Mr. Seth Bradley, PE; Ms. Emily Carpenter, PE; Mr. Jimmy Scales, EI; Mr. Jesse Wooden, EI; and Ms. Rebecca Williamson, EI all of Tennessee Department of Transportation
- Civil Engineering Faculty: Dr. Badoe, Dr. Click, Dr. Huff, Dr. Weathers, and Dr. Kalyanapu
- Project Team Members: Zane Robinson, Kalei Hair, Elise Galea, Brianna McCall, Blayne Carroll, and Abigail Cothron

Design of Infrastructure for a Mixed-Use Development

- Professional Mentors: Mr. Barry Quinn, PE; Mr. John Gore, PE; Mr. Jeff Hooper, PE all of Barge Cauthen & Associates; and Mr. Mark Savage, PE of EMC Structural Engineers
- Civil Engineering Faculty: Dr. Badoe, Dr. Click, Dr. VandenBerge, Dr. Weathers, and Dr. Kalyanapu
- Project Team Members: Cullen Morrow, Joon Sim, Justin Baker, Keaton Metcalf, Ashton Mitchell, and Alejandro Segoviano-Carrillo

Old Lebanon Dirt Road Widening and Shared Use Path

- Professional Mentors: Ms. Paige Harris, PE; Mr. Colin Williams, EI; Mr. Justin Corbitt, EI; and Mr. Shelby Cohen all of WSP
- Civil Engineering Faculty: Dr. Badoe, Dr. Avera, and Dr. Weathers
- Project Team Members: Will Moran, Eric Jordan, Kyle Ingleburger, Jacob Sutton, and Brett Howard

Civil & Environmental Engineering Cont.

Design of I-69 Roadway between West of Wolverine Road and East of R. Calloway Road in Obion County, Tennessee

- Professional Mentors: Mr. Harrison Bruce, EI and Mr. John Pennington of HMB Professional Engineers, Inc.
- Civil Engineering Faculty: Dr. Badoe, Dr. Avera, Dr. Huff, and Dr. Weathers
- Project Team Members: Levi Cross, Sam Fisher, Harrison Hall, Jacob Oligny, Michael Powell, and Andrew Palmeter

Clarksville Water Treatment Plant - Solids Handling Building

- Professional Mentors: Mr. Greg Gash, EI; Ms. Kate MacIndoe, PE; Mr. Brian Hollander, PE; and Mr. Andrew Johnson, PE all of SSR Inc.
- Civil Engineering Faculty: Dr. Badoe, Dr. Henderson, Dr. Datta, and Dr. Weathers
- Project Team Members: Ethan Harper, John Westerman, Thomas Pardue, Kyle Wendt, Darius Eury, and George Safaipour

Daniel Badoe, Ph.D., Lead Design Sequence Faculty
Benjamin Mohr, Ph.D., P.E., Chair

Computer Science

Alexa Integration with Connected Products

- Sponsor: AO Smith
- Project Team Members: Brown, Cuskey, Douthit, Harper, Parker
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Augmented Reality

- Sponsor: TN State Parks
- Project Team Members: Boyd, Leisure, Sells, Tice, Winters

Breadcrumb Fraud Detection

- Sponsor: Transcard
- Project Team Members: Burgess, Gannod, Hull, MacGregor, Myers, Williams

Capture Dash

- Sponsor: SAIC
- Project Team Members: Brown, Latham, Lichtenstrahl, Mitchell

EduNet

- Sponsor: Rural Reimagined
- Project Team Members: Al-Halawani, Fisher, Ford, Green, Motykowski

Electronic Clinical Record

- Sponsor: Predisan
- Project Team Members: Carico, Cunningham, Johnson, Lafever, Medrano, Vlahakos

Map Suite

- Sponsor: Averitt
- Project Team Members: Moroney, Presley, Rich, Sweeten, Gable

Model Visualization Project

- Sponsor: Urban Science
- Project Team Members: Garton, In, Nelson, Siedlecki, Tomichek

Opportunity Connector

- Sponsor: Compassio
- Project Team Members: Bates, Davis, Johnson, Lewis, Thompson

Computer Science Cont.

Predicting Potential Patient Issues

- Sponsor: NavSea
- Project Team Members: Doonis, Fornehed, Hill, Kelley, McGuire, McKay

Recommender System

- Sponsor: Cru
- Project Team Members: Austin, Davis, Hynek, Steinmeyer, Quarles

Weather Location

- Sponsor: ORNL
- Project Team Members: Dodd, Hendrick, Kemp, McDonald, Qualls

William Eberle, Ph.D., Lead Design Sequence Faculty
Gerald Gannod, Ph.D., Chair

Electrical & Computer Engineering

Autonomous Golf Caddy

- Project Team Members: Davini, Martin, Nail, Terry, Ellis

Autonomous Hydrographic Survey Vessel

- Project Team Members: Alley, Ashby, Daniel, Herrera

Autonomous Surveillance Drone

- Project Team Members: Shockey, Senz, Davis, Lunn

EV Battery Modeling

- Project Team Members: McClain, Valentine, Frost, Clendenin, Ford

Fluidyne Electric Generator

- Project Team Members: Dexter, Whitehead, Rogers, Tindell

IEEE Southeast Convention Robotics Competition

- Project Team Members: Garner, Hall, Sheeler, Summers

IMU Based Personnel and/or Equipment Tracking (Proprietary to REI company)

- Project Team Members: Sanderson, Patel, Clouse, Sylvester

Mario Kart Integrated Exercise Bike

- Project Team Members: Faulkner, Griffin, Hester

Quad-to-Fixed Wing Delivery Drone

- Project Team Members: Sandoval, Morse, Doss, Walker

Self-Organizing Smart Refill Coaster

- Project Team Members: Adams, Hall, Houbre, Love

Structure Health monitoring using mobile crowd sensing

- Project Team Members: Rogers, Baker, Washington, Wharton, Beebe

Jesse Roberts, Ph.D., Lead Design Sequence Faculty
Allen MacKenzie, Ph.D., Chair

Manufacturing & Engineering Technology

Durable Products Inc.

- Sponsor: UT Center for Industrial Services and Durable Products Inc
- Project Team Members: Jake Phillips, Jared Bakely, Jeffery Morales, Nick Iverson

Jackson Kayak Senior Project

- Sponsor: UT Center for Industrial Services and Jackson Kayak
- Project Team Members: Zachary Blackwell, Micah Carty, Alan Rob, Trevor Sheldon, and Emily Shelton

Iris Plastics: Pressure Monitoring and Warning System

- Sponsor: UT Center for Industrial Services and Iris Plastics
- Project Team Members: Matthew Bogle, Emory Koger, Joshua Mays, and Carson Yarbrough

Royal Oaks Charcoal

- Sponsor: UT Center for Industrial Services and Royal Oak Enterprises
- Project Team Members: Blake Brown, Tomas Dean, Jonathan Fesler, Mauricio Munoz, David Reagan

Hydrogen Electrolysis

- Sponsor: Transtar Industries
- Project Team Members: Carter Schunk, Derek Parsley, Hayden Graham, Reed Cass, and Jeremy Roberts

Coke Crusher: Automating Tennessee Techs' Coke Crushing Process

- Sponsor: Manufacturing Engineering Technology Department
- Project Team Members: David Bradford, Alex Glaza, Jonathan Howard, Chris Simpson, Makaleb Thompson, Simon Bashour

Cupola Airflow Optimization Project Report

- Sponsor: Manufacturing Engineering Technology Department
- Project Team Members: Ethan Arnold, Brian Stevens, Cody Swafford, Raymond Peplow, Sean Fox, and Shady Nabil

Michael Baswell, Ph.D., Lead Design Sequence Faculty
Fred Vondra, Ph.D., Chair

Mechanical Engineering

3D Printed Aircraft 1

- Project Team Members: Hunter Belvin, Christopher Collins, Colton Higgins, Tyler Rich

3D Printed Aircraft 2

- Project Team Members: Khalid Alzahrani, Seth Casteel, John Dyer, Anthony Shaneyfelt

Air Force Cargo

- Sponsor: Air Force
- Project Team Members: Norberto Domingo, Jacklynn Friesel, Leland Goldston, Ryan Heath, Andrew Holmes, Austin Marler, Miya Scruggs, Jonathan White

Air Force Tracking

- Sponsor: Air Force
- Project Team Members: Gavin Campbell, Shelby Dockery, Austin Downing, Ali Khoshnow, Billy Lian, Eric Ramsey, Devin Roland, Breanna Woosley

AM Digital Twin

- Sponsor: Manufacturing and Engineering Technology
- Project Team Members: Kerolos Gaber, Gabriel Rogers, Jack Sims, Yixing Wang

ASME HPV

- Project Team Members: Hunter Hodge, Collin Ptak, Corey Ross, Craig Bowen, Jacob Foster, Keeton Stakely, Cason Worthy

Baja 4WD

- Project Team Members: Mccaw Johnson, Brandon McCarter, Luke Morgan, Benjamin Reid

Electric Boat

- Sponsor: American Society of Naval Engineers
- Project Team Members: Rachel Debaar, Eddie Gaspar, Madelyn Hise, Abby Mink

Flight Sim

- Project Team Members: Nicholas Bartlett, Olivia Cline, John Rampy, Abigail Sandman

Mechanical Engineering Cont.

Greeting Robot

- Project Team Members: Eathan Allbert, Tomas Attalla, Marina Ayoub, Sung Kyung Lee, Blake Locke, Zachary Rollins, Jonathan Seals, Abigail Ward

SAE Aero

- Project Team Members: Jaymin Patel, Alejandro Pujol Pradillos, Noah Simpson, Mohammed Tawhari, Jared Bennett, Rebecca Burke, Vanessa Hughes, Thomas Osborne

SAE E Formula

- Project Team Members: Jacob Burian, Andrew Henson, Jared Jones, Johann Mostella

Sheep Dog Tracking

- Sponsor: College of Agriculture and Human Ecology
- Project Team Members: Lucas Gross, Zachary Lukasiak, Craig Rackley, Warren Sims

Sheep Feeding System

- Sponsor: College of Agriculture and Human Ecology
- Project Team Members: Brandon Reynolds, Patrick Schulte, George Tanas, Shady Beshara, Robert Bond, Noah Montgomery

Steering Simulator

- Project Team Members: Andrew Bynum, Samuel Griffin, Nathan Woodard

Superior Graphite

- Sponsor: Superior Graphite
- Project Team Members: Koltar Houser, Patrick Jobman, William McCarty, Hunter Vick

Vehicle Sim Cockpit

- Project Team Members: Haleigh Chappell, Jaycie Howell, Walker Hudlow, Haley Smallwood

Vehicle Sim Sensors

- Project Team Members: Gabriel Alfaro, Tyler Lowe, William Owens

Andy Pardue, Ph.D., Lead Design Sequence Faculty
Mohan Rao, Ph.D., Chair

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