

Senior Engineering Design

CELEBRATION

A Virtual Event | Wednesday, December 16th



Welcoming Remarks



Dr. Ajay Prasad
Dept. Mechanical Engineering



Dr. Dawn Elliott
Dept. Biomedical Engineering

Senior Engineering Design: **By the Numbers**

173 Students

41 Teams

4 Engineering Majors

28 Sponsors

13 Faculty

11 Staff Members

61 Evaluators

14 Weeks of Hard Work

Many thanks to our
EXTERNAL
SPONSORS

Agilent Technologies

Air Liquide

Air Liquide Healthcare

Art Therapy Express, Inc.

Avkin

Christiana Care: Helen F. Graham Cancer Center

Christiana Care Neonatal Intensive Care Unit

CNH Industrial

Curative Sciences, LLC

Datwyler

GGB Bearing Technologies

Globus Medical, Inc.

KVI

Norwalt Design

Siemens Healthineers Diagnostics

VPScantleburyMD, LLC

W.L. Gore & Associates, Inc.

Yale School of Medicine: Dr. Yetsa Tuakli

Many thanks to our
INTERNAL
SPONSORS

University of Delaware

- Athletics
- Athletic Training
- College of Agriculture
- College of Health Sciences
- Communications Sciences & Disorders
- Department of Biological Sciences
- Department of Biomedical Engineering
- Department of Chemical & Biomolecular Engineering
- Department of Materials Sciences Engineering
- Department of Mechanical Engineering

Many thanks to our
STAFF

Jeff Ricketts
Scott Nelson
Whitney Sample
Design Studio TAs
Machine Shop TAs
Kristin Schmidt

Elaine Nelson
Vicky Tosh-Morelli
Ann Connor
Amy Adams
Allie Andrews
Michele Schwander
Nancy England

2020 Senior Design

FACULTY

Jenni Buckley, PhD

David Burris, PhD

Joe Feser, PhD

Jim Glancey, PhD, PE

Curtis Johnson, PhD

Ashu Khandha, PhD

Julie Kohn, PhD

Ajay Prasad, PhD

Sarah Rooney, PhD

Mike Santare, PhD

Steve Timmins, PhD

Tyler Van Buren, PhD

Adam Wickenheiser, PhD

Many thanks to our **EVALUATORS**

James Alesi | Thunderbolt, LLC.

Mark Bendett | Northstar Strategic Consulting

Jason Benson | University of Delaware,
Department of Biomedical Engineering

Glenn Catlin | DuPont Silicon Valley Technology Center

Emily Chang | W.L. Gore & Associates, Inc.

Elise Corbin | University of Delaware,
Department of Biomedical Engineering

Paul Costello | Evergreen Management Consulting

Jack Craft | Mars International

Kevin Cresswell | W.L. Gore & Associates, Inc.

Doug Darrell | Radius Systems, LLC

Jay Gunaskera | University of Delaware,
Department of Mechanical Engineering

Paul Hagerty | Hagerty Environmental LLC

Stefanie Hansen | University of Delaware,
Department of Theatre

Zubaer Hossain | University of Delaware,
Department of Mechanical Engineering

Brianna Hulbert | Intellijoint Surgical

Paul Imhoff | University of Delaware,
Department of Civil & Environmental Engineering

N'Dea Irvin-Choy | University of Delaware,
Department of Biomedical Engineering

Mike Keefe | University of Delaware,
Department of Mechanical Engineering

Chris Nagele | Johnson & Johnson

Beth Paquette | NASA Goddard Space Flight Center

Christina Pellicane | University of Delaware,
Horn Program in Entrepreneurship

Peter Popper | Peacock Sales

Vinu Rajendran | Nimbis Designs, LLC

Dustyn Roberts | University of Pennsylvania,
Department of Mechanical Engineering and Applied
Mechanics

Mike Seitel | Norwalt Design

Fabrizio Sergi | University of Delaware,
Department of Biomedical Engineering

Eric Sindelar | Hamilton Robotics

(Continued...)

EVALUATORS

Sam Das | University of Delaware,
Department of Mechanical Engineering

Abigail Dela Paz | Medtronic

John DeLuca | W.L. Gore & Associates, Inc.

Heather Doty | University of Delaware,
Department of Mechanical Engineering

Dawn Elliott | University of Delaware,
Department of Biomedical Engineering

Jordan Estock | Concord High School, Design and
Engineering

Ibrahim Farhoud | Air Liquide

Dan Freeman | University of Delaware,
Horn Program in Entrepreneurship

Ed Gargiulo | Siemens Healthcare

Jim Gitney | Group50

Ariel Gruswitz | Delaware Prosperity Partnership

Jerry Kegelman | NASA's Langley Research Center

Kristi Kiick | University of Delaware,
Department of Biomedical Engineering

Matthew Leibowitz | Hologic Inc.

Pam Lottero-Perdue | Towson University,
Department of Physics, Astronomy & Geosciences

X. Lucas Lu | University of Delaware,
Department of Mechanical Engineering

Megan Mannino | Boston Microfluidics

Adam Masters | Virginia Tech,
Department of Engineering Education

Grace McIlvain | University of Delaware,
Department of Biomedical Engineering

David McKee | University of Delaware,
Department of Mechanical Engineering

Krista Murray | University of Delaware,
Department of Environmental Health & Safety

Alexis Slupe | W.L. Gore & Associates, Inc.

Meg Smith | Stryker Corporation

Melanie Smith | University of Delaware,
Department of Electrical & Computer Engineering

Megan Swan | Siemens Healthcare

Brooks Twilley | University of Delaware,
MakerGym

Taylor Vogt | Northrop Grumman

Koffi Pierre Yao | University of Delaware,
Department of Mechanical Engineering

Michael Yon | Groton Partners Merchant Bankers

Ryan Zurakowski | University of Delaware,
Department of Biomedical Engineering



Senior Engineering Design
The Awards
Design Discipline Awards

Process Improvement Award

Presented by Prof. Dave Burris

116: Tribological test system for rotary bearings

Team Members: Sean Courtney, Colin Post, Ali Al Ghafri, Cody DeSantis

Sponsor: GGB Bearing Technologies

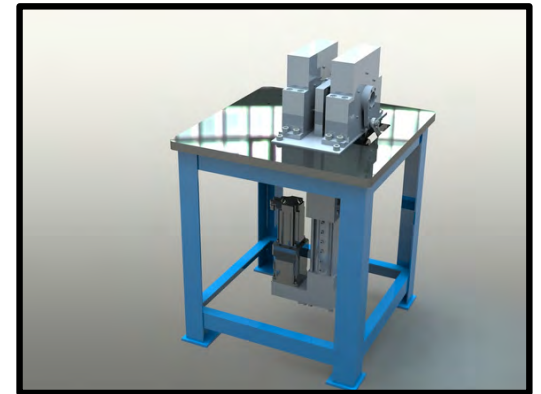
Advisor: Prof. David Burris

126: Design Optimization of Bamboo Wheelchair

Team Members: Olivia Romulus, Christina Le Febvre, Cristina Gaia, Nicholas Rubini

Sponsor: Yale University School of Medicine: Dr. Yetsa Tuakli

Advisor: Prof. Jenni Buckley



New Product Development Award

Presented by Prof. Ashu Khandha

112: Vaccine Administration Method at Poultry Hatcheries

Team Members: Matthew Sandford, Justin Leary, Michael Massari, Jessie Lissner

Sponsor: UD Agriculture: Dr. Hong Li

Advisor: Prof. Jim Glancey

203: Frugal Emergency Oxygen Can

Team Members: Eric Chang, Michael Bertman, Amanda Kelly, Zackary Tiedeman

Sponsor: Air Liquide Healthcare

Advisor: Prof. Sarah Rooney

206: Device to compress rapid inflow from arterialized vein

Team Members: Luke James, Violet Ullman, Ethan Todd, Neil Godbole

Sponsor: VPScantleburyMD, LLC

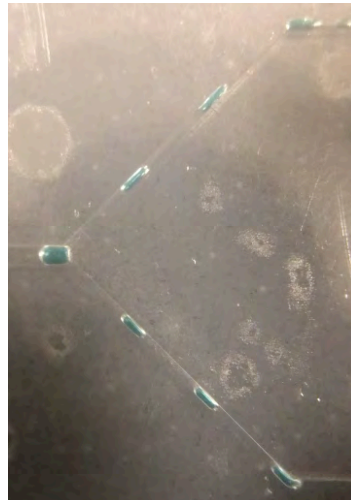
Advisor: Prof. Julie Kohn

Thermal/Fluids Award

Presented by Prof. Joseph Feser

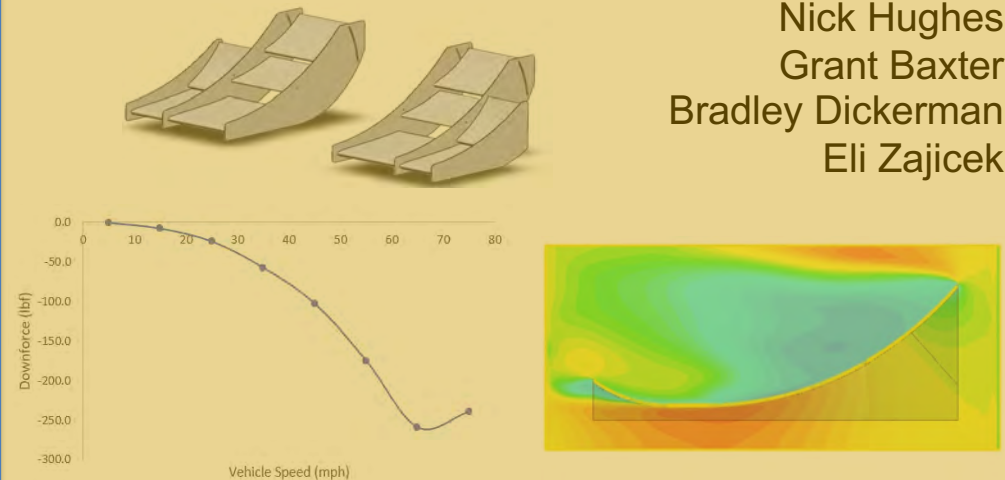
Siemens Healthineers, “Microfluidic Test Bed”

Muizz Hassanali
Heidi Knutsen
Garrett Semenetz
Max Sokolich



FSAE, “Aerodynamics Group”

Nick Hughes
Grant Baxter
Bradley Dickerman
Eli Zajicek



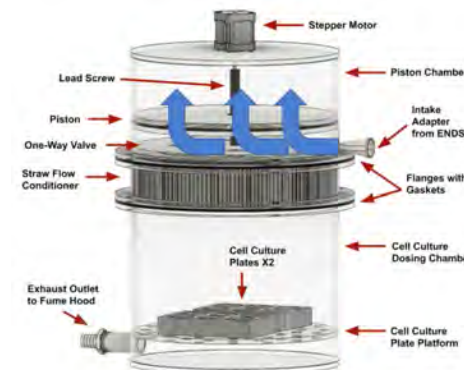
UD Mech. Eng.,
“Waterless Homebrew-Scale Wort Chiller”

Craig Klevan
Shannon Bushinsky
Tanner Morgan



UD Chem. Eng., “Dosing Chamber for Electronic
Nicotine Delivery System Aerosols”

Mason Mostrom
Nick Pautler
Alexander Gliwa
Jadan Randolph



Systems/Dynamics Award

Presented by Prof. Adam Wickenheiser

117: Reference Lever for AFM Calibration

Team Members: Andrew Baratz, Christopher Evans, Zachary Krewson

Sponsor: UD Mechanical Engineering: Dr. David Burris

Advisor: Prof. Joe Feser

121: Vibration Stage for Bone Health

Team Members: Zhu Taoyu, Anne Porter, Emily Magoon

Sponsor: UD Mechanical Engineering: Dr. Liyun Wang

Advisor: Prof. Michael Santare

203: Frugal Emergency Oxygen Can

Team Members: Eric Chang, Michael Bertman, Amanda Kelly, Zackary Tiedeman

Sponsor: Air Liquide Healthcare

Advisor: Prof. Sarah Rooney

Biomedical Design Award

Presented by Prof. Julie Kohn

105: Light Based Medical Device for Oral Mucositis

Team Members: Jonathan Kopf, Sophia Cherouri, Julia Zimmer, Donnamarie Gahn

Sponsor: Curative Sciences

Advisor: Prof. Adam Wickenheiser

203: Frugal Emergency Oxygen Can

Team Members: Eric Chang, Michael Bertman, Amanda Kelly, Zackary Tiedeman

Sponsor: Air Liquide Healthcare

Advisor: Prof. Sarah Rooney

121: Vibration Stage for Bone Health

Team Members: Zhu Taoyu, Anne Porter, Emily Magoon

Sponsor: UD Mechanical Engineering: Dr. Liyun Wang

Advisor: Prof. Michael Santare

204: Double Lumen Nasoenteric Tube

Team Members: Brea Chernokal, Kiera Popp, Emily Davis, Kristina Newton

Sponsor: Christiana Care: Helen F Graham Cancer Center

Advisor: Prof. Julie Kohn

122: Fixture for Eye Lens Biomechanical Analyses

Team Members: Amisha Jain, Marissa Heino, Thomas Manzoni, Baylee Scharf

Sponsor: UD Biological Sciences: Dr. Velia Fowler

Advisor: Prof. Michael Santare

Environmental Design Award

Presented by Prof. Jim Glancey

120: Waterless Homebrew-Scale Wort Chiller

Team Members: Shannon Bushinsky, Craig Klevan, Tanner Morgan

Sponsor: UD Mechanical Engineering: Dr. Joe Feser

Advisor: Prof. David Burris

500: UD Solar Decathlon

Team Members: Travis Plystak, Jazmyne Mitchell, Michelle Reckner, Mitchell Maxwell, Jaeah Yoo

Sponsor: UD Mechanical Engineering

Advisor: Prof. Jim Glancey

Mechanoelectrical Design Award

Presented by Prof. Dave Burris

101: COBOT End Effector and Fixture Design

Team Members: Austin Weigel, Lucas Edwards, Joseph Whaley, Amen Ahmed

Sponsor: Agilent Technologies

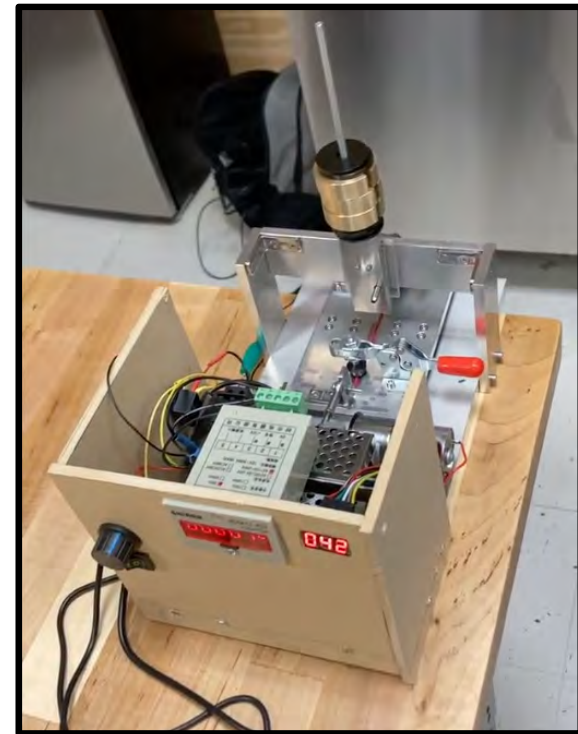
Advisor: Prof. Joe Feser

125: Scrape Abrasion Testing on Insulated Wiring

Team Members: Julian Castillo, James Callindes, Mike Hullstrung,
Ryan Fisher, Christopher Mckenzie

Sponsor: W.L.Gore & Associates

Advisor: Prof. David Burris



Medical & Rehabilitation Devices Award

Presented by Prof. Mike Santare

105: Light Based Medical Device for Oral Mucositis

Team Members: Jonathan Kopf, Sophia Cherouri, Julia Zimmer, Donnamarie Gahn

Sponsor: Curative Sciences

Advisor: Prof. Adam Wickenheiser

119: HensNest Face Mask

Team Members: Thomas Amato, Jonathan Jenkins, Tyler Walling

Sponsor: UD Mechanical Engineering

Advisor: Prof. Jenni Buckley

208: Improved Lower Body Injury Scooter

Team Members: Bill Duncan, Angela Livingston, Jacob Stuchlik, Maria Lilley

Sponsor: UD Athletics & Recreation/Athletic Training

Advisor: Prof. Curtis Johnson

211: Hardware and electronic enhancements of the DE ankle-foot-orthosis (DE-AFO)

Team Members: Krishnan Nair, Pavithran Naicker, Kenneth Mohs, Arya Shajpaul

Sponsor: UD Athletics & Department of Physical Therapy

Advisor: Prof. Ashutosh Khandha

Experimental or Educational Tools Award

Presented by Prof. Curtis Johnson

103: Wearable Needle Decompression Simulator for Healthcare Education

Team Members: Jefferson Steltz, Madelynne White, Tam Nguyen, Emily Suwala
Sponsor: Avkin
Advisor: Prof. Jenni Buckley

112: Vaccine Administration Method at Poultry Hatcheries

Team Members: Matthew Sandford, Justin Leary, Michael Massari, Jessie Lissner
Sponsor: UD Agriculture: Dr. Hong Li
Advisor: Prof. Jim Glancey

209: MRI-Compatible Mechanical Loading Device for Application to Knee Joint Testing

Team Members: Austin Wetzel, Will Borkowski, Harrison Smith, Rebecca Clements
Sponsor: UD Biomedical Engineering
Advisor: Prof. Curtis Johnson

121: Vibration Stage for Bone Health

Team Members: Zhu Taoyu, Anne Porter, Emily Magoon
Sponsor: UD Mechanical Engineering: Dr. Liyun Wang
Advisor: Prof. Michael Santare

122: Fixture for Eye Lens Biomechanical Analyses

Team Members: Amisha Jain, Marissa Heino, Thomas Manzoni, Baylee Scharf
Sponsor: UD Biological Sciences: Dr. Velia Fowler
Advisor: Prof. Michael Santare

210: Safety and durability testing for a novel Ankle-Foot-Orthosis (AFO)

Team Members: Julianna Wayne, Byron Kasper, Emily Powsner
Sponsor: UD Dept of Kinesiology & Applied Physiology, Dept of Fashion & Apparel Studies
Advisor: Prof. Ashutosh Khandha

212: Lower limb biomechanical testing integration with six degree of freedom robot

Team Members: Elizabeth Kaye, Emily Easton, Emily Eichenlaub, Daniel Levenson
Sponsor: Globus Medical Inc.
Advisor: Prof. Ashutosh Khandha

Cell & Tissue Award

Presented by Prof. Julie Kohn

121: Vibration Stage for Bone Health

Team Members: Zhu Taoyu, Anne Porter, Emily Magoon
Sponsor: UD Mechanical Engineering: Dr. Liyun Wang
Advisor: Prof. Michael Santare

122: Fixture for Eye Lens Biomechanical Analyses

Team Members: Amisha Jain, Marissa Heino, Thomas Manzoni,
Baylee Scharf
Sponsor: UD Biological Sciences: Dr. Velia Fowler
Advisor: Prof. Michael Santare

205: Umbilical Catheter Device for Neonatesyses

Team Members: Zankar Modi, Joseph Korn, Rachael Passantino, Sarah
Geissler
Sponsor: Christiana Care: Neonatal Intensive Care Unit
Advisor: Prof. Julie Kohn



Senior Engineering Design
The Awards
Prototyping Awards

Machining Award

Presented by Mr. Jeff Ricketts & Mr. Scott Nelson

102: Design and build a long range firefighting foam generator

Team Members: Justin Adams, Peyton Smith, Cameron Smith, Adam Reynolds, Abdulaziz Alewidi

Sponsor: Air Liquide

Advisor: Prof. Joe Feser

107: CNC Coolant Mixing System

Team Members: Collin Cresta, William Dowdy, Alec Scallo

Sponsor: KVI

Advisor: Prof. Jim Glancey

123: Unsteady Foil Experimental Platform

Team Members: Raymond Zayas, Rob Samuelson, Elroy McAlexander, Alex Beyer, Austin Maaddi

Sponsor: UD Mechanical Engineering: Dr. Tyler Van Buren

Advisor: Prof. Tyler Van Buren

124: Bioinspired Propulsion System for Small Watercraft

Team Members: Luke Williams, Gabe Brown, Connor Tamaki, Mendicino Jake, Isabel Catugas

Sponsor: UD Mechanical Engineering: Dr. Tyler Van Buren

Advisor: Prof. Tyler Van Buren

208: Improved Lower Body Injury Scooter

Team Members: Bill Duncan, Angela Livingston, Jacob Stuchlik, Maria Lilley

Sponsor: UD Athletics & Recreation/Athletic Training

Advisor: Prof. Curtis Johnson

Design Studio Prototyping Award

Presented by Mr. Whitney Sample

103: Wearable Needle Decompression Simulator for Healthcare Education

Team Members: Jefferson Steltz, Madelynne White, Tam Nguyen, Emily Suwala

Sponsor: Avkin

Advisor: Prof. Jenni Buckley

110: Microfluidic Technology Test Bed

Team Members: Heidi Knutsen, Garrett Semenetz, Max Sokolich,
Muizz Hassanali

Sponsor: Siemens Healthcare Diagnostics

Advisor: Prof. Joe Feser

111: Poultry Euthanasia Training System

Team Members: Mallory Smith, Marc Woolley, Matthew Magorry

Sponsor: UD Agriculture: Dr. Brian Ladman

Advisor: Prof. Jenni Buckley



Senior Engineering Design
The Awards
Open Categories

The People's Choice Award

Presented by Prof. Jenni Buckley

1st

122: Fixture for Eye Lens Biomechanical Analyses

Team Members: Amisha Jain, Marissa Heino, Thomas Manzoni, Baylee Scharf

Sponsor: UD Biological Sciences: Dr. Velia Fowler

Advisor: Prof. Michael Santare

2nd

201: Adjustable Rotating Easel Table

Team Members: Andrew Bank, Gina Pallozzi, Austin Scioli

Sponsor: Art Therapy Express Inc

Advisor: Prof. Sarah Rooney

3rd

116: Tribological test system for rotary bearings

Team Members: Sean Courtney, Colin Post, Ali Al Ghafri, Cody DeSanti

Sponsor: GGB Bearing Technologies

Advisor: Prof. David Burris

The Grit Award

Presented by Prof. Jenni Buckley

grit

n.

The capacity to recover quickly from difficulties; toughness.

106: Extrusion Outfeed Optimization

Team Members: Colin Insinga, Alex Hantman, Hunter Bradford, Kristina Kowal

Sponsor: Datwyler

Advisor: Prof. Jim Glancey

119: HensNest Face Mask

Team Members: Thomas Amato, Jonathan Jenkins, Tyler Walling

Sponsor: UD Mechanical Engineering

Advisor: Prof. Jenni Buckley

207: Capturing Tactile Motion During Touch Events

Team Members: Kylie Greulich, Hannah Nevel, Joshua Jacob

Sponsor: UD Materials Science & Biomedical Engineering

Advisor: Prof. Curtis Johnson

201: Adjustable Rotating Easel Table

Team Members: Andrew Bank, Gina Pallozzi, Austin Scioli

Sponsor: Art Therapy Express Inc

Advisor: Prof. Sarah Rooney

210: Safety and durability testing for a novel Ankle-Foot-Orthosis (AFO)

Team Members: Julianna Wayne, Byron Kasper, Emily Powsner

Sponsor: UD Dept of Kinesiology & Applied Physiology, Dept of Fashion & Apparel Studies

Advisor: Prof. Ashutosh Khandha

Most Valuable Project (MVP) Award

Presented by Prof. Ashu Khandha

101: COBOT End Effector and Fixture Design

Team Members: Austin Weigel, Lucas Edwards, Joseph Whaley, Amen Ahmed

Sponsor: Agilent Technologies

Advisor: Prof. Joe Feser

125: Scrape Abrasion Testing on Insulated Wiring

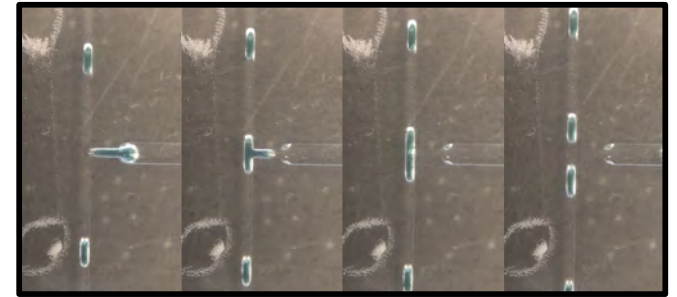
Team Members: Julian Castillo, James Callindes, Mike Hullstrung, Ryan Fisher,
Christopher Mckenzie

Sponsor: W.L.Gore & Associates

Advisor: Prof. David Burris

Prof. Michael Keefe Award

Presented by Prof. Dave Burris



110: Microfluidic Technology Test Bed

Team Members: Heidi Knutsen, Garrett Semenetz, Max Sokolich, Muizz Hassanali

Sponsor: Siemens Healthcare Diagnostics

Advisor: Prof. Joe Feser

111: Poultry Euthanasia Training System

Team Members: Mallory Smith, Marc Woolley, Matthew Magorry

Sponsor: UD Agriculture: Dr. Brian Ladman

Advisor: Prof. Jenni Buckley

115: Vocal Demand Task for Vocal Fatigue

Team Members: Emerson McCauley, Adam Veasey, Fiona Brogan, Shri Prabha Shivram

Sponsor: UD Communication Sciences & Disorders

Advisor: Prof. Jenni Buckley

203: Frugal Emergency Oxygen Can

Team Members: Eric Chang, Michael Bertman, Amanda Kelly Zackary Tiedeman

Sponsor: Air Liquide Healthcare

Advisor: Prof. Sarah Rooney

208: Improved Lower Body Injury Scooter

Team Members: Bill Duncan, Angela Livingston, Jacob Stuchlik, Maria Lilley

Sponsor: UD Athletics & Recreation/Athletic Training

Advisor: Prof. Curtis Johnson

Chairperson's Award: Mechanical Eng.

Presented by Prof. Ajay Prasad

110: Microfluidic Technology Test Bed

Team Members: Heidi Knutsen, Garrett Semenetz, Max Sokolich, Muizz Hassanali

Sponsor: Siemens Healthcare Diagnostics

Advisor: Prof. Joe Feser

125: Scrape Abrasion Testing on Insulated Wiring

Team Members: Julian Castillo, James Callindes, Mike Hullstrung, Ryan Fisher,
Christopher Mckenzie

Sponsor: W.L.Gore & Associates

Advisor: Prof. David Burris

In Recognition

Prof. Dawn Elliott

Founding Chairperson of UD Biomedical Engineering



Chairperson's Award: Biomedical Eng.

Presented by Prof. Dawn Elliott

203: Frugal Emergency Oxygen Can

Team Members: Eric Chang, Michael Bertman, Amanda Kelly, Zackary Tiedeman

Sponsor: Air Liquide Healthcare

Advisor: Prof. Sarah Rooney

206: Device to compress rapid inflow from arterialized vein

Team Members: Luke James, Violet Ullman, Ethan Todd, Neil Godbole

Sponsor: VPScantleburyMD, LLC

Advisor: Prof. Julie Kohn

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Sponsor: UD Athletics & Dept. Physical Therapy

Advisor: Prof. Ashutosh Khandha