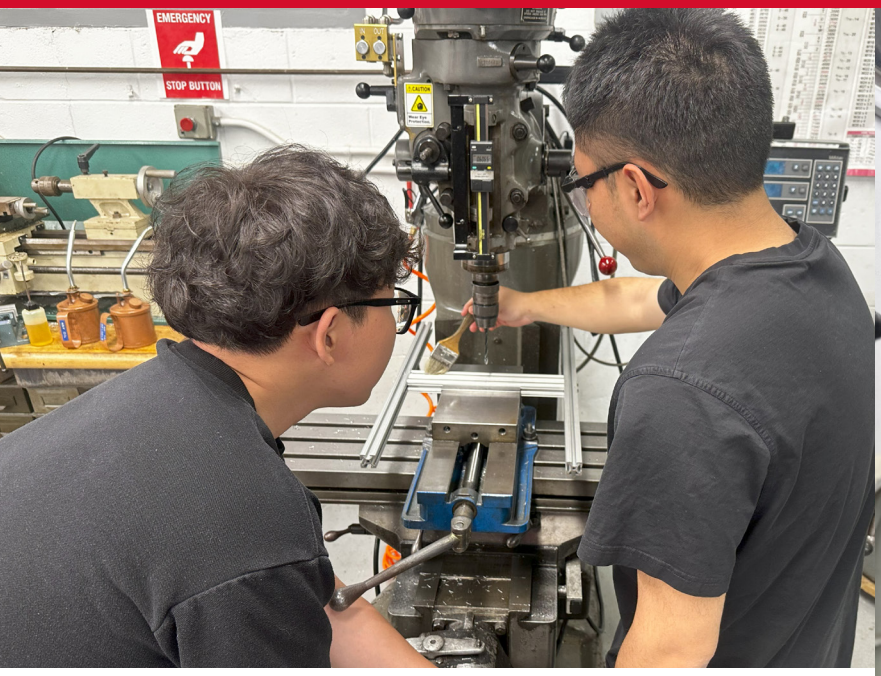


Mechanical and Aerospace Engineering
2024 Design and Manufacturing Expo
May 2, 2024

RUTGERS
School of Engineering

RUTGERS
Mechanical and Aerospace Engineering

Course Coordinators	Prof. Xi Gu Prof. Assimina A. Pelegri
Teaching Assistants	Mr. Mohit Agarwal Ms. Rituparna Mohanty Mr. Chengwei Zhao
Design Specialists	Dr. Basily Basily Mr. Milan Simonovic Mr. Ioan-Mihai Gradina
Seminar Speakers	Prof. Richard Dool *Rutgers School of Communication & Information* Dr. Merrill Edmonds *Siemens* Mr. Ken Johnson *Lockheed Martin (Ret.)* Mr. Alejandro Ruiz *Rutgers REHS* Mr. Christopher Sacelaris *Pratt & Whitney* Mr. Milan Simonovic *Rutgers MAE* Prof. Stephen Tse *Rutgers MAE*



NOTE FROM THE CHAIR

Dear cherished members of our community,

We are thrilled about the 2024 Design and Manufacturing Expo. During this year's Expo, 47 groups will present their exciting projects, guided by our faculty and industrial partners. This event is a unique opportunity for our students to showcase their talent, innovation, ingenuity, teamwork, and engagement.

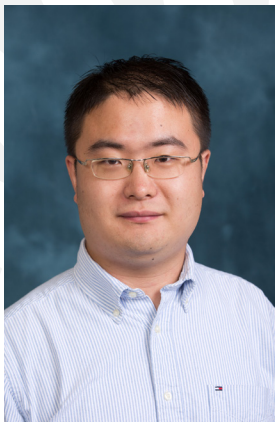
The Mechanical and Aerospace Engineering Department is a vibrant academic community offering three undergraduate programs in Mechanical Engineering, Aerospace Engineering, and Applied Science (Packaging Engineering concentration). In addition, the Department offers graduate/advanced programs leading to M.S., M.Eng., and Ph.D. degrees. Forty full-time faculty members educate more than 900 undergraduate and 150 graduate students. Together, we form a vibrant community that includes students, faculty, alums, and industry partners, all committed to collaborative endeavors driven by the highest standards of research and innovation. Our faculty members are passionately dedicated to empowering students to excel and evolve into adept problem solvers and trailblazers. Our students benefit from extensive courses designed to instill the fundamental principles of mechanical and aerospace engineering. They can engage in undergraduate research projects, providing invaluable hands-on experience in real-world applications akin to industry-level research. Our faculty has achieved distinction among their peers and as fellows of professional engineering societies, including the American Society of Mechanical Engineers (ASME), American Institute of Aeronautics and Astronautics (AIAA), American Physical Society (APS), Acoustical Society of America (ASA), and American Academy of Mechanics (AAM). Our Department has an exciting and multidisciplinary research portfolio, which includes advancing scientific knowledge and technology in various areas, including nanostructures, hypersonics, autonomous robotics, electro-hydrodynamics, fluid interactions, energy science, and advanced materials, among many others.

We are grateful to all judges for their sustained commitment and participation in this event and our external Advisory Board's dedicated support through the planning and execution. Thanks to all the faculty advisors for leading and coordinating the Senior Project Experience. To our staff, particularly Dr. Basily Basily, Mr. Milan Simonovic, and Mr. Ioan-Mihai Gradina, for their technical advice in reviewing designs and manufacturing project components.

To our students, we are very proud of your efforts and accomplishments! We wish you a successful and rewarding career. Stay in touch!

Assimina A. Pelegri, Ph.D.
Professor and Chair
Department of Mechanical and Aerospace Engineering

NOTE FROM THE COORDINATORS



Dear students, parents, and friends,

We would like to take this opportunity to welcome you to the Mechanical and Aerospace Engineering Department at Rutgers! In the following pages, you will find the Senior Design projects for AY 2023-24. During these projects, students can work with industry and faculty advisors, gaining experience in real-world engineering. Many of these projects can lead to new technologies or other innovations outside of academia, and they help our students transition to life after graduation.

To our seniors, we celebrate your accomplishments and appreciate your efforts. Your class achieved record numbers in engaging in professional and educational development activities, including internships and co-ops, JJ Slade fellowships, and undergraduate research opportunities. You are now at the finishing line, ready to explore the many "tomorrows." Many of you will continue your education in the BS/MS program at Rutgers or pursue higher degrees at other institutions, and many of you, at the time of this letter, have secured jobs. We are very proud of you and your accomplishments in the last four years. We know this was not easy for many of you, but again, you rose to the occasion and showed how innovative, entrepreneurial, and resourceful our young MAE engineers are. Use the inspiration and ingenuity you exhibited in your classes to propel you in the next chapters of your lives!

We would also like to express our gratitude to the course teaching assistants, Mohit Agarwal, Rituparna Mohanty, and Chengwei Zhao, whose hard work and dedication made senior design experience possible.

This brochure is a record of your achievements! Congratulations, Class of 2024!

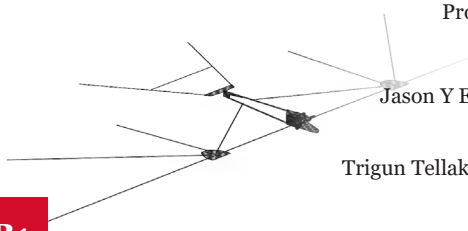
Xi Gu, Ph.D.
Assistant Teaching Professor
Dept. of Mechanical & Aerospace Engineering

Assimina A. Pelegri, Ph.D.
Professor and Chair
Dept. of Mechanical & Aerospace Engineering

DESIGN AND MANUFACTURING PROJECTS

MECHANICAL BIRD

AEROSPACE DESIGN PROJECT



Faculty Advisor
Prof. Prosenjit Bagchi

Group Members
Sona Ajith Kumar
Jason Y Espinoza Zambrano
Sukhdeep S Jaswal
Harrison J Rauh
Trigun Tellakula Chandrashekar

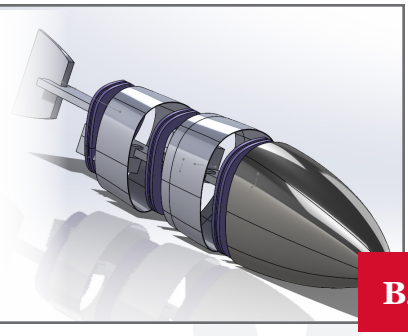
AE B1

A mechanical bird capable of generating lift to sustain flight. Based off a seagull, biomimicry and mechanics are used to create this piece of avian-inspired machine.

MECHANICAL FISH

Faculty Advisor
Prof. Prosenjit Bagchi

Group Members
Jonathan Arias
Yash N Chavan
Allison Chen
Aryan N Narvekar
Shalaka K Tendolkar



B4

A mechanical fish prototype that can swim in a straight line automatically using Arduino code and make turns using undulatory motions, with battery power.

PROJECT FIREFLY

AEROSPACE DESIGN PROJECT

Faculty Advisor
Prof. Xiaoli Bai

Group Members
Armando Alvarado
Brantly D Desharnais
Chirag Khurana
Jonathan Laberov
Noah M McAllister

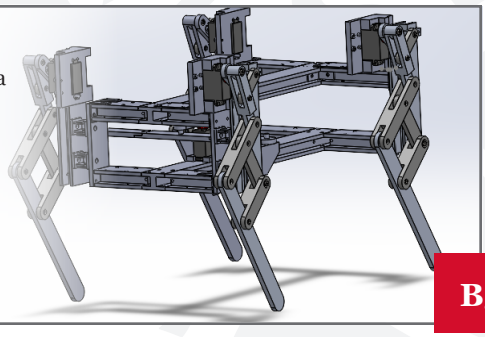
AE B2

A long range, unmanned aerial vehicle designed for inflight aerosol measurements and sampling for wildfire monitoring. Capable of autonomous, real-time aerosol monitoring for fire evacuation, flame front monitoring, and air sample collection for further analysis.

SOLAR POWERED TERRAIN WALKER

Faculty Advisor
Prof. William Bottega

Group Members
Justin M Bradley
Brendan Curran
Kirat S Gill
Steven Kaplan
Leo Shaw
Sean M Sullivan

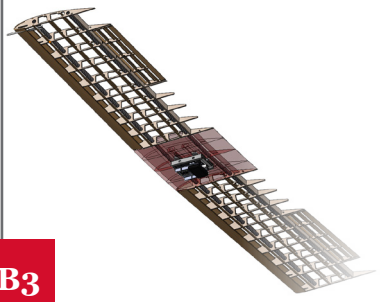


B5

The challenge of our project is to design a solar powered terrain walker. The walker uses a chebyshev mechanism to produce forward motion. The walker is charged by a solar panel attached at the top.

INTEGRATED TELEMETRY SYSTEM FOR AIRCRAFT STABILITY AND CONTROL DERIVATIVE CALCULATIONS

AEROSPACE DESIGN PROJECT



Faculty Advisor
Prof. Haim Baruh

Group Members
Benjamin Fauselit
Mithun Krishnan
William Lu
Wahedul I Mahedi
Camille A Paduganao
Pablo E Thomas

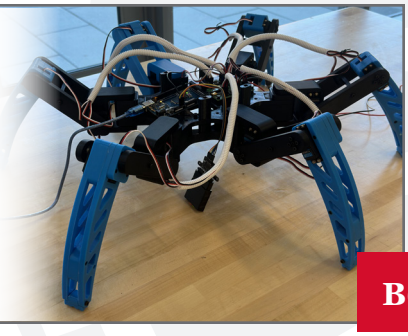
AE B3

The Modular Aircraft Communication Hardware System (MACHS) is an arduino-based flight telemetry logger capable of live data transmission. Using MACHS, testing programs can be conducted to calculate aircraft stability and control derivatives empirically.

SOLAR POWERED TERRAIN WALKER: ADVANCING ROBOTIC EXPLORATION AND MOBILITY

Faculty Advisor
Prof. William Bottega

Group Members
Aathi Anandan
Andrew S Bryce
Karem H Elgazoly
Benjamin J Gorski
Tong Hu
Jason R Kelly



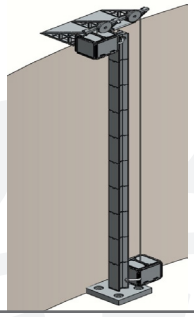
B6

This project aims to develop a solar-powered walking vehicle meeting specifications like a 1.5-foot height limit, autonomous obstacle avoidance, and an 8-ounce payload. It will race a rival team, utilizing solar energy stored onboard.

DESIGN AND MANUFACTURING PROJECTS

MECHANISM TO TRANSPORT HUMANS AND CARGO INTO AND OUT OF A LUNAR LAVA TUBE

AEROSPACE DESIGN PROJECT



Faculty Advisor
Prof. Haym Benaroya

Group Members
Kelly M Hughes
Rajan S Jethva
Jasmine A Khaled
Cameron A Matulewski
Sujay B Patel

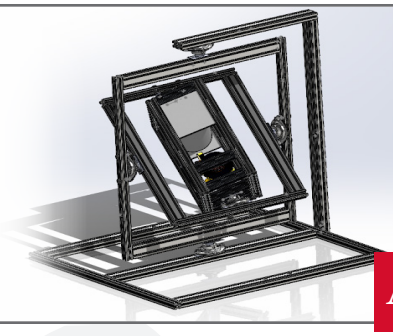
AE B7

Our group has undertaken the task of designing a machine capable of moving equipment and astronauts into and out of a lava tube on the Moon, where future Lunar colonists are expected to inhabit.

ZERO-GRAVITY FLIGHT EXPERIMENT TO EXPLORE THE PROPELLANT SLOSHING PROBLEM

Faculty Advisor
Prof. Laurent Burlion

Group Members
Jason O Chaudhry
Manuel A Correia
Carlos Moscoso
Joe J Palethu
Nina R Sciarra
Sarah M Terracina



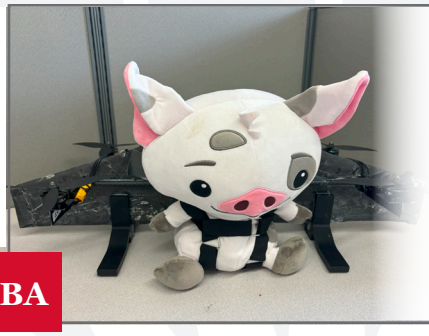
AEROSPACE DESIGN PROJECT

AE BC

To further sloshing-control research, a testbench structure is designed that rotates a cube-satellite in 3 DOF to monitor the sloshing of the propellant while simulating a zero-gravity flight and handling 9 g's of acceleration.

FLYING EXOSUIT

AEROSPACE DESIGN PROJECT



Faculty Advisor
Prof. Laurent Burlion

Group Members
Idris Bacchus
Cecilia R Diaz
Druhin S Patel
Shreya Srikanth
Melissa S Thompson

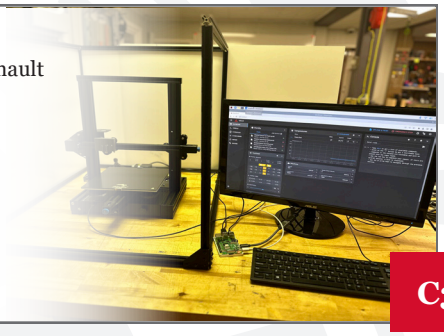
AE BA

The Flying Exosuit project develops a tail-sitter quadcopter for efficient two-kilogram payload transport, seamlessly transitioning between VTOL and horizontal glide. Utilizing advanced aerodynamic and electronic analyses, it pioneers human-like flight.

ADVANCED POLARIZATION UNIT FOR SMART MATERIAL PROCESSING

Faculty Advisor
Prof. Kimberly Cook-Chenault

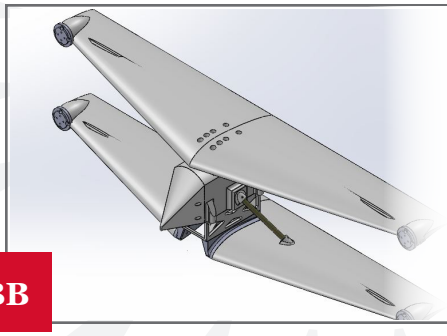
Group Members
Jake R Bothe
Thomas Long
Evan A Ocasio
Dylan A Penafiel
Jan W Tomon



C3

Designing a novel automatic polarization benchtop system for piezoelectric materials to replace contact techniques, aiming for efficiency and scalability in mass manufacturing while accommodating at least four by four-inch samples.

EXOSKELETON FLYING SUIT



Faculty Advisor
Prof. Laurent Burlion

Group Members
Ellis H Bartolomeo
Arvind Kruthiventy
Nolan M Loehr
Joseph J Melfi
Jason Ng
Zacharry S Soriano

BB

The exoskeleton aims to transport a human while being similarly sized. This project is a scaled down version using electricity to power its flight. It will transition from vertical takeoff to horizontal flight and back

ACTIVE FLOW CONTROL USING SYNTHETIC JET ACTUATORS IN AN RC AIRPLANE

Faculty Advisor
Prof. Edward DeMauro

Group Members
Patrick T Boland
Nicodemus O Leaver
Hamad Shiblee-Alvarado
Emily E Werosta

AEROSPACE DESIGN PROJECT

AE D1

Embedding piezoelectric synthetic jet actuators in the top of an RC plane wing to delay boundary layer separation therefore delaying stall and increasing high angle-of-attack efficiency.

DESIGN AND MANUFACTURING PROJECTS

DESIGN OF NOVEL BI-PROPELLANT ROCKET ENGINE INJECTOR PLATE

AEROSPACE DESIGN PROJECT

Faculty Advisor
Prof. Edward DeMauro

Group Members
Midhat Alvi
Callisto S Morgan
Russell E Nicholls
Keith P O'Donnell
Dollar Shah
Jake R Stocki

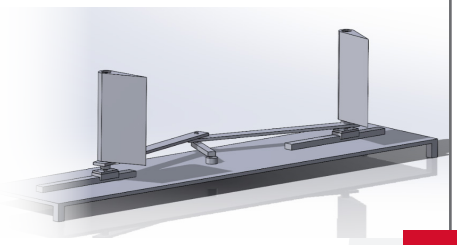
AE D2

Rutgers' inaugural rocket engine program focuses on designing and testing four prototype injector plates, aiming to identify the most effective model for ongoing production in their pioneering Bi-Propellant Rocket system initiative

BIO-INSPIRED FLAPPING WING ENERGY HARVESTER

Faculty Advisor
Prof. Mitsunori Denda

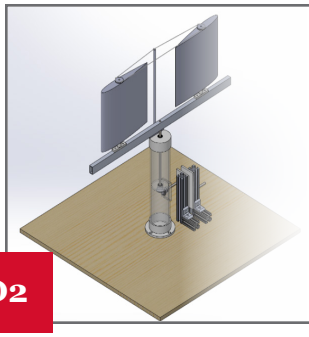
Group Members
Elijah Ade-Festus
Darwin L Charles
Sebastian Konopka
Kelly E McCarty
Dalton M Mower
Daniel M Sadek



D3

BIFWEH improves traditional wind turbines with a compact, cost-effective, experimental energy harvesting solution, overcoming infrastructure, cost, and space constraints. It aims to revolutionize renewable energy by providing a sustainable alternative for wind energy collection.

BIO-INSPIRED FLAPPING WING ENERGY HARVESTER



Faculty Advisor
Prof. Mitsunori Denda

Group Members
Zakaria H Channaoui
Guanyu Chen
Jiawei Ji
Hang Yin
Zhihao Zhang

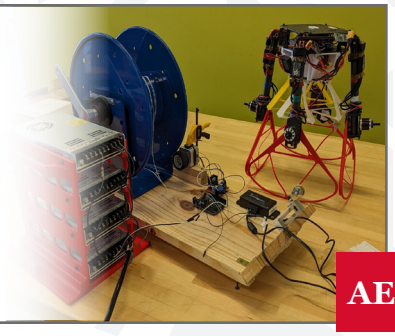
D2

Innovate wind energy by mimicking the flapping movements of birds and insects.The design is a single beam with two flaps that rotate to create flap motion that drives spindle and gear motors to generate electricity.

TETHER SYSTEM FOR A WEATHER MONITORING DRONE

Faculty Advisor
Prof. Francisco Javier Diez

Group Members
Yusuf A Ali
Darsh D Mehta
Pronnoy Nandy
Ryan A O'Neill
Robert L Prussack
Eric M Ulisse



AEROSPACE DESIGN PROJECT

AE D4

This project is a tether system that continuously powers a weather monitoring drone at altitudes up to 200 feet. It consists of a cable and an automated reel that manages tension in the tether wire.

STAYING STABLE - KEEPING OUR COOL DURING HIGH SPEED FLIGHTS

AEROSPACE DESIGN PROJECT

Faculty Advisor
Prof. Edward DeMauro

Group Members
Mateusz Boryszewski
Jeremy F Lai
Sagnik Mukherjee
David L Samolkin
Luca S Sirman
Alexa N Sullivan

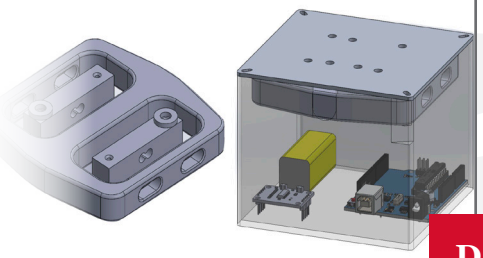
AE D3

RRPL's two-stage rocket has struggled with static stability due to opposing forces, and with drag at supersonic speeds. Through research, we created a custom airfoil and fin shapes to optimize stability without compromising drag.

VIRTUAL REALITY CYCLING KIT (VRACK)

Faculty Advisor
Prof. German Drazer

Group Members
Matthew J Britton
James B Hogle
Isaiah R Lee
Ian P Lertola
Julie Shehata
Akshay A Sheth

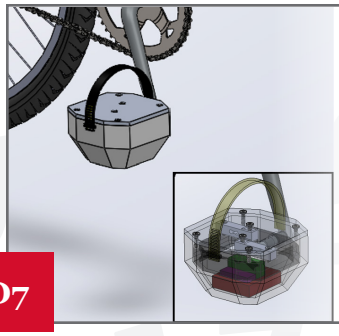


D5

Strokes often affect balance causing coordination loss. Stationary bikes aid coordination improvement, yet lack feedback mechanisms. VRACK solves this with specialized pedals linked to virtual reality, offering feedback for patients improvement and better progress monitoring.

DESIGN AND MANUFACTURING PROJECTS

VRACK



Faculty Advisor
Prof. German Drazer

Group Members
Christopher M Iannella
Jae Lee
Christine M Malekpour
Vrushabh S Shah
Amy J Sierra

D7

A virtual reality cycling kit comprised of two electronic pedals and a virtual reality environment. Designed to provide feedback to its user regarding right or left leg strength imbalances to serve as an affordable option for stroke rehabilitation.

LAYER-WISE OPTICAL INSPECTION OF ADDITIVELY MANUFACTURED PARTS

Faculty Advisor
Prof. Yuebin Guo

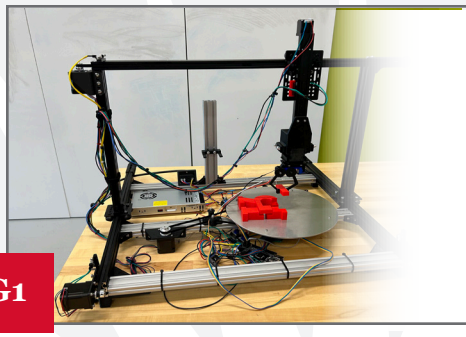
Industry Advisor
Dr. Shane Esola

Group Members
Shaan Aamir
Arash I Fatahi
James A Jensen
Alex Lisenko
Alex P Stone

G5

Our group will study the effects of printing temperatures and cooling times between layers on the overall strength of the print

G.A.M.T.R.Y: A MULTI-FUNCTION 3D GANTRY ROBOT



Faculty Advisor
Prof. Xi Gu

Group Members
Vibhu S Iyer
Kenny Kuang
Matthew M Laemmle
Akhil T Neerati
Benjamin C Shanosky
Nishad H Thakar

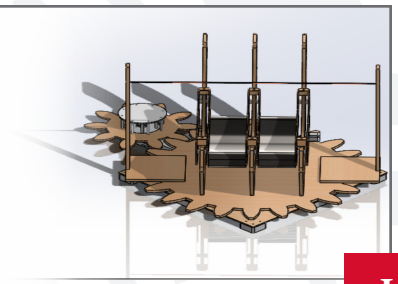
G1

A modified gantry capable of performing different functions related to the manufacturing of items. The gantry autonomously switches functions to manufacture products without human intervention once commands have been sent in.

CONCENTRATED SOLAR ENERGY SYSTEM

Faculty Advisor
Prof. Yogesh Jaluria

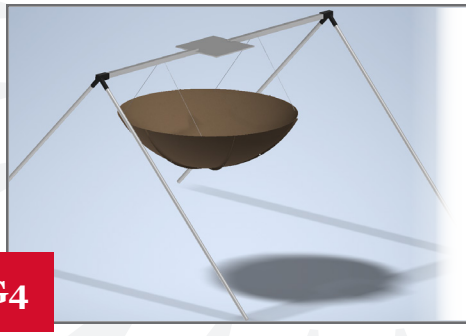
Group Members
Brayan Dominguez
Jaison D Prajapati
John P Rojas
Maanav D Shah
Shubin Xie
Qiyan Zhu



J1

Revolutionary concentrated solar collector system utilizing advanced technology to concentrate and track sunlight, converting it into high-efficiency, renewable water energy to store for various industrial and residential purposes while reducing environmental impact.

SOLAR POWERED GRILL



Faculty Advisor
Prof. Zhixiong Guo

Group Members
Lukas Czarnocki
Isaiah M Jonte
Emre B Kavlak
John S King
Derin A Kucuk
Usman A Saeed

G4

To contribute to our planet's sustainability, our solar powered grill reduces emissions compared to traditional grilling methods. With easy assembly, our project harnesses solar energy through a parabolic mirror to concentrate heat onto a cooking platform

WIND ENERGY SYSTEM

Faculty Advisor
Prof. Yogesh Jaluria

Group Members
Justin A Aguado
Kaetana G Degiovanni
Amone Filmalter
Hugh McGuire
Vishnupriya Ramesh
Crystal Yung

J2

This is an automated hydroponic system powered by a wind turbine which controls the amount of water pumping through the system. It also incorporates sensors to record temperature and battery charge.

DESIGN AND MANUFACTURING PROJECTS

AEROSPACE DESIGN PROJECT

LIGHTER THAN AIR SURVEILLANCE VEHICLE

Faculty Advisor
Prof. Doyle D. Knight

Group Members
Anish K Aluru
Edgar S Hernandez
Walter K Luers
Thomas J Saleeb
Gabriel S Tertuliano

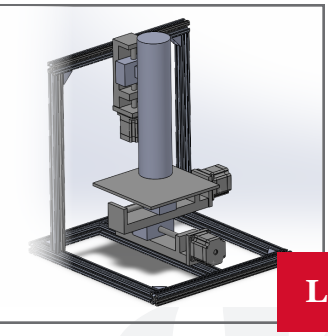
AE K1

Design and build a remote-operated surveillance balloon which is capable of loitering in an area for extended periods of time and transmitting live feed to the ground.

3D PRINTER FOR THERMOPLASTIC PELLET EXTRUDER

Faculty Advisor
Prof. Jennifer Lynch-Branzoi

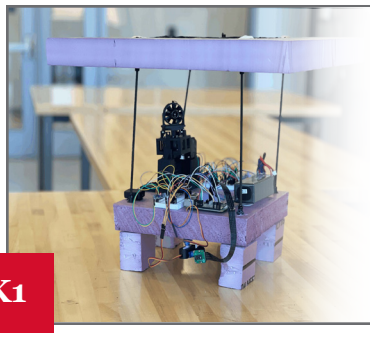
Group Members
Jack G Manzino
Mario S Outland
Matthew C Robayo
Kathryn E Sneddon



L2

Our 3D Printer is created to print thermoplastic with pellets as feedstock to eliminate waste. Our robust movement system allows for unconventional movement to ensure temperature and structural stability for heavy loads and high temperatures.

LIGHTER-THAN-AIR SURVEILLANCE VEHICLE



Faculty Advisor
Prof. Doyle D. Knight

Group Members
Ted Bae
Connor J Dempsey
Ryan J Hacker
Benjamin Kravitz
James P Nugent
Brian A Polis

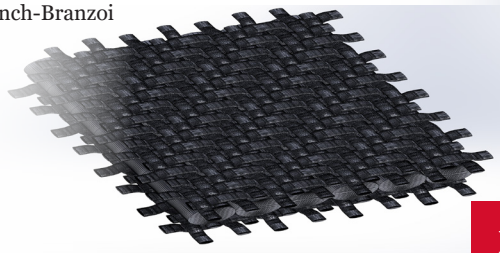
K1

A lighter-than-air surveillance vehicle capable of wireless video transmission, fine movement control, and multi-directional travel. Our vehicle is capable of collecting environmental data.

ARMOR ENHANCED WITH SHEAR THICKENING FLUID

Faculty Advisor
Prof. Jennifer Lynch-Branzoi

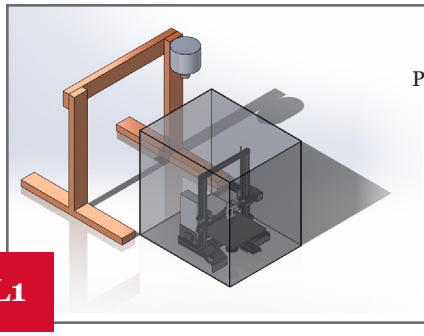
Group Members
John T Anglim
Talah B Hassan
Delsin Olmedo
Nicole Posada



L3

An experimental liquid armor developed involving a combination of features from previous designs in order to reduce the impact felt by blunt trauma while keeping armor thickness low.

3D PRINTER FOR ELASTOMERIC COMPOSITES



Faculty Advisor
Prof. Jennifer Lynch-Branzoi

Group Members
Raul Barragan
Joseph A DeNisco
Frank Mendieta
Oluwaferanmi A Omidiran
Alexa M Scala
Jesus Soto

L1

Developing a novel 3D printer for graphene-rich thermosets, featuring a unique pump system and high-viscosity mixing chamber, aimed at creating advanced elastomer sensors with automation capabilities for enhanced usability and innovation in sensor technology.

3D PRINTER USING PELLET EXTRUSION

Faculty Advisor
Prof. Jennifer Lynch-Branzoi

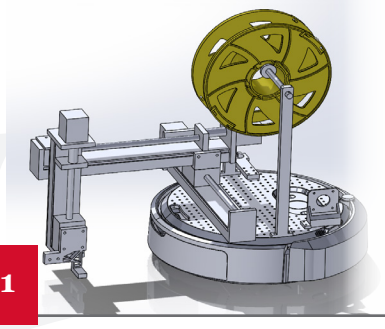
Group Members
Dylan R Fedele
Steven J Garcia
Sam Khalifa
Rafael S Lacon

L4

Developing a novel 3D printer head capable of storing plastic pellets and extruding them at high temperatures for improved materials science research.

DESIGN AND MANUFACTURING PROJECTS

MOBILE 3D PRINTING SOLUTION FOR THERMOPLASTIC MATERIALS



Faculty Advisor
Prof. Rajiv Malhotra

Group Members
Devin A Genther
Asmita Ghosh
Justin M Hsu
Anthony Perez
Benjamin D Platoff
Marcus E Raman

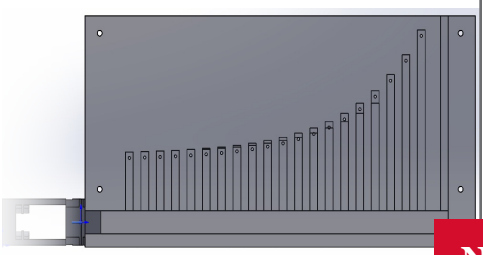
M1

This project builds upon a prototype of a mobile autonomous 3D printer to improve its printing range and functionality— specifically expanding its print capability in the cardinal directions and optimizing its movement.

WORKING MODEL OF THE HUMAN COCHLEA

Faculty Advisor
Prof. Andrew Norris

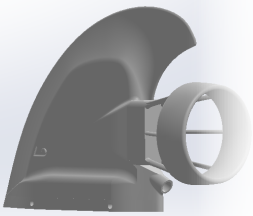
Group Members
Carmel S Bader
Sriya Bapatla
Hirva R Jadav
Justin M Morgan
Precious Opara
Sharoze Shahid



N1

This project is an educational working hydrodynamic model of mechanical sound wave filtering in the human cochlea. It demonstrates Békésy's classical passive wave theory, which is fundamental to understanding cochlear mechanics.

MOTORIZED FIN SURFBOARD PROPULSION UNIT



Faculty Advisor
Prof. Aaron Mazzeo

Group Members
Uzair Ahmed
Marek Drapala
Christopher R Harrington
Cole L Neuman
Joseph L O'Donnell

M2

A propeller and motor designed to fit into a fin that easily attaches to any surfboard. Meant to assist new and experienced surfers catch any wave they desire, saving energy and time for maximum enjoyment.

RUTGERS FORMULA RACING IN-HUB MOTOR

Faculty Advisor
Prof. Assimina Pelegri

Group Members
Maxim Arkhipov
Szymon R Frackowski
Harry C Gavilanes
Coltrane M Kamikura
Anuj H Patel

P1

An electric motor drivetrain consists of a planetary gearbox, hub, and brake-integrated system. The system is designed to operate independently, enabling two- and four-wheel drive for Rutgers Formula Racing's race car.

SURFBOARD PROPULSION

Faculty Advisor
Prof. Aaron Mazzeo

Group Members
Jin-Hyuk Choi
Steven M Coponi
Dominick J Luppino
Alyssa Nayar
Douglas S Willey

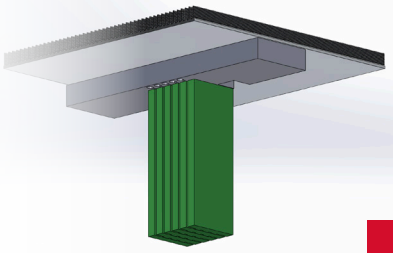
M3

Innovative slingshot for Wavestorm surfboards! Designed for easy activation with a simple button press, it provides an extra 154 pounds of thrust, helping surfers catch waves effortlessly.

ADVANCED THERMAL MANAGEMENT SOLUTION FOR BATTERY FAST CHARGING

Faculty Advisor
Prof. Amin Reihani

Group Members
Aritra Chakraborty
Christopher T Gersbeck
Justin A Peterman
Pranav Tripathi



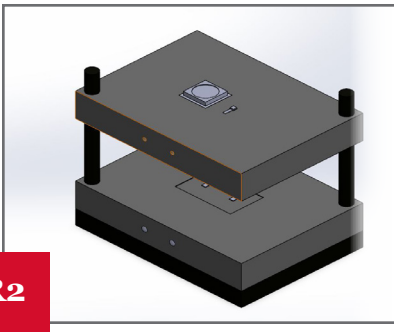
R1

Developing an advanced thermal management solution utilizing copper heat pipes to optimize battery performance during rapid charging, enhancing safety, efficiency, and lifespan in electric vehicles.

DESIGN AND MANUFACTURING PROJECTS

TEST SETUP THERMAL CHARACTERIZATION OF BATTERY CELLS

R2



Faculty Advisor
Prof. Amin Reihani

Group Members
Joshua I Auyeung
Peter Chen
Zachary G Lees
Cavin Saravanan

The purpose of the test setup is to measure through and across-plane thermal conductivity of lithium-ion batteries by heating up batteries with a PTC heater and measuring their temperatures at various points using thin-film thermistors.

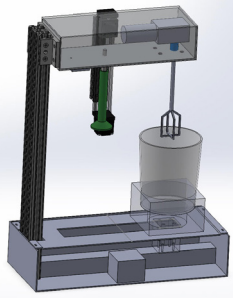
MULTIPLE METRIC DEVICE FOR MIXEDNESS OF DENSE PASTES

S2

Faculty Advisors
Prof. German Drazer
Prof. Jerry Shan

Industry Advisor
Dr. Shane Esola

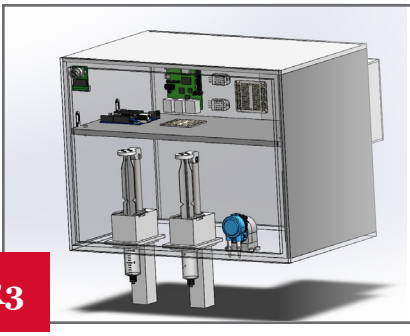
Group Members
Comfort Nadjiwa
Enrique Perez
Anton Udovenko



Developing a device utilizing torque, texture analyzing, and optical analysis to assess mixedness of dense pastes, targeting manufacturing efficiency and accuracy.

AUTOMATED INDOOR GROWING SYSTEM

R3



Faculty Advisor
Prof. Todd Rossi

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Christopher N Lijo
Mayco Lucero
Jonathan Ortiz
Matthew H Roman
Emmanuel Serrano-Perez

An indoor growing system that uses hydroponics coupled with sensors, actuators, and Raspberry Pi to adjust the conditions of the enclosed environment to grow plants in optimal conditions and alert the user of plant status.

TEST SAMPLE BURNING BOX (TSBB)

S5

Faculty Advisor
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Industry Advisor
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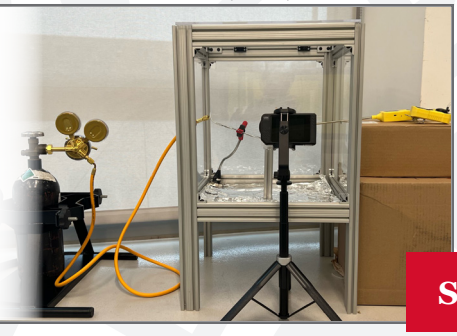
Emaan Amir
Jack A Bostjancic
Nare K Cho
Nettie M Gaeta
Christopher A Garcia
Cole M Jenkins

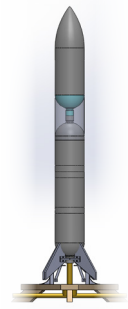


The MINET materials manufactured in Dr. Singer's Laboratory present interesting potential for extracting and moving high amounts of energy. With our partners at Picatinny Arsenal, we built a combustion chamber to safely observe their properties.

WORLD RECORD SETTING WATER ROCKET

AEROSPACE DESIGN PROJECT

AE S1



Faculty Advisor
Prof. Jerry Shan

Group Members
Francisco Almachi-Vera
Diego A Carrion Castro
Khyathi Dadi
Andrew Y Kim
Jonathan F Kofman
Prateek Singh

Group AE_S1's is attempting to beat the world record of a multi-stage water rocket with the altitude surpassing 1100 feet. Our current design has a boat tail design with fins and three interconnected 2L bottles.

DASHERS: THE AUTOMATED FOOSBALL TABLE

T1

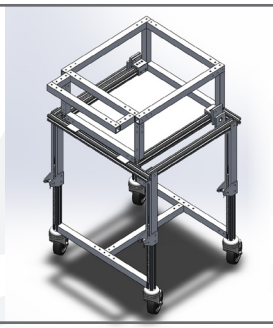
Faculty Advisor
Prof. Stephen Tse

Group Members
Shoshana Erblich
Abbas A Faisal
Rishi U Goculdas
Ethan M Greene
Sami Y Jawabrah
Hirsh M Ramani
Daniel D Tsoy

DASHERS is an automated foosball table that transforms the game of foosball through high-powered mechanics and advanced robotic computing. Real-time visual data powers a speedy and accurate competitive experience for all skill levels.

DESIGN AND MANUFACTURING PROJECTS

THE SMARTY CARTY



Faculty Advisor
Prof. Stephen Tse

Group Members
Mathew Joseph
Steven A Kantwenwein
Rohan Y Sakhardande
Hiren D Solanki

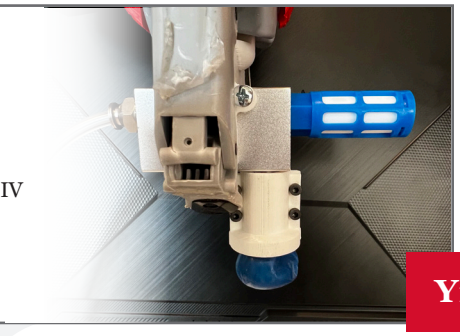
T2

The Smarty Carty is a personal shopping cart for consumers to make grocery shopping faster and more efficient. You will never have to use reusable grocery bags again!

ROBOTIC GRIPPER

Faculty Advisor
Prof. Jingang Yi

Group Members
Riky Bae
James M Cunningham
Nicholas Klementowicz IV
Anmoldeep s Multani
Evan P Van Lenten



Y1

We designed a pneumatic soft gripper to be attached to a robotic arm for fast manipulation of parts from a bin to a fixture.

DESIGN OF A STRONG AND LIGHTWEIGHT CYLINDRICAL PRESSURE VESSEL USING CARBON FIBERS AND EPOXY RESIN

Faculty Advisor
Prof. George Weng

Group Members
Hazim A Abdelhamid
Jude G Bidle
Mohak Patel
Sahil K Patel
Dominik J Polifronio
Mitchell J Raven
Yichi Zhang

W1

Design of a cylindrical pressure vessel using carbon fibers and epoxy resin that is high in strength and lightweight by nature.

AUTONOMOUS FLEET COLLABORATION FOR UNKNOWN TERRITORY EXPLORATION

AEROSPACE DESIGN PROJECT

Faculty Advisor
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Group Members
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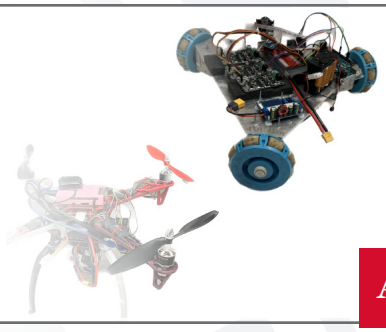
Alex Lee
Handell D Quiros
Yunus E Tozlu
Paolo B Virtudazo
Ryan K Walton



AE Z1

An autonomous drone provides a “map” of an area for the ground rovers to follow and bring the package to its destination.

HIGH STRENGTH, LIGHT WEIGHT SPHERICAL PRESSURE VESSEL WITH FIBER-REINFORCED COMPOSITES

AEROSPACE DESIGN PROJECT

Faculty Advisor
Prof. George Weng

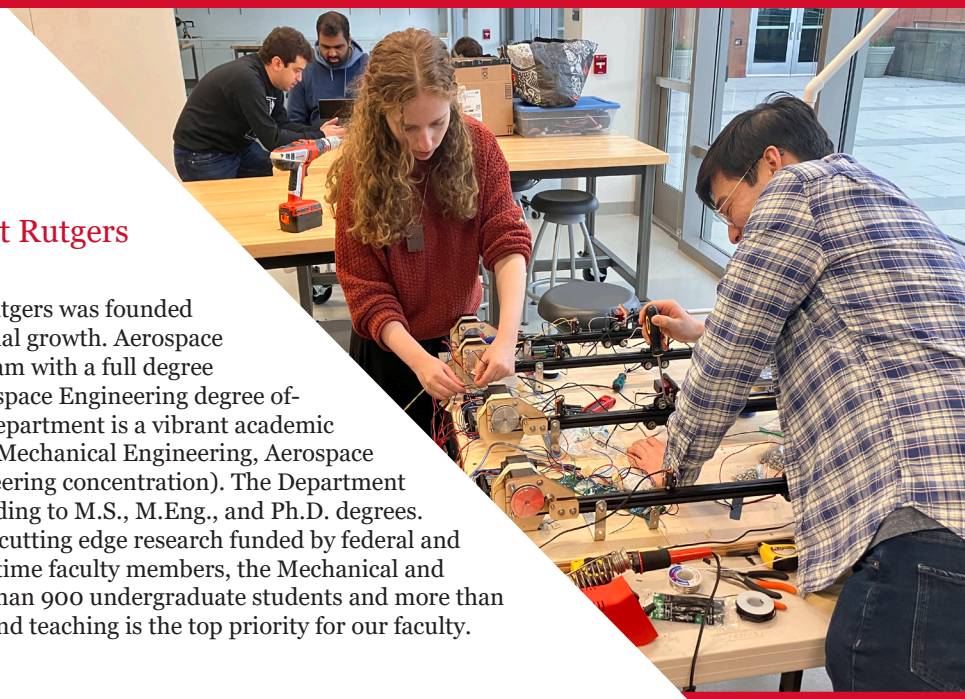
Group Members
Steven Bercher
Colton G Cooper
Dahmir Gunter
Timothy Kevorkov
Faraz Shah
Vedant V Shenoy

AE W2

A lightweight spherical pressure vessel made from carbon fiber-reinforced polymer composites. Our design utilizes a geodesic sphere as the internal structure with an interior rubber bladder.

Cover Photos (All group members listed left to right):

Front top left: Hang Yin, Guanyu Chen (D2)
Front bottom left: David Samolkin, Alexa Sullivan (AE-D3)
Front right: Russell Nicholls, Callisto Morgan (AE-D2)
Front inside top left: Vedant Shenoy, Timothy Kevorkov, Colton Cooper, Faraz Shah, Dahmir Gunter (AE-W2)
Front inside top right: Kenny Kuang, Matthew Laemmle, Benjamin Shanosky, Akhil Neerati, Nishad Thakar, Vibhu Iyer (G1)
Front inside bottom left: Noah McAllister, Armando Alvarado (AE-B2)
Front inside bottom right: Adriana Camacho, Matthew Roman, Mayco Lucero, Christopher Lijo, Emmanuel Serrano-Perez (R3)
Back: Shoshana Erblich, Ethan Greene (T1)



Mechanical & Aerospace Engineering at Rutgers

The Department of Mechanical Engineering at Rutgers was founded in 1908 with a focus on driving the country's industrial growth. Aerospace Engineering was added in 1965 as a certificate program with a full degree program established in 2015. It is now the only Aerospace Engineering degree offered among New Jersey's public universities. The Department is a vibrant academic community offering three undergraduate degrees in Mechanical Engineering, Aerospace Engineering, and Applied Science (Packaging Engineering concentration). The Department has state of the art laboratories used for research leading to M.S., M.Eng., and Ph.D. degrees. Undergraduate and graduate students participate in cutting edge research funded by federal and state agencies, and industrial partners. With 40 full-time faculty members, the Mechanical and Aerospace Engineering Department educates more than 900 undergraduate students and more than 150 graduate students. Excellence in both research and teaching is the top priority for our faculty.

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