

**Mechanical and Aerospace Engineering  
2021 Design and Manufacturing Expo  
May 12, 2021**

**RUTGERS**  
School of Engineering



# RUTGERS

Mechanical and Aerospace  
Engineering

## Course Coordinators

Prof. Assimina A. Pelegri  
Prof. Xi Gu

## Teaching Assistants

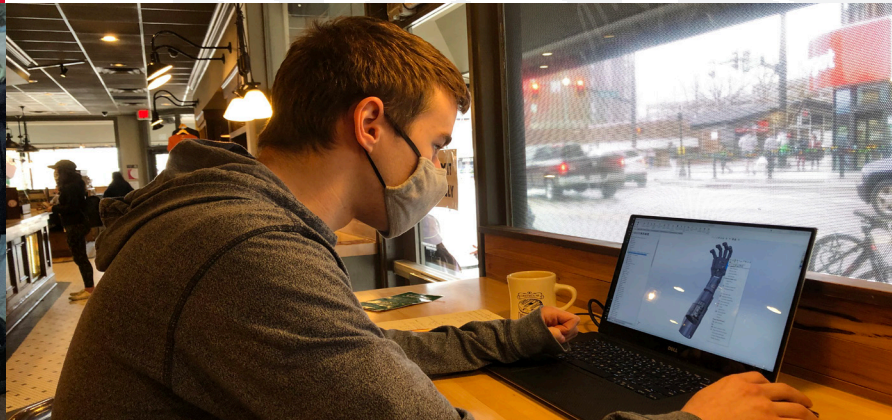
Mohit Agarwal  
Hang Zhang

## Design Specialists

Dr. Basily Basily  
Mr. Milan Simonovic

## Seminar Speakers

*Dr. Jerry Shan Rutgers MAE*  
*Mr. Milan Simonovic Rutgers MAE*  
*Mr. Merrill Edmonds Rutgers MAE*  
*Dr. Richard Dool Rutgers School of Communication and Information*  
*Mr. Ken Johnson Lockheed Martin (Ret.)*  
*Dr. Mukesh M. Patel Rutgers Business School*  
*Mr. Hariharan Vijayakumar Aersys Inc.*  
*Mr. John Laucius Merck (Ret.)*



## NOTE FROM THE CHAIR

The Mechanical and Aerospace Engineering Department is a vibrant academic community offering two undergraduate degrees in Mechanical Engineering and Aerospace Engineering, in addition to graduate/advanced programs leading to MS, MEng and PhD degrees. Our 30+ full-time faculty members educate more than 780 undergraduate and 160 graduate students. Our Department is one of the largest and oldest units in the School of Engineering, having been founded in 1908. Today, our programs rank on the top 50 Graduate Engineering Programs in the nation, according to U.S. News and World Report. Our exciting and multidisciplinary research portfolio is advancing research in a variety of scientific and technological areas, including nanostructures, autonomous robotics, electrohydrodynamics, fluid interactions, energy science, and advanced materials.

Our community of students, faculty, alumni, and industry partners are devoted to collaborative work at the highest standards of research and innovation. Every faculty member is dedicated to helping our students achieve success through teaching excellence and an exciting array of research projects. Students have access to a wide range of classes that train them in the core principles of mechanical and aerospace engineering. They have the opportunity to participate in research projects as undergraduates, allowing them to gain experience in real-world applications comparable to research conducted by industry.

Excellence in teaching is a priority for our faculty members who take seriously their role as educators, training students to be problem solvers and innovators. Our faculty has achieved distinction among their peers and as fellows of professional engineering societies, including the American Society of Mechanical Engineers (ASME), American Physical Society (APS), Acoustical Society of America (ASA), and American Academy of Mechanics (AAM).

We invite you to join our Mechanical and Aerospace Engineering community in our sustained efforts to advance societal needs through the scientific and technological discovery & innovation, design, and manufacturing.

Alberto Cuitiño, Ph.D.  
Professor and Chair  
Department of Mechanical and Aerospace Engineering

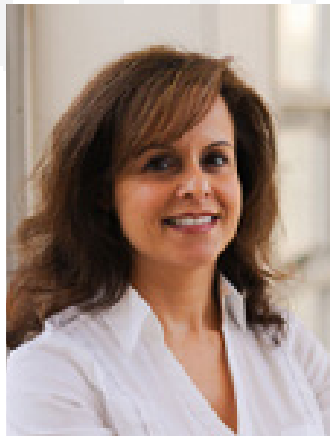


## NOTE FROM THE COORDINATOR

Dear students, parents, and friends,

I would like to take this opportunity to welcome you to the Mechanical and Aerospace Engineering Department at Rutgers! Presented in the next few pages is the challenge that every Rutgers MAE undergraduate has to face, the yearly Design and Manufacturing Project. All classroom learning is translated to real-life problems as small groups of students work under faculty members to design and build an operational device that accomplishes a preset list of goals over the span of two semesters in their final year. Students compete with their projects in April during Rutgers Day in a public setting and are judged by academic and industrial experts. During these projects, students have the opportunity to work with industry members as well as faculty, 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. A key experience is our partnership with the Rutgers Business School faculty whose students collaborate with ours and prepare business plans to address the business component of design and engineering innovation. This provides a unique opportunity to students to work in a multidisciplinary entrepreneurial environment that is distinct to our department. Take your time to read through our projects and celebrate with us the innovativeness, entrepreneurship, and resourcefulness of our young engineers!

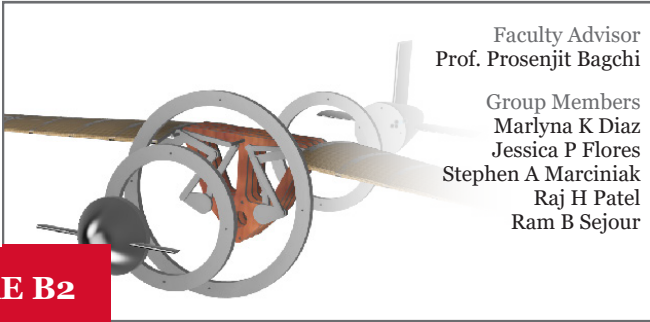
Assimina A. Pelegri, Ph.D.  
Professor and Undergraduate Program Director  
Department of Mechanical and Aerospace Engineering



# DESIGN AND MANUFACTURING PROJECTS

AEROSPACE  
DESIGN PROJECT

## MECHANICAL BIRD



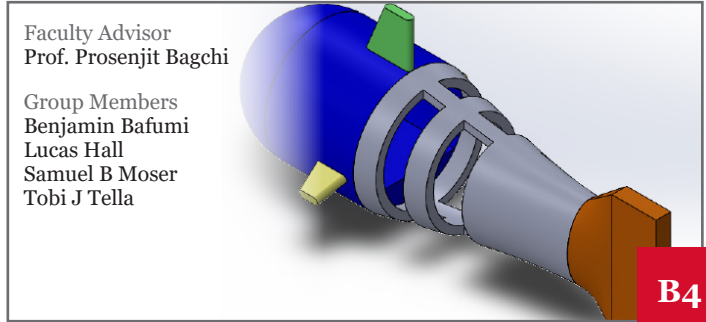
Faculty Advisor  
Prof. Prosenjit Bagchi

Group Members  
Marlyna K Diaz  
Jessica P Flores  
Stephen A Marciniak  
Raj H Patel  
Ram B Sejour

**AE B2**

An ornithopter in which all lift and thrust are produced by the wings flapping in a manner similar to that of a bird, thus not requiring external sources of thrust in order to maintain flight.

## MECHANICAL FISH



Faculty Advisor  
Prof. Prosenjit Bagchi

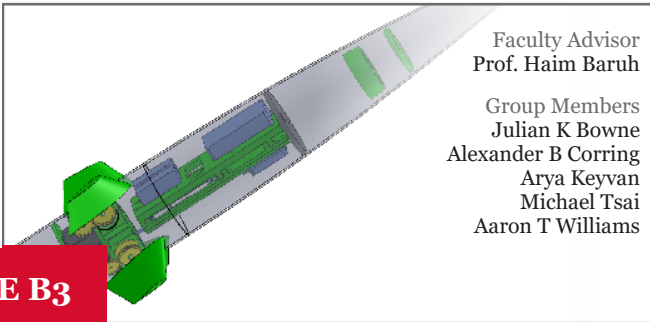
Group Members  
Benjamin Bafumi  
Lucas Hall  
Samuel B Moser  
Tobi J Tella

**B4**

We developed an underwater device that propels and maneuvers like a fish using body undulations and ballast control. Motor controller design and structural analysis allow the device to translate forward and laterally, and change depth.

AEROSPACE  
DESIGN PROJECT

## ATTITUDE CONTROL SYSTEM FOR ROCKET STABILIZATION



Faculty Advisor  
Prof. Haim Baruh

Group Members  
Julian K Bowne  
Alexander B Corring  
Arya Keyvan  
Michael Tsai  
Aaron T Williams

**AE B3**

A Reaction Control System designed to estimate attitude utilizing a predictive model and measured gyroscopic data. Trajectory is then corrected by deflecting fins to produce the necessary aerodynamic torques about the vehicle's center of mass.

## MULTI-MODE HYBRID UNMANNED DELIVERY SYSTEM



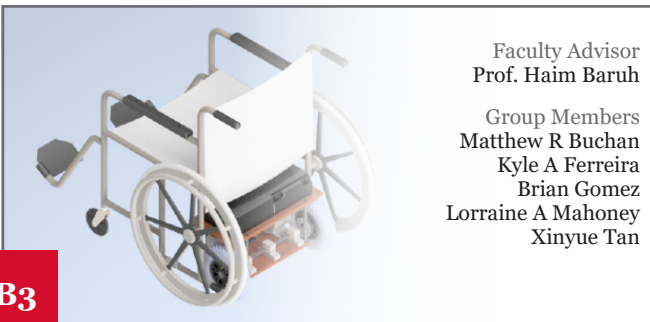
Faculty Advisor  
Prof. Onur Bilgen

Group Members  
Camil Andruch  
Nolan M Angelia  
Weihaio Cheng  
Muhammet A Gungor  
Paul Wang

**B5**

The Multi-Mode Hybrid Drone System (MMHDS) is a delivery drone prototype that employs a system of two autonomous aircraft, taking advantage of the strengths of different vehicle types.

## WHEELCHAIR CONVERSION KIT



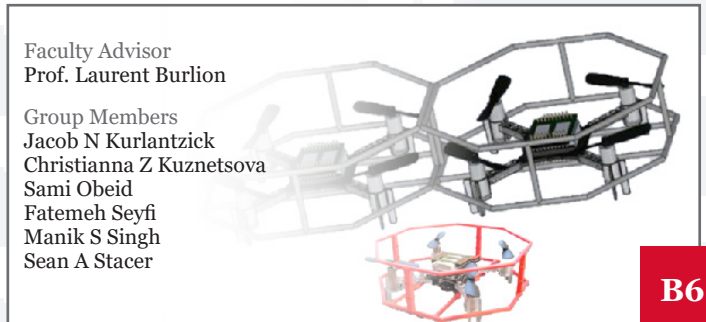
Faculty Advisor  
Prof. Haim Baruh

Group Members  
Matthew R Buchan  
Kyle A Ferreira  
Brian Gomez  
Lorraine A Mahoney  
Xinyue Tan

**B3**

The objective for this project is to construct a conversion kit to allow a standard, push wheelchair to become motorized. The consumer can install the motor and costs significantly less than an electric wheelchair.

## MODULAR DRONES



Faculty Advisor  
Prof. Laurent Burlion

Group Members  
Jacob N Kurlantzick  
Christianna Z Kuznetsova  
Sami Obeid  
Fatemeh Seyfi  
Manik S Singh  
Sean A Stacer

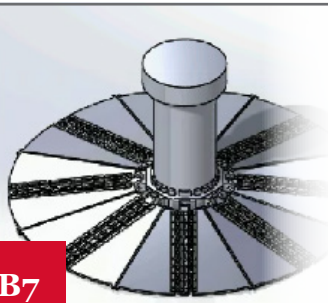
**B6**

Modular drones with the ability to connect and disconnect in midair and fly together both autonomously and with human control for the purpose of carrying a payload

# DESIGN AND MANUFACTURING PROJECTS

AEROSPACE  
DESIGN PROJECT

## INFLATABLE DEPLOYABLE LUNAR HABITAT



Faculty Advisor  
Prof. Haym Benaroya

Group Members  
Hossain Ahmad  
Alex M Martinez  
Nina M Parsons  
Mykhalo Petrovskyy  
Saleh M Tahir  
Philip W Touhey

**AE B7**

Lunar habitat that will land on Starship, then be deployed and inflated to house astronauts on near-term missions on the lunar surface.

## AUTONOMOUS DRONE HUNTER



Faculty Advisor  
Prof. Laurent Burlion

Group Members  
Adedayo A Ayegbusi  
Anas Elahi  
Asad I Elahi  
Ian A Kurashov  
James A Trontell  
Jonathan Zusman

**AE BD**

With the increasing popularity of unmanned aerial vehicles, many bad actors have taken advantage of the airspace. Our group proposes a unique, smart drone designed to hunt, capture, and eliminate foreign drones from unwanted areas.

AEROSPACE  
DESIGN PROJECT

## ZERO-G DRONE



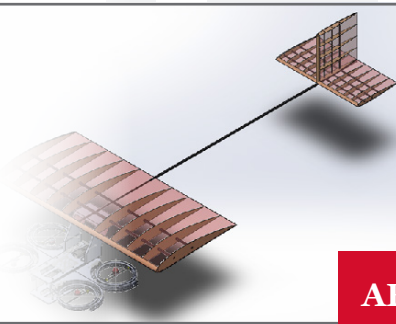
Faculty Advisor  
Prof. Onur Bilgen

Group Members  
Raneem A Elsayed  
Pamela Grullon  
Shiqi Ma  
Huan Min  
Alejandro Salvador-Garcia  
Jonathan Snyder  
Jenna M Wendt

**AE BA**

Our project is a quadcopter that will simulate microgravity conditions in by maintaining 1g acceleration for as long as possible in flight. The experiment platform will record data and accommodate experiments of multiple types.

## HIGHLY AGILE VERTICAL TAKE-OFF AND LANDING DRONE



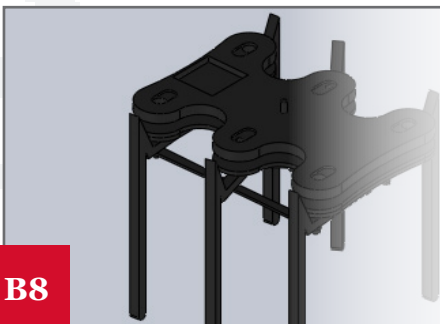
Faculty Advisor  
Prof. Laurent Burlion

Group Members  
Robert J Buckelew  
Steven D Calalpa  
Michael R Higgins  
Chad O McClelland  
Declan T O'Brien  
Eric S Vonier

**AE BE**

This project is a VTOL aircraft with gimbaled motors. These motors are managed by a custom control scheme that incorporates pilot input in real time. This aircraft design allows for aggressive maneuvers and stable flight.

## SOLAR SEED SPREADER



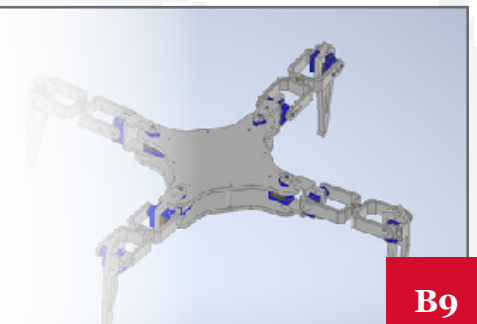
Faculty Advisor  
Prof. William Bottega

Group Members  
Johan S Agudelo  
Irvic V Gondor  
Mark J Koehr  
Janell Y Taylor

**B8**

The goal of the project is to design and simulate a solar powered walker that will spread seeds as it walks across a farm.

## MECHANICAL SOLAR WALKER



Faculty Advisor  
Prof. William Bottega

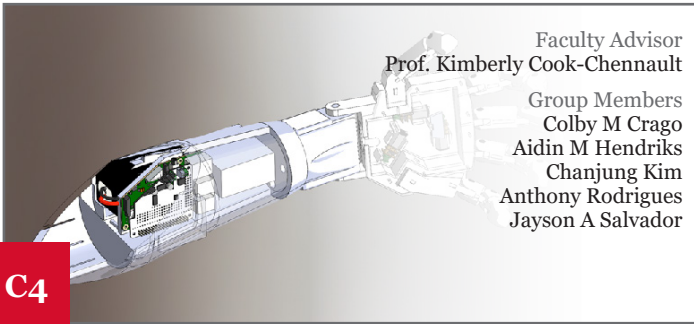
Group Members  
Asaad S Abdul-Hamid  
Hanks S Flanagan  
Adrian Malvarez  
Marcelo R Suquilanda  
Jason P Yu

**B9**

The solar walker is 3D printed using carbon fiber. With each leg consisting of 3 motors powered by a solar battery, the walker can traverse in 3 dimensions with a 2 oz. payload.

# DESIGN AND MANUFACTURING PROJECTS

## DESIGN OF BIOMECHANICAL HAND



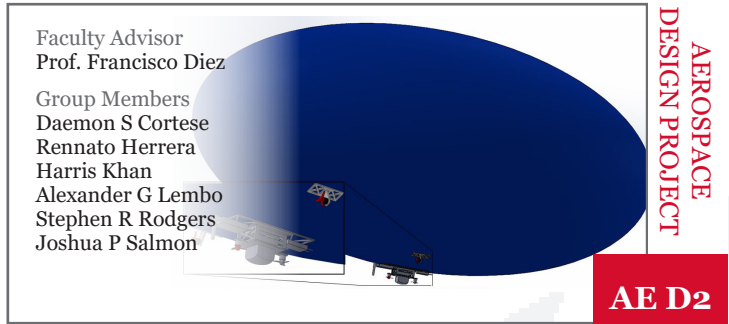
Faculty Advisor  
Prof. Kimberly Cook-Chennault

Group Members  
Colby M Crago  
Aidin M Hendriks  
Chanjung Kim  
Anthony Rodrigues  
Jayson A Salvador

**C4**

This biomechanical hand is designed that incorporate both mechanical and electrical functioning which contains voice controlled and pressure sensor system.

## FLAPPING WING ENERGY HARVESTER



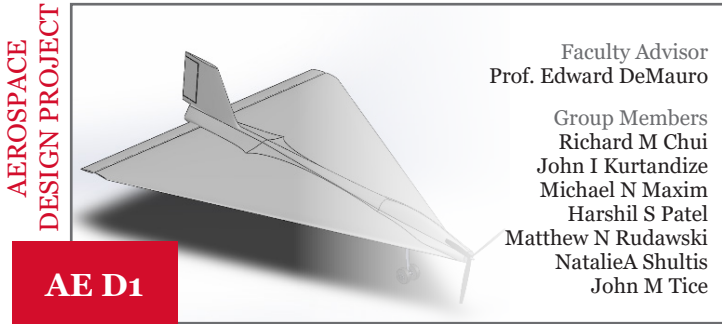
Faculty Advisor  
Prof. Francisco Diez

Group Members  
Daemon S Cortese  
Rennato Herrera  
Harris Khan  
Alexander G Lembo  
Stephen R Rodgers  
Joshua P Salmon

**AE D2**

Our group is designing and manufacturing a self-flying blimp, to be used for a lightshow, as a source of entertainment for patrons at the American Dream Mall.

## DELTA WING CANDY DROPPER



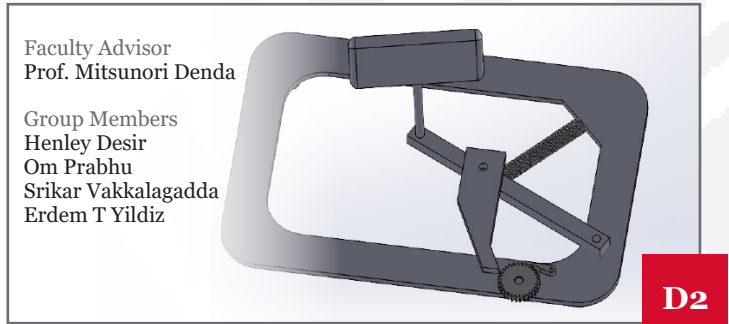
Faculty Advisor  
Prof. Edward DeMauro

Group Members  
Richard M Chui  
John I Kurtandize  
Michael N Maxim  
Harshil S Patel  
Matthew N Rudawski  
NatalieA Shultis  
John M Tice

**AE D1**

Remote controlled Delta Wing craft that is capable of taking off and landing under its own power, performing a coordinated turn, and delivering a .25 lb. payload to a required location

## BIO-INSPIRED FLAPPING WING ENERGY HARVESTER II



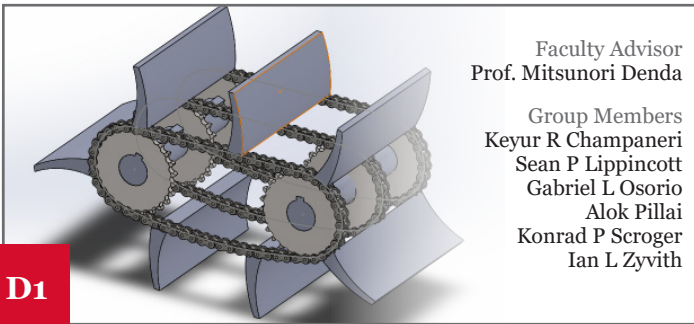
Faculty Advisor  
Prof. Mitsunori Denda

Group Members  
Henley Desir  
Om Prabhu  
Srikar Vakkalagadda  
Erdem T Yildiz

**D2**

The two goals of the project are to design a more stable and easily calibrated schlieren system and to create a new control code in LabView that is clear and well commented.

## BIO-INSPIRED FLAPPING WING ENERGY HARVESTER



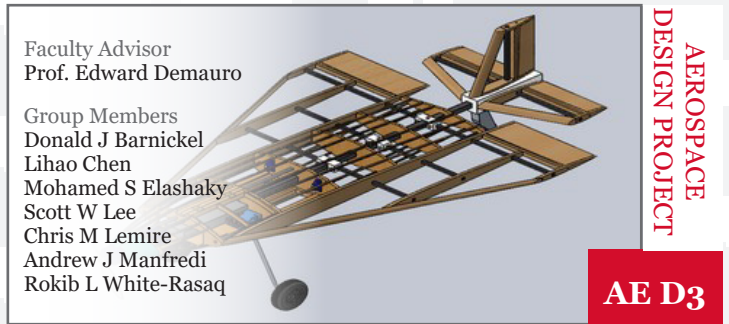
Faculty Advisor  
Prof. Mitsunori Denda

Group Members  
Keyur R Champaneri  
Sean P Lippincott  
Gabriel L Osorio  
Alok Pillai  
Konrad P Scroger  
Ian L Zyvith

**D1**

We designed a wind energy harvesting system that takes inspiration from the hand cranked powered flashlight and instead uses the biological shape of wings and fins to harvest the energy from wind power.

## OPERATION DELTA WING CANDY DROP



Faculty Advisor  
Prof. Edward Demauro

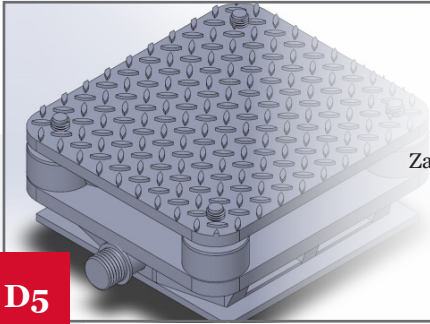
Group Members  
Donald J Barnickel  
Lihao Chen  
Mohamed S Elashaky  
Scott W Lee  
Chris M Lemire  
Andrew J Manfredi  
Rokib L White-Rasaq

**AE D3**

An original design of a new drone is able to lift off with its own power, perform a coordinated turn, drop a quarter pound of candy, and then land.

# DESIGN AND MANUFACTURING PROJECTS

## VIRTUAL REALITY CYCLING FOR PATIENT REHABILITATION.



Faculty Advisor  
Prof. German Drazer

Group Members  
Fatmael Zahraa K Hamza  
Zachary-James A Henderson  
Jessica P Jan  
Mathew A Lambie  
Maryam Manzoor  
Tyriq Thompson

D5

We designed a pedal to measure the strength of a stroke victim to help them see how they're recovering is going as they pedal on a stationary bicycle.

## LOW COST VENTILATOR FOR COVID-19 PATIENTS



Faculty Advisor  
Prof. Yuebin Guo

Group Members  
Kevin J Donlan  
Zhijing Hu  
Pik Luen Li  
Prabhdeep Singh  
Travis B Thompson-Sevcik

G3

The low cost COVID-19 ventilator is capable of both mandatory and assistive ventilation and will fill the gap between a clinical ventilators and a bag valve mask, while meeting all medical and respiratory requirements.

## THE AUTOMATED GANTRY SYSTEM FOR INDIVIDUALIZED PRODUCTS.



Faculty Advisor  
Prof. Xi Gu

Group Members  
Het T Bhagat  
Kenneth Cantos  
Danny Chan  
Siddhant P Naik  
Brian Wilhem

G1

The Automated Gantry System for Individualized Products allows manufacturers to produce variety of individualized products. The multifunctional and modular gantry allows companies to swap the machine's tools as needed, replacing multi machines capabilities by one.

## SOLAR-POWERED AIR PURIFICATION DEVICE



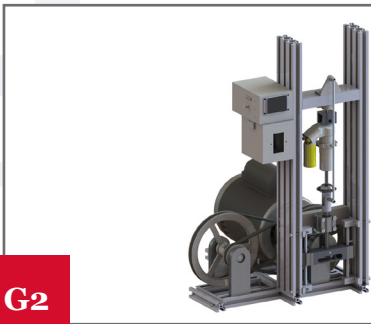
Faculty Advisor  
Prof. Zhixiong Guo

Group Members  
Jason T Belanger  
Bradley A Carnegie  
Evan J Chan  
Leah N Evangelista  
Aayush A Gandhi  
Scott C Riccardi

G4

Solar-Powered Air Purification device that utilizes air filters to trap any particles as small as 0.3 microns along with a UV light to kill any remaining particles in the air.

## FSAE SHOCK DYNAMOMETER



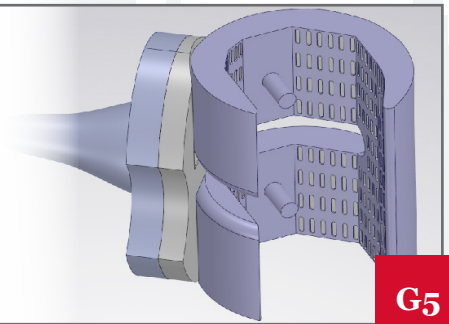
Faculty Advisor  
Prof. Xi Gu

Group Members  
Nyles W Gamble  
Muhammed M Kamal  
Isaac T Paez  
Julian D Sowa  
Stephen J Weinpahl  
Sean R Wheat

G2

This project is designed for small racing teams to be able to calibrate and tune the shock absorbers of their vehicles to achieve maximum performance.

## HYBRID KNEE IMPLANT



Faculty Advisor  
Prof. Yuebin Guo

Group Members  
Kofi I Awa  
Mohamed S Benteftifa  
Jared J Martindale  
Krystian M Mol  
Ivy L Nguyen

G5

Design, manufacturing, and assembly of the three components making up a standard knee implant. These three components include the femoral component, tibial component, and the plastic spacer in between.

# DESIGN AND MANUFACTURING PROJECTS

## THE HYBRID GREEN MICROGRID



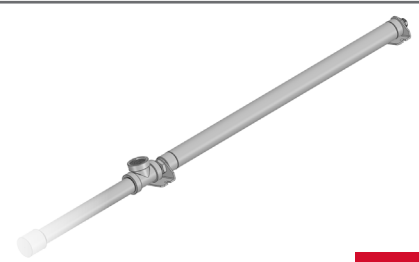
Faculty Advisor  
Prof. Yogesh Jaluria

Group Members  
Ogechukwu C Eze  
Gabriel Franco  
Akosua Opoku-Agyemang  
Alexander N Pai  
Seki Son

J2

Solar collector that cycles water until desired temperatures which is then stored for later use, while a wind turbine provides electricity for pumping power and electrical storage.

## RECYCLED BOTTLES PLASTIC EXTRUDER



Faculty Advisor  
Prof. Howon Lee

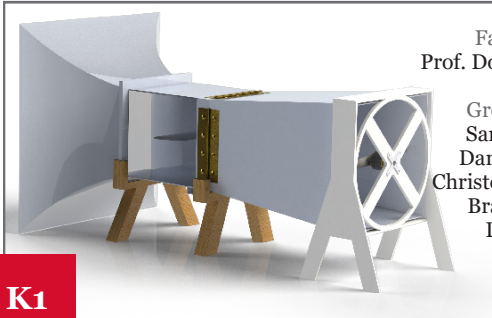
Group Members  
Lukasz Gomulka  
Niratjot S Grewal  
Jay R Patel  
Karan S Patel  
Aaron R Wiese

L2

An extruder that is designed to melt down plastic commonly found in recyclable bottles using electric heating and compressed air. Designed as the first stage of a 3D printing filament production process.

## TABLETOP SUBSONIC WIND TUNNEL

AEROSPACE  
DESIGN PROJECT



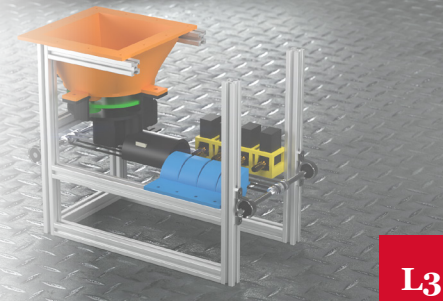
Faculty Advisor  
Prof. Doyle D. Knight

Group Members  
Samuel Chernov  
Daniella J Chung  
Christopher J Ennis  
Bradley T Miller  
Daniel F Tiber  
Xujie Zhang

AE K1

A low cost, modular wind tunnel that is suitable for undergraduate laboratory experiments. This design not only provides easy integration with any computer system, but is sustainable, durable, and adheres to the standardized engineering protocols.

## COLOR-BASED PNEUMATIC SORTER



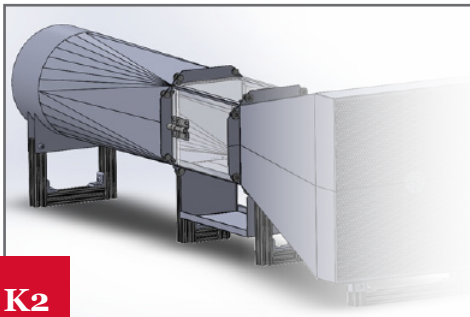
Faculty Advisor  
Prof. Hao Lin

Group Members  
Emma-Leigh P Cameron  
Ethan M Catalanello  
Jacob S Lilienfeld  
Aaron J Pfister  
Matthew G Signorelli

L3

A low-cost color-based sorting system that replicates industry-level metal scrap sorting system. Unsorted objects are distributed onto a conveyor belt, where the color is determined before a pneumatic actuator pushes them into sorted bins.

## TABLE TOP SUBSONIC WIND TUNNEL



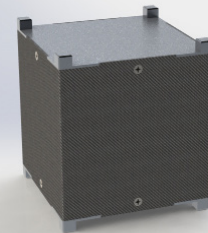
Faculty Advisor  
Prof. Doyle D. Knight

Group Members  
Gautam G Iyer  
Shane T LeCompte  
Shakti V Patel  
John R Sanders  
Daniel C Santoro

K2

A modular subsonic wind tunnel that allows for speeds up to fifteen meters per second, up to twenty degree angle of attack and able to fit within eight cubic feet.

## COMPOSITE CUBESAT STRUCTURE



Faculty Advisor  
Prof. Jennifer Lynch-Branzoi

Group Members  
Nicolas Arboleda  
Sunny D Patel  
Meghna Sen  
Daria Timura

L4

Our CubeSat structure was designed and tested to withstand forces experienced during launch. To manufacture, the base/cover plate and chassis wall molds are machined and the mold is used to cure the CFRP walls.



# DESIGN AND MANUFACTURING PROJECTS

## ACTIVE AERODYNAMICS FOR RUTGERS FORMULA RACING CAR



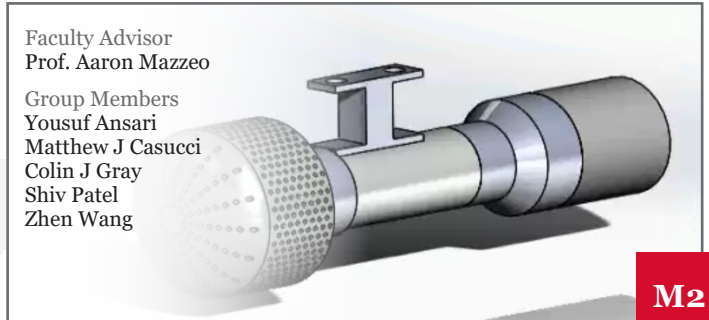
Faculty Advisor  
Prof. Hao Lin

Group Members  
John L Bebel  
Alex P Bertucci  
Rachael M Heath  
Jack S Tayler

L5

At the push of a button, the aerodynamic components of the car can be actively adjusted, allowing for minimized drag and downforce to increase the car's performance when going down a straight.

## DETACHABLE PROPULSION SYSTEM FOR VARYING SURFBOARD SIZES



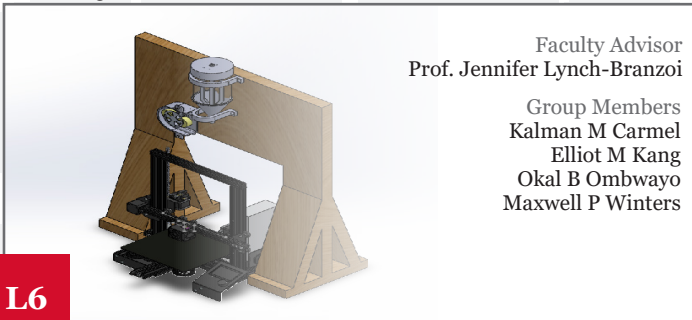
Faculty Advisor  
Prof. Aaron Mazzeo

Group Members  
Yousuf Ansari  
Matthew J Casucci  
Colin J Gray  
Shiv Patel  
Zhen Wang

M2

A detachable propulsion system that will aim to help the user learn to surf by providing a thrust, which reduces the necessary strength and fundamentals needed to surf.

## 3D PRINTING WITH ELASTOMERIC COMPOSITES



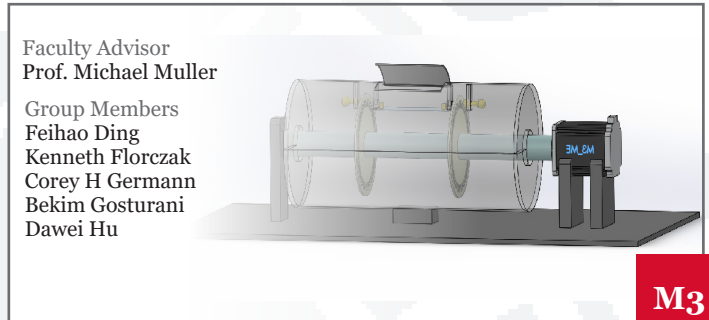
Faculty Advisor  
Prof. Jennifer Lynch-Branzoi

Group Members  
Kalman M Carmel  
Elliot M Kang  
Okal B Ombwayo  
Maxwell P Winters

L6

A 3D printer modification built on the Creality Ender 3 capable of printing elastomeric composites with a high concentration of nanoparticles, such as graphene, intended to improve the mechanical properties of the elastomer.

## OPTICAL TORQUE MEASUREMENT SYSTEM



Faculty Advisor  
Prof. Michael Muller

Group Members  
Feihao Ding  
Kenneth Florczak  
Corey H Germann  
Bekim Gosturani  
Dawei Hu

M3

Attempting to measure the efficiency of an engine by using torque which is calculated by optical system to measure the deflection in the axis of a predefined rod that is attached to the system.

## DETACHABLE PROPULSION UNIT



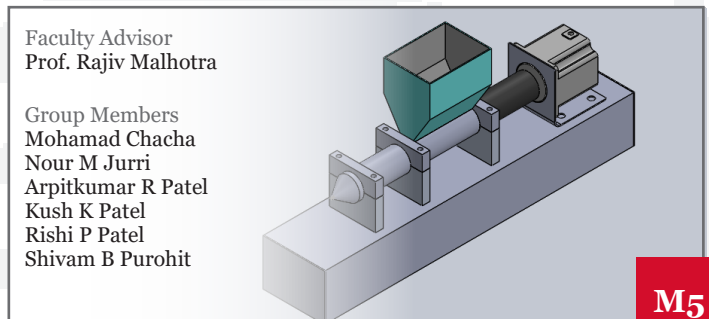
Faculty Advisor  
Prof. Aaron Mazzeo

Group Members  
Peter J Innis  
Thomas K Jakositz  
Chris P Murphy  
Ron Peleg  
Brandon M Stiffler

M1

The detachable propulsion unit allows surfers to wirelessly communicate to their surfboard in order to achieve the right amount of power to catch any wave that they would like to surf.

## FILAMENT EXTRUDER FOR THERMOPLASTICS AND METALLIC MATERIALS



Faculty Advisor  
Prof. Rajiv Malhotra

Group Members  
Mohamad Chacha  
Nour M Jurri  
Arpikumar R Patel  
Kush K Patel  
Rishi P Patel  
Shivam B Purohit

M5

A filament extruder that will extrude filament of increased strength by having the capability to intake and mix Polyactic acid with metal powder material. The filament should be produced at a rate of 2 lb/hr.

# DESIGN AND MANUFACTURING PROJECTS

## DRILL PRESS CONVERSION KIT TO CNC MILL



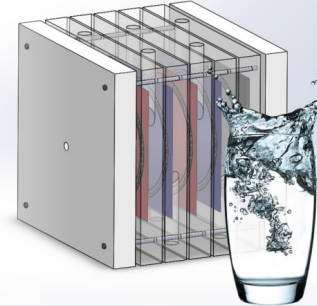
Faculty Advisor  
Prof. Assimina Pelegri

Group Members  
Johan D Alarcon  
Jiahao Lu  
Andrea Olarte  
Anthony M Tenorio-Coronel

P1

An existing stock drill press converted into a soft material cutting CNC mill for low-cost entry into the industrial sector.

## ELECTRODIALYSIS FOR WATER DESALINATION



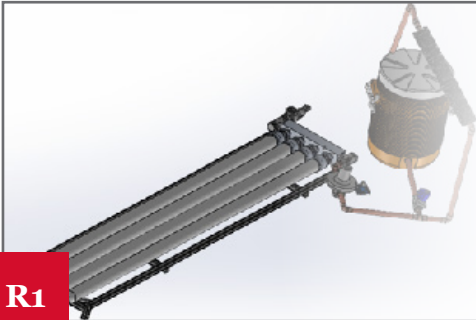
Faculty Advisor  
Prof. Jerry Shan

Group Members  
Elizabeth A Bui  
Andrew S Koshy  
Matthew R Lange  
Damian Modzelewski  
Gabrielle M Nagrowski  
Aasvi F Shah

S2

This device is designed to desalinate water via electrodesalination using ion-exchange membranes. A lab-scale stack is constructed with a supplemental discussion of scalability.

## STEAM GENERATING SOLAR COLLECTOR



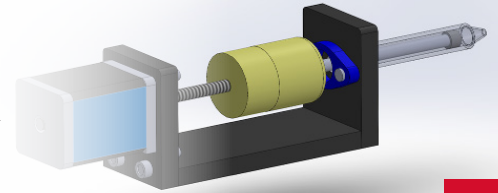
Faculty Advisor  
Prof. Todd Rossi

Group Members  
Nafis Choudhury  
Lauren R Dimperio  
Jeff M Eshak  
Justin M Graff  
Jared T Janowsky  
Amarjit Singh

R1

By using gravity instead of a pump, we are creating a more household friendly solar collector for heating the air and hot water in homes while reducing power requirements of the system.

## ELECTROSTATIC SPRAY AUTOMOTIVE SCRATCH ELIMINATOR



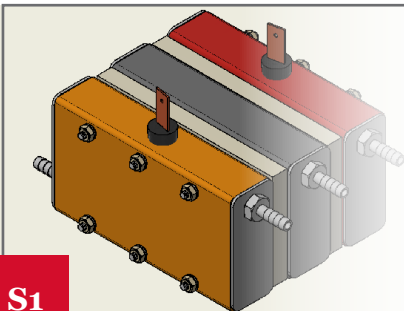
Faculty Advisor  
Prof. Jonathan Singer

Group Members  
Jake A Ari  
Alex Bogut  
Andro H Mikhaeil  
James D Wu  
Peter L Yannella

S5

We have designed an all in one, user friendly, electrostatic car scratch spray remover, giving a wide range of consumers the ability to repair small to medium sized scratches at an affordable price.

## STACKABLE, SCALABLE BLUE ENERGY



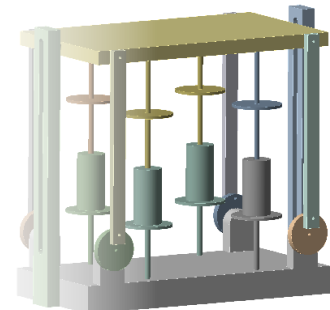
Faculty Advisor  
Prof. Jerry Shan

Group Members  
Alyanna V Argueza  
Hank C Huang  
Jeshua Rodriguez  
Kenneth R Wang

S1

Focusing on an underutilized source of power taken from the salinity gradient between fresh and saltwater, this project uses ion selective membranes to passively separate positively and negatively charged particles to generate electricity.

## ELECTROSTATIC SPRAY AUTOMOTIVE SCRATCH ELIMINATOR



Faculty Advisor  
Prof. Stephen Tse

Group Members  
Marco A Castro  
Minhyung Jeong  
Zharrae Vaughn

T1

The future of research pertaining to the benefits of equine related therapy as well as the future of horse racing training

# DESIGN AND MANUFACTURING PROJECTS

## SINGLE STEP STAIR CLIMBER



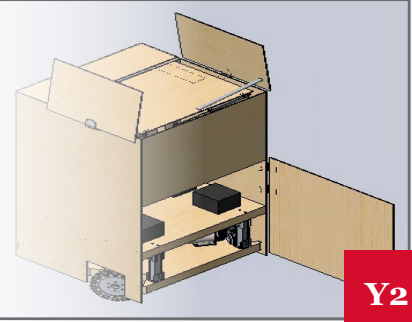
Faculty Advisor  
Prof. Stephen Tse

Group Members  
Anthony Dargis  
Armando E Lizardo  
Max E Shippe  
Kevin W Weinreich

T2

An add-on for wheelchairs that allows wheelchair users to overcome a single step without the assistance from another person to access areas without handclapped access

## AUTONOMOUSLY NAVIGATING DELIVERY ROBOT



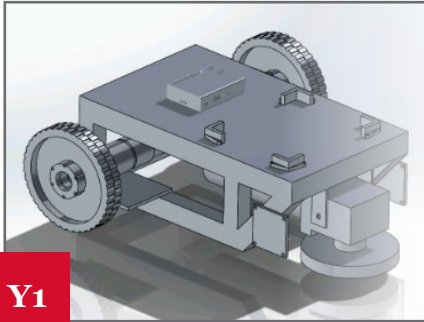
Faculty Advisor  
Prof. Jingang Yi

Group Members  
Bhumit A Patel  
Chetan M Patel  
Pablo A Vasconez  
Graham P Watson

Y2

The autonomously navigating robotic delivery system is a robot that is equipped with a lift mechanism for the contents being delivered. The primary use will be for hospitals to reduce the workload of healthcare staff.

## AUTONOMOUS GRINDING ROBOT



Faculty Advisor  
Prof. Jingang Yi

Group Members  
Evan R Eldemachki  
Rahat M Islam  
Subhash J Kungumaraj  
Justin T Newman  
Hiroumi Okamura

Y1

The primary objective of this project was to design and develop a fully functioning concrete floor grinding robot capable of autonomous self navigation and self locomotion using camera imaging and on board computer.

## A ROBUST FLEET OF GROUND ROBOTS AND DRONES FOR FOREIGN TERRITORY EXPLORATION

Faculty Advisor  
Prof. Qingze Zou

Group Members  
Daniel S Banas  
Christian S Cendejas  
Alex Cruz  
Zachary S Hassel  
Dean Y Khulusi  
Miguel E Luna  
Priya Patel



AEROSPACE  
DESIGN PROJECT

AE Z4

Fleet of ground robots and drones designed to explore unknown environments, with the purpose of finding, locating, and confirming resources for life.

### Cover Photos

All group members listed left to right, top to bottom.  
Front top left: Christianna Kuznetsova  
Front top right: Nyles Gamble  
Front bottom left: Jenna Wendt  
Front bottom middle: Andrea Olarte  
Front bottom right: Chad McClelland  
Front inside left:  
Front inside top right: Anthony Rodrigues  
Front inside bottom right: Graham Watson, Bhumit Patel, Chetan Patel, Pablo Vasconez  
Back inside bottom left: Kevin Weinreich  
Back inside bottom right: Kenneth Wang  
Back: Brandon Stiffler, Thomas Jakositz

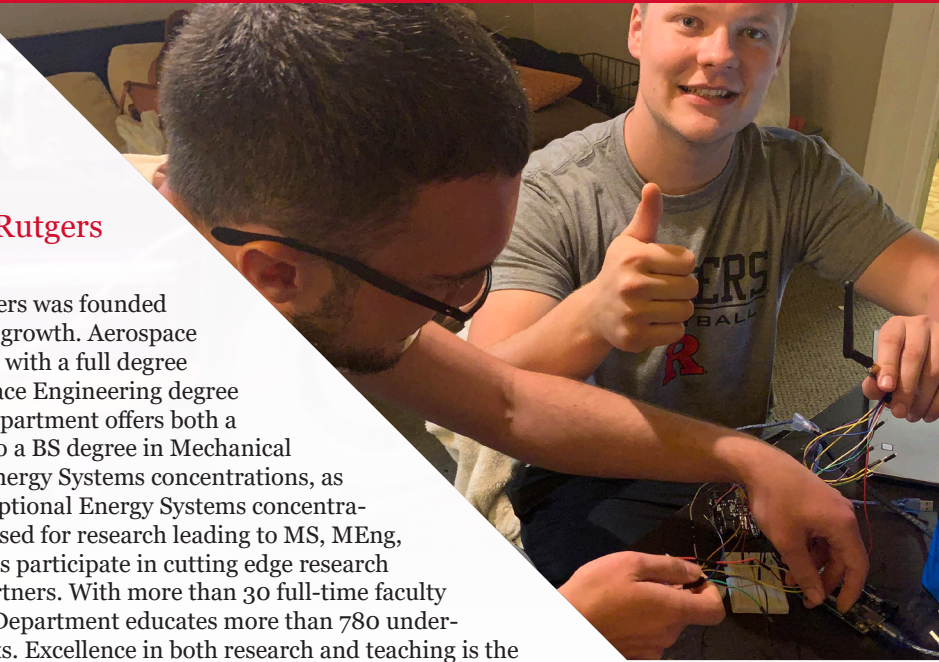


**RUTGERS**

Mechanical and Aerospace  
Engineering

## Mechanical & Aerospace Engineering at Rutgers

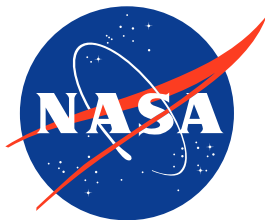
The Department of Mechanical Engineering at Rutgers was founded in 1908 with a focus on driving the country's industrial growth. Aerospace Engineering was added in 1965 as a certificate program with a full degree program established in 2015. It is now the only Aerospace Engineering degree offered among New Jersey's public universities. The Department offers both a standard Mechanical Engineering curriculum leading to a BS degree in Mechanical Engineering with optional Aerospace Engineering or Energy Systems concentrations, as well as a BS degree in Aerospace Engineering with an optional Energy Systems concentration. The Department has state of the art laboratories used for research leading to MS, MEng, and PhD degrees. Undergraduate and graduate students participate in cutting edge research funded by federal and state agencies, and industrial partners. With more than 30 full-time faculty members, the Mechanical and Aerospace Engineering Department educates more than 780 undergraduate students and more than 200 graduate students. Excellence in both research and teaching is the top priority for our faculty.



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Mission Systems



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**Dr. Sai K. Doddi**  
**Edward F. Dundon**  
**Floyd R. Emmons**  
**Gerald L. Feder**  
**Cadrin E. Gill**  
**Paul R. Gustin**  
**Allyson E. Kovacevich**  
**John A. Laucius**  
**William H. Lawrence**  
**Jiaming Li**  
**Anthony P. Meehan**  
**Gaurav Misra**  
**Thomas Modzelewski**  
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