Towards Autonomous Drones Guidance Using Computer Vision

Students: Anthony Russo, Thomas Romeu, Haris Alam
Faculty Mentor: Mohammed Alabsi
1. Identifying Psychological and Social Reasons for a Depressed Mood among Disadvantaged Mothers of Childbearing Age

2. Assessing the Climate of Inclusivity and Acceptance of Diversity at the School of Nursing Health and Exercise Science

Tamara Rene
Invisibility & Teleportation

Starlin Regalado-Nunez
Biokinesis & Telepathy

Rahshida Atkins, PhD, MSN, RN, APN-C
Flight & Immortality
Technical title: Molecular simulations of biomolecular systems
Layperson title: Researchers telling computers to tell atoms what to do

Zach Alseika
Playing ukulele

Noor Grewal
Boating

Vani Lorish
Eating food

Ifrah Malik
Mind-reading

Cassi McDermott
Eating food

Joe Baker (mentor)
Simulating molecules, playing the violin
The Transition from Infertility to Motherhood

Student: Ellie Kerhin
Faculty Mentor: Jessica Barnack-Tavlaris
Using fancy math to reduce computer simulation time by over 2,500%!

(MUSE Title: A polynomial chaos approach for predicting swimming performance)

Anna Dorval, Mathemagician (rising 4th year Math major)
Nick Battista, Nerd (Math & Stats faculty)
Understanding Bond Degradation Between Fiber Reinforced Polymer (FRP) Strengthening and Concrete due to Freeze-Thaw Cycling

How Many Times can Iceman Freeze Adhesive-X?

Hayley Conway - rising Senior civil engineering major; glows

Dr. Andrew Bechtel Civil engineering Dept. Shovels well
Curriculum Development in Support of Gallery Diversification

Featuring *The Usual Suspects*, work by Carrie Mae Weems

Megan Healey & Olivia Williams
Dr. Carolina Blatt & Dr. Lois Fichner-Rathus
Forecasting Performance Changes of Natural Language Processing Systems during Active Learning

Robert Helck
Humza Zaki
Dr. Michael Bloodgood
Justice & Blameworthiness:
Parental Demographics and the Criminalization of Hot Car Deaths

Look Before You Lock!

not a movie title
(but good to remember if you have kids or pets in your car)
#PassTheHotCarsAct

Super Sociologists?...

Cameron Keating: drafting long treatises in a single sitting
Jordan Ekstrom: adapting swiftly to new perspectives
Dr. Liz Borland: making structure out of chaos
Pedestrian Performance Metrics Derived from Connected and Automated Vehicle Data

‘How Well is Traffic Flowing?’

David Cardenas - Sophomore
Christopher  - Junior
Alexa Karpus - Senior

Tom Brennan, Prof. Civil
Design and Development of a Portable Muscle Fatigue Monitor

Are your muscles spent, or are you faking it?

Amanda Dias & Sebastian Winter

Brett F. BuSha
Effects of habitat degradation on songbird physiology and behavior

Are roads bad for birds?

Isaac Gutierrez: flight
Luke Butler: telekinesis
Culturally cognizant literacy education in a globalizing world.

LINGUISTIC AND CULTURAL DIVERSITY AS A CLASSROOM RESOURCE

Teresa Folan  Superpowers include bilingualism and biculturalism

Dr. David Bwire  Superpowers include multilingualism and multiculturalism
Exotic Topological States in Magnetic Systems: Higher Order and Deformed Skyrmions

Mentees: Pierce Wickenden, Brennan Neubauer
Mentor: Dr. Daniel Capic
Studies of Honeysuckle Morphology, Genomics & Herbivory

The Honeysuckle Collective presents:
HONEYSCULL ODYSSEY: THE ADVENTURES OF UNDERSTANDING THE POWER AND DIVERSITY OF HONEYSUCKLES ACROSS THE PLANET!

Anna
Making my lab laugh

Robby
Getting up Early

Siya
Star Wars Encyclopedia

Dr. Clement
Plant Whisperer
Project Title: “Health Education as A Strategy To Enhance The Quality Of Life Of Older Adults, Their Families And Caregivers Affected By Covid-19 In Trenton Area, NJ”

Title for Layperson: Improving Life-Quality of Older Adults

Dr. Souza
It is not how long life is but the quality of our life

Kelly Maneri
Leading from within; making quick decisions
Exploring Barnacle Exoskeleton Development and Materials Properties as a Function of Growth Environment

or

Metamorphosis: Swimming bug to super shell

Phylicia Menendez
Angela Mo
Raegan Gautam
Kirthana Krishnamurthy
Dr. Gary Dickinson
Technical title: Designing a Mass Spectrometric Assay to Detect Ytfe Adducts from a Chelator Fragment Library

Layperson title: Finding Something that Sticks to this Protein

Coco Peddinti
Winning at air hockey, karaoke, getting out of escape rooms.

Justin Martinez
Picking things up and putting them back down (weightlifting), rambling about random science topics.

Cristian Herrera Alpizar
Understanding calculus but needing a calculator for 23+49, competitive swimming.

Levi Ekanger (mentor)
Guessing who reviewed a manuscript, rollerblading over small sticks and stones without falling.
Investigation of key questions in bacterial genetics using a soil bacterium

Adventures in Bacterial Genetics!

Emily Behnke: Excellent at picking Tupperware for leftovers!
Omar Halim: Able to lift heavy weights & decode entire genomes!
Sean Siniscalco: Remembers insanely specific but utterly irrelevant things!
Dr. K.T. Elliott: Pipettes at the speed of lightning!
Monocyte-derived Microparticles in Thrombosis

*in other words*…

How do Microparticles Contribute to Blood Clots?

Microparticles = microvesicles with a clotting factor

Student: Jessica Longstreth
Superpowers: fluid dynamics enthusiast, baker in free-time

Faculty: Dr. Constance Hall
Superpowers: thrombosis and fluid dynamics expert
Virus-inspired transfection of a marine alga: plasmid DNA within a viral envelope

(A sheep in wolf’s clothing: helpful genes wrapped in a virus coat)

Beth
Can solve a Rubik’s cube!

Meghna
Can binge any sitcom in no time!

Samielle
I can make desserts disappear!

Dr. Hirsh
Cooks a perfect hard-boiled egg!


https://capeodd.com/sheep-wolfs-clothing/
Climate Change and its impact
On Water Resources Engineering

Isabella Lamboy, rising junior civil engineering
John McElroy, rising junior civil engineering

Michael Horst, Associate Professor of Civil Engineering
Enhancing the Sensitivity & Selectivity of a 3D Sensor for Direct Nitric Oxide Detection from Cultured Cells (Sensors for Cellular Espionage)

José de León González
Slightly stretchier than average skin

Nikolas Romano
Holds the world record for Fastest Time To Eat Three Rice Krispies Treats

Angela Thomas
professional victim of gravity

Dr. Rebecca Hunter (mentor)
instrument whisperer, unintentional memorizer of random song lyrics and other useless information
Well siblings of a child newly diagnosed with type 1 diabetes: The sibling’s perception

How does the sibling view the diagnosis and how does it holistically affect the individual?

Student: Sarah Curtis
Faculty: Dr. Tami Jakubowski

My superpower: Ability to empathize
My superpower: Listening
Focussing on how to manage/prevent osteoporosis development in this population specifically through dietary methods.
Title: Enhancing the Bandwidth and Miniaturization of Microstrip Antennas for 5G Communications and IoT Applications

Layperson Title: Improving Antennas for 5G Communications and IoT Applications

Benjamin Winkler
Super Power: I can freeze the time!!

Nicholas Alvear
Fun fact: Length of Africa is longer than the diameter of Mercury!!

Talha Murad
Super Power: I can emit and receive radio waves!!

Dr. Khan
Super Power: Horse Riding, Biking, Kayaking
Development of Stabilization and Speech Recognition Algorithms using Nao Robots

Team 1 (Rising Juniors)
Samantha Potomic\textsuperscript{2} and Jack Marble\textsuperscript{2}

Team 2 (Rising Sophomores)
Rebecca Kimmick\textsuperscript{1} and Shawn Kushner\textsuperscript{2}

Faculty Mentor: Dr. Seung Kim

Dept. of Electrical\textsuperscript{1} and Computer\textsuperscript{2} Engineering
Voices of Asian American Teachers: Exploring Intersections of Racial and Professional Identities through Phenomenological Interviews

aka

“What do Asian American Teachers have to say about their lives and teaching?”

Rachel Lee (Superpower: Teleportation)

Dr. MinSoo Kim-Bossard (Superpower: Empathy)
Technical Title: A Novel Connection Between $[\text{PSI}^+]$ Prion Formation and RNA Splicing in *Saccharomyces cerevisiae*

Marvel Title: Do shape-shifting proteins aid yeast survival??

Student: Audrey Riccitelli  
**Super powers:** pouring plates; super-artist; EMT (savior of the people!)

Faculty: Dr. Tracy Kress  
**Super powers:** yeast “frogging”; traveling; geeking out to Stranger Things
Multiwavelength Census of Active Supermassive Black Holes In Shocked Post-Starburst Galaxies

Layperson Title: Black hole brightness in galaxies that “just” stopped forming stars using telescopes

Students: Amanda Graessle, Louis Miller, and Dean Klunk

Faculty Mentor: Dr. Lauranne Lanz

1 Recently, astronomically speaking, means in the last billion years!
Effects of Space Radiation Exposure on Bone Strength

Dr. Anthony Lau, Alexandra Stibler, Nicholas Cavallero, Gilberto Torres

Armed Forces Radiobiology Research Institute

NASA

Collect Bones

Space Radiation

Quantitative MicroCT Imaging

Computational FE Models

Biomechanical Testing

Structural

Material
Official Title: Neural Measures of Fluency and Disfluency During Recognition Memory

Layperson title: How does perception alter remembering?

Student: Sam Sawhney
Faculty Mentor: Andy Leynes
FAOMeT Gene Expression in *Carcinus maenas* in Response To Salinity Changes

Layperson Title: How crabs regulate salt levels in their blood when salinity in seawater changes.

Luctamuelle (Lucta): Speed reading novels, loving animals

Rachel Lea: Smiling, Baking

Kiandry Minaya: Going to the gym, socializing

Don Lovett: Photography, cooking
Searching for life on Tatooines, around black holes, and in closely-packed solar systems

Characterizing the orbits, atmospheres, and habitability of dynamically unique exoplanets

Skylar D'angiolillo: exoplanet atmospheres
Ashley Fernandez: compact planet orbits
Michael Pedowitz: circumbinary planets
Mike Polania: black hole planets

Faculty mentor: Dr. Mariah MacDonald
Pathways to Reentry: Examining Perspectives of Returning Citizens Navigating Life After Prison

What are the experiences of individuals returning from prison in New Jersey in their own words?

Faculty Mentor: Dr. Michael B. Mitchell, Superpower: “Human food disposal”

Student Collaborator #1: Angie Tamayo-Leon, Superpower: “Chancla shooter”

Student Collaborator #2: Irvin Echeverria, Superpower: “Heightened recall”
Delaware River

Student Collaborators
Liz Stahl and Brianna Titus

Faculty Mentor
Elizabeth Mackie
Developing sustainable approaches to fuels and chemicals

MUSE title: Developing Improved Ruthenium and Palladium Catalysts to Degrade Plastics
Team Plastics Recycling

Iron Catalysts for CO₂ Reduction
Team CO₂

Angelica Bolon
Rising junior
Chemistry Major
MUSE
Positivity and Modesty

Yaa Serwaa Awuah
Rising sophomore
Chemistry Major
MUSE
Resilient

Alyssa Minnella
Rising senior
Chemistry Major
Making people smile

Sai Dhulipala
Rising Junior
Chemistry Major
MUSE
Strength and Tenacity

Mubarak Rawe
Rising sophomore
Chemistry Major
Sherman Fairchild
Translating French

Abby O’Connor mentor
Chef extraordinaire
Children of the Midnight Sun: The Hip Hop Saga

Dr. Lisa Ortiz-Vilarelle: Master of the Mystic Arts, Sorcerer Supreme

Cesar Gonzalez: The Legendary Iron Fist, Son of K’un - Lun
Targeted Cost-Effective Protein Variant Library Design

*a.k.a*

How to build billions of protein variants when you feel super stingy

<table>
<thead>
<tr>
<th>Participant</th>
<th>Super power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yehuda Binik</td>
<td>Heat vision (can use laser pointer)</td>
</tr>
<tr>
<td>Faiza Hoque</td>
<td>Telekinesis (asks politely to bring her something)</td>
</tr>
<tr>
<td>Dimitris Papamichail</td>
<td>Mind reading (knows when students are bored during lecture)</td>
</tr>
</tbody>
</table>
PROJECT AND LEARNING PLAN FOR VISUALIZING ACROSS BOUNDARIES

MARVEL UNIVERSE: WAKANDA

DR. KIM PEARSON AS QUEEN RAMONDA

FAITH CHRISTIAN AS SHURI
Juggling with more than two particles: Biomimetic studies of multi electron-proton transfers.

Saptarshi Dutta  
(Coolest Transition Glasses)

Tanay Parnaik  
(Does Chemistry with Style)

Gio Parada  
(Can’t Juggle but sings in the lab)
Probing Secondary Student Attitudes About Physics

or...

Why do students hate physics so dang much?

Student: Joey “The Tinkerer” Sabatino

Mentor: AJ “The Setup Man” Richards
Official Title: Toward Understanding of Virtual Reality Sickness in Children

Layperson Title: Does children get sick in VR?

Students: Paula Arroyave
Elliot Topper
Andrew Michael

Faculty Mentor: Sharif Mohammad Shahnewaz Ferdous
Examining the role of CYP72 enzymes in maize and Arabidopsis biochemical and growth responses to environmental stress

OR

How do CYP72s modify plant growth and biochemistry in response to stress?

Ellie Kreider: adept transplanter, Mrs. Maize
Shreya Ranadive: gel sculptor
MaryAngela Senter: PCR master, super cool
Leeann Thornton: biochemist, plant wrangler, gene investigator, mentor
Can individual responses to environmental variation contribute to the formation of new species?

-or-

Can differences in how you grow up help cause new species to form?

Neel Patel – Superhuman Sleeping
Sathya Rameshkumar – Superhuman Problem-solving
Matt Wund – Superhuman Punctuality
Identification and characterization of regulatory genes of corn (Zea mays) defense responses

or simply:

The search for maize defense genes

Dr. Woldemariam  Kruti Patel  Ryan Pagnilo
A Data Visualization Experience for Preservice Teachers (ADVizE): Analyzing Undergraduate Data

Analyzing Data from an Undergraduate Workshop Series Focused on Data Visualization

Dr. Melissa Zrada

Druscilla Kojiem
Super power(s):
- Super Big Appetite
- Super Big Heart
- Super Talkative