

congratulations
class of 2015

*Thanks to the greatest
mother Um Falah<3*

Shaymaa Abdulla



*Thank you to my parents and my sister
for all their support and guidance, and
to all my family and friends, for keeping
me sane over the past 4 years*

Aman Aberra



ASU has given an amazing and irreplaceable experience. My experiences have granted me various priceless opportunities that I am greatly thankful for.

Edward Acquah



I would like to thank my family and friends for their support these last couple of years. I would also like to thank my professors for their guidance.

Matthew Ryan Adame





Headphones

Yong Che He

***Thanks mom and dad for all
your support! I couldn't have
done it without you two! Love
you lots!***

Anngela Christina Adams



I would like to thank my family for their support throughout my college career. I wouldn't be here without their encouragement.

Raj Ahir



***Thank you Mom, Dad, my little
Brother and all of my friends for
supporting me to come this far.***

Mamun Ahmed



***Thank you my wonderful
wife, Maria.. LOVE YOU!***

Bradley Ailor





Thank you to my parents for all of your support but mostly to my wife and sons. Thank you for helping me through.

M. Bryce Albretsen



***Dear Family,
I want you to know how much I appreciate
all of the time and energy you put into
helping me throughout my college career.
I Love You All***

Ziyad Alhassnah



***AZ is My 1st USA State, and ASU is
the one and the only one who I will
be admiring the most for my life.***

Abdulaziz Ahmed N Alhuwaymil



I have learned so much during my time at ASU and none of it would have been possible if not for my family and friends' support. Love you all!

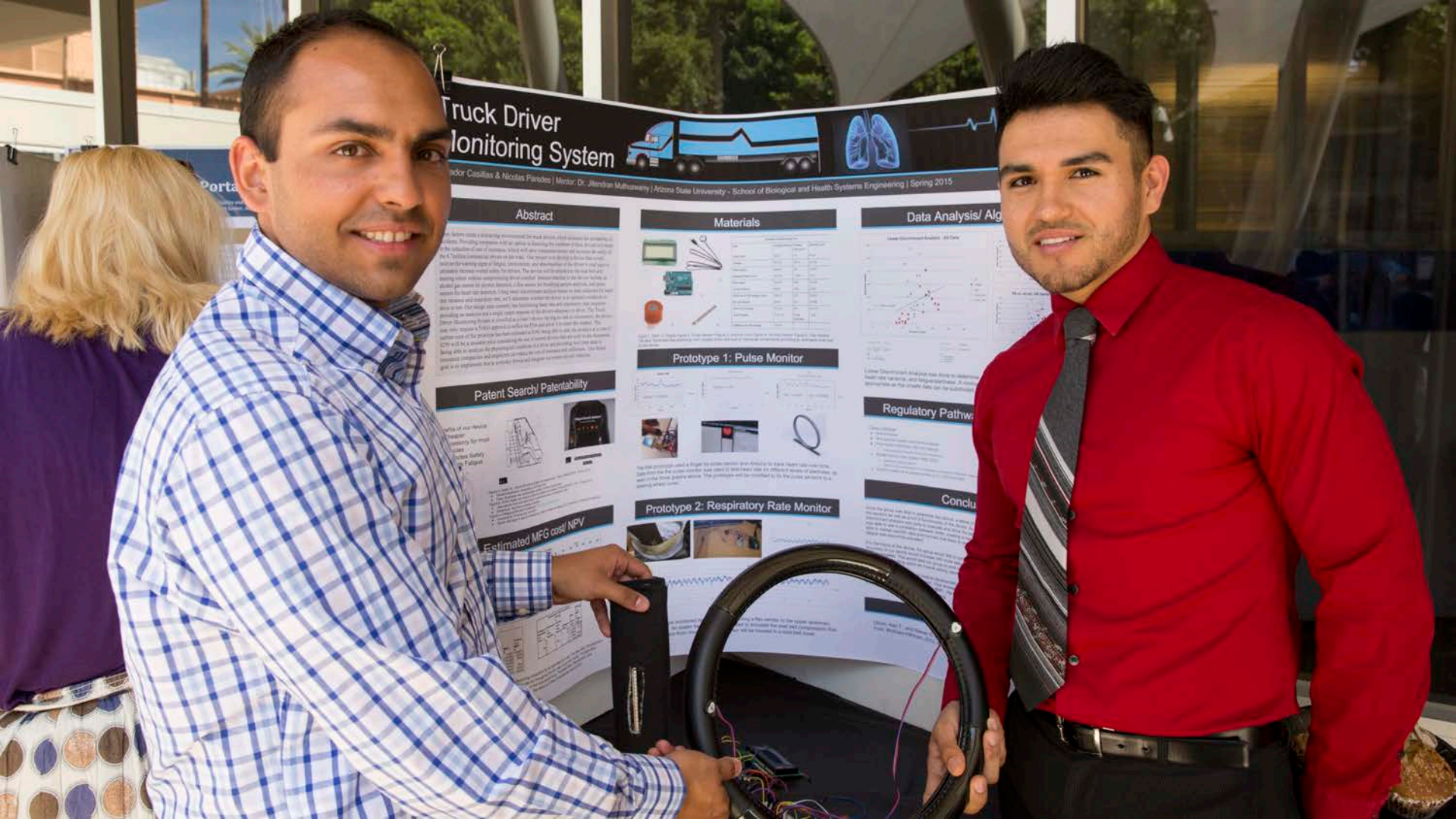
Jason Kenneth Allen



*I want to give a big thanks to
my parents for always
motivating me to my success.*

Sara Almalih





Truck Driver Monitoring System

Advisor: Casillas & Nicolas Pardebe | Mentor: Dr. Alondra Muthazawiy | Arizona State University - School of Biological and Health Systems Engineering | Spring 2015

Abstract

Before such a demanding environment the truck driver, which consists of operating a vehicle, the truck driver's attention is not on keeping the vehicle steady. In fact, it is on the job of the driver to keep the vehicle steady. The system is designed to detect the driver's attention level by using a camera to monitor the driver's eyes. The system is designed to detect the driver's attention level by using a camera to monitor the driver's eyes. The system is designed to detect the driver's attention level by using a camera to monitor the driver's eyes.

Materials

Materials used in the system include a camera, a microcontroller, and a sensor. The camera is used to monitor the driver's eyes, the microcontroller is used to process the data, and the sensor is used to monitor the driver's pulse.

Data Analysis/ Alg

The data analysis algorithm is designed to detect the driver's attention level by using a camera to monitor the driver's eyes. The algorithm is designed to detect the driver's attention level by using a camera to monitor the driver's eyes.

Patent Search/ Patentability

The patent search process is designed to detect the driver's attention level by using a camera to monitor the driver's eyes. The patent search process is designed to detect the driver's attention level by using a camera to monitor the driver's eyes.

Estimated MFG cost/ NPV

The estimated manufacturing cost and net present value are calculated based on the system's components and the market demand for such a system.

Prototype 1: Pulse Monitor

The pulse monitor prototype is designed to detect the driver's pulse by using a sensor. The pulse monitor prototype is designed to detect the driver's pulse by using a sensor.

Prototype 2: Respiratory Rate Monitor

The respiratory rate monitor prototype is designed to detect the driver's respiratory rate by using a sensor. The respiratory rate monitor prototype is designed to detect the driver's respiratory rate by using a sensor.

Regulatory Pathway

The regulatory pathway is designed to detect the driver's attention level by using a camera to monitor the driver's eyes. The regulatory pathway is designed to detect the driver's attention level by using a camera to monitor the driver's eyes.

Conclusion

The conclusion of the project is that the truck driver monitoring system is a viable solution for detecting the driver's attention level and preventing accidents. The system is designed to detect the driver's attention level by using a camera to monitor the driver's eyes.

*I truly could not have made
it here today without all of
your love and support*

Saleh Mutair Almutair



*i wouldn't even dream of
being here if it wasn't for
my beloved family! <3*

Abdulaziz Al-Tamimi



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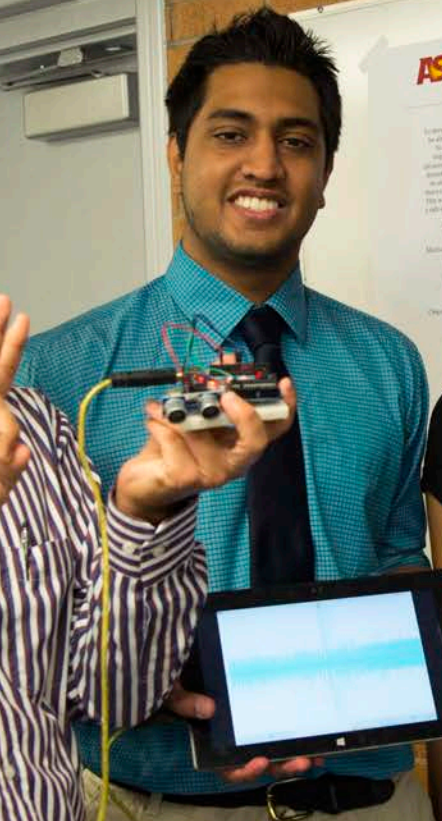
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Thank you for everything you've done for us Mom. I love you more than you could ever know! Diego, you're pretty cool too dude. I guess I love you too.

Antonio Alvarado



EXIT



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Introduction

Background information... This device is designed to detect... and... in a... field...

Motivation and

Background information... This device is designed to detect... and... in a... field...

Technical Details

Background information... This device is designed to detect... and... in a... field...

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Design

Supply Voltage	5V DC
Current	15 mA
Frequency	60 Hz
Resolution	0.01
Accuracy	±2%
Dimensions	41 x 20 x 15 mm



$$V_{out} = V_{in} \cdot (1 + \frac{R_2}{R_1})$$

Results

- Working Device Achieved
- restricted range of 1.00 cm
- angle of 90°
- Scanner Range Potential
- meter in plane field.
- Accuracy achieved over 90°
- in a single scanner model.
- perfect 1 up-to second direction
- plane.



I would like to thank my friends and family for all the love and support I have gotten. I could not have done it without them.

Bailey Ammons



*A special thank you to my parents, Mr. & Mrs. Mahdi Al-Ansari. You supported me through thick and thin and I appreciate it!
I love you!!!*

Ahmed Mahdi Ansari



*Thank you to my mom & dad for
supporting me in all my dreams &
aspirations & for always believing in me.
I love you both!*

- Camille Armendariz

Camille Armendariz



***Congratulations and Thank You to My
Parents. Two kids down, one to go!
Thank you for everything you have
given us, love, support, and funding ;)***

Alexander Arveson





ASU engineering
SEAN HOWARD

Objective: Investigate the

Background:
Experiments investigate
real-time audio feedback
prosthetics, proving effective
object discrimination and
determining position of fo



Thank You to all my family and friends for the support and motivation to finish my degree, especially my Mom, Dad, and Brother.

Daniel Ascencio



Thank you J.T. Austin, Jacey Austin, Brock Austin, and Melissa for all your love and support! I love you all!

Charles Barry Austin



ASU changed my world by making me realize how vast and diverse it is. Thank you ASU for being the biggest and most diverse college in the U.S.

Shayan Azimi



*To the family and friends who
endured me during my teenage
years, and school years, the
biggest thank you!!*

Kale Aziz



Thank you Irene, Hunter and Reese for all of your support and understanding during this journey. I couldn't have done it without you. I love you!

Cecil Otto Baird





ASU Arizona State University
engineering
ARIZONA STATE UNIVERSITY
Shi-Kang Lin
Mechanical

I'm so lucky to have a supportive family as I pursue higher education. Shout out to my grandparents who made a special effort to be here. Love you all!

Lindsey Baker



***Thank you Papa and Mama
Carmen y Armando
Baldenegro***

Armando Baldenegro



***Thank you to all my family
and friends for all of the love
and support. I love you!***

Amy Lynn Baldwin



***"It's All About Choices" -Troy
Bales***

KCCO

Jeffrey Robert Bales





Diagnostic Kit for Disease Detection Using Antibody Conjugated Gold Nanoparticle Microspheres

Cameron Gardner^{1,2}, Alysia Alexander¹, Chiao May Lee¹, Antonio Garcia¹, and Karmella Haynes¹
1. ASU School of Biological and Health Systems Engineering, 2. ASU W.P. Carey, Tempe, AZ

Abstract
The development of a diagnostic kit for disease detection using antibody conjugated gold nanoparticle microspheres (AuNP-Ab) is a promising technology for point-of-care diagnosis. This project aims to develop a portable, low-cost diagnostic kit for disease detection using AuNP-Ab. The kit will consist of a handheld device that can detect the presence of a target antigen in a sample. The device will use a colorimetric assay to detect the presence of the target antigen. The kit will be used to detect the presence of a target antigen in a sample. The kit will be used to detect the presence of a target antigen in a sample.

Product Design
The diagnostic kit will consist of a handheld device that can detect the presence of a target antigen in a sample. The device will use a colorimetric assay to detect the presence of the target antigen. The kit will be used to detect the presence of a target antigen in a sample. The kit will be used to detect the presence of a target antigen in a sample.

Estimated Manufacturing Cost per Unit

Component	Quantity	Unit Cost	Total Cost
AuNP-Ab	1000	\$0.10	\$100.00
Handheld Device	1	\$50.00	\$50.00
Reagents	1000	\$0.05	\$50.00
Packaging	1000	\$0.05	\$50.00
Shipping	1000	\$0.05	\$50.00
Total			\$300.00

Results and Conclusion
The results of the diagnostic kit are shown in the figure. The kit was able to detect the presence of a target antigen in a sample. The kit was able to detect the presence of a target antigen in a sample. The kit was able to detect the presence of a target antigen in a sample.

Discussion and Future Plans
The diagnostic kit is a promising technology for point-of-care diagnosis. The kit is a promising technology for point-of-care diagnosis. The kit is a promising technology for point-of-care diagnosis.



Development of High Affinity Single-Chain Variable Fragments for Traumatic Brain Injury

Colleen McHale, Amanda Wittens, Daniel Aerts, Susan...
School of Biological Health Systems Engineering, Arizona State University

Introduction
Traumatic Brain Injury (TBI) is a leading cause of death and disability in the United States. The development of high affinity single-chain variable fragments (scFvs) for TBI is a promising technology for point-of-care diagnosis.

Methods
The scFvs were developed using a phage display library. The scFvs were screened for their ability to bind to a target antigen. The scFvs were screened for their ability to bind to a target antigen.

Results
The scFvs were able to bind to the target antigen. The scFvs were able to bind to the target antigen. The scFvs were able to bind to the target antigen.

Conclusion
The scFvs are a promising technology for point-of-care diagnosis. The scFvs are a promising technology for point-of-care diagnosis. The scFvs are a promising technology for point-of-care diagnosis.

Thank you to all my family and friends. I wouldn't have been able to make it without you all.

Matthew Ryan Banuelos



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***My family and friends for all
of their support***

Raul Hernandez Barbosa



***The light at the end of the tunnel
is no longer an on coming train,
but rather a whole new world to
explore! Thanks for everything.***

Bryan Robert Barchey





***Gracias por todo el apoyo!
Los quiero mucho!***

Jeanette Rosas Barillas



My time spent here at ASU has been an absolutely incredible experience. I owe my success and happiness to the loving support of my friends and family.

Andrew Robert Barkan



I would like to thank my Mom and Dad for supporting me throughout everything. They have been my role models and I could not have asked for more.

Trevor Michael Barker



*I would like to thank my family, friends,
and colleagues for their kindness and
support throughout these past four
years at ASU. You're the best.*

Sylvia Barnai



*Family INSPIRED me.
Friends ENCOURAGED me.
Faith CARRIED me.*

Sharon Arlene Bast





OPTIMIZED HUMAN-THERMAL COMFORT FOR DESIGN AND ANALYSIS OF HYBRID ELECTRIC POWERING VEHICLE
Samantha Fay, ASU Engineering, School of Sustainable Engineering and the Built Environment, Tempe, AZ

Abstract
Human factors research studies are becoming the critical design consideration for all commercial transportation vehicles. Both driver and passenger thermal comfort is a key consideration in the design of vehicles. Designing the human-machine interface for the vehicle is a key consideration in the design of vehicles. The goal is to provide the operator with a comfortable and safe environment for the vehicle. This research is focused on the design of the human-machine interface for the vehicle. The goal is to provide the operator with a comfortable and safe environment for the vehicle.

Research
The research is focused on the design of the human-machine interface for the vehicle. The goal is to provide the operator with a comfortable and safe environment for the vehicle.

Conclusion
The research is focused on the design of the human-machine interface for the vehicle. The goal is to provide the operator with a comfortable and safe environment for the vehicle.

References
1. ASU Engineering, "Human Factors Research," 2018.
2. ASU Engineering, "Human Factors Research," 2018.

ASU engineering
Samantha Fay
ASU Engineering, School of Sustainable Engineering and the Built Environment, Tempe, AZ

ASU engineering
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Thanks family, friends for your support throughout all these years. Your positive encouragement has meant a lot. Especially my wife Lauren. I love you.

Isaac Adrian Bates



My Bateson Family is the reason I'm here today. I would not have been able to without your infinite love and support.

Amanda Marie Bateson



***Thanks for all your support
Mom, Dad, Megan, and
Jess.***

Joshua Peter Befort



My experience:

#PvWest #SigEp

#Puppy #SwitchedMajorTwice

#VictoryLap #ByeASU

#ThanksMom

Timothy Stephen Belda





Built In Self Test for STAR Communication

Scott Korman, Josh Gilbert, Steve Straker, Ryan Ebbel
Mentor: Jerome Korman and Suk Goh

In a typical communication system, modulation techniques are used to embed message signals at different wavelengths in time or at different frequencies. Simultaneous transmit and receive (STAR) is a more efficient alternative where communication can take place at the same time and frequency.

Retrieved signals are only small relative to transmitted signals. This "sniffing" introduces a unique challenge. The low power received signal must be distinguished from the high power transmitted signal. One method for doing this is by subtracting the transmitted signal from the overall received signal in order to see the incoming low power signal.

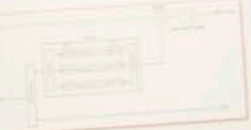


Figure 1 - Built-in self-test system

Applications Include:

- Wireless Network Towers
- Disables Wireless Capacity
- Reduce frequency spectrum needed
- Greatly Reduces Complexity
- Military Radar and Security
- Longer Duration and Accuracy
- Higher Radar



Figure 2 - Overview of STAR

This conception provides techniques for self-monitoring and calibration techniques as well as RF circuits techniques for effectively canceling the transmitted signal. These techniques serve as the main focus of the project. The end goal is to design and test RF built-in self test STAR circuitry as an initial proof of concept.

Figure 3 - Mathematical Results

***Couldn't have done it
without my family and
friends.***

Jonathan Scott Bell



***Thank you Melissa, Nicole, Gabrianna,
Morrigan and Maddison for your
patience through this journey! We did
it! Go Vols and Go Navy!***

Jeffrey Brian Benson



I credit God's blessing, my family's support, and my mentors' guidance in helping me obtain this goal in my education and success.

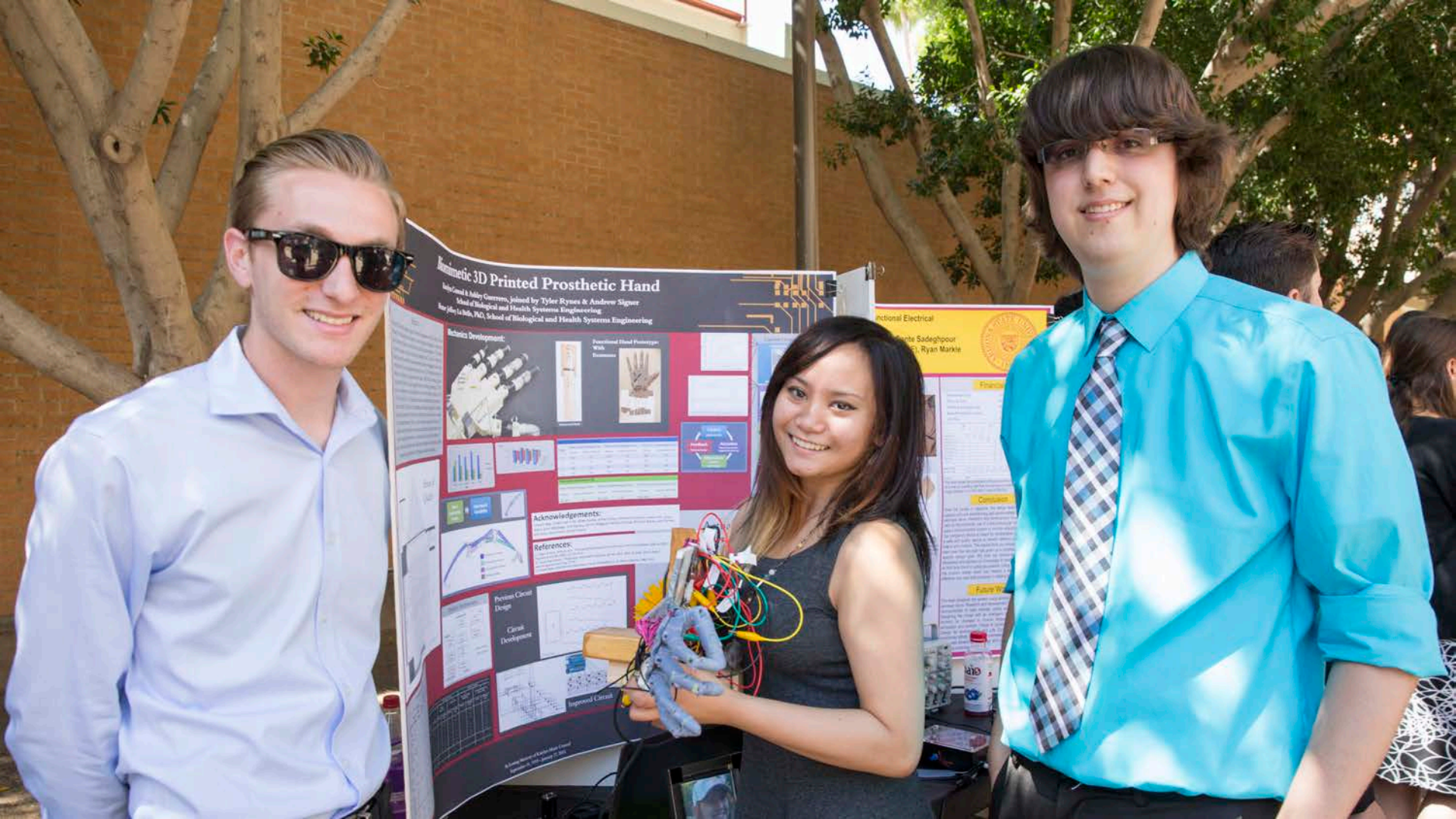
Gabriel Rudy Bernal



God Blessed me with an amazing family, I wouldn't be here without them. Thank you for always being there.

Derek Biah





Bionic 3D Printed Prosthetic Hand

Initial Concept & Early Courses, Joined by Tyler Ryznar & Andrew Siggers
School of Biological and Health Systems Engineering
Prof. Jafar J. Jafar, PhD, School of Biological and Health Systems Engineering

Bionics Development:



Acknowledgements:

References:

Protein Circuit Design

Circuit Development

Integrated Circuit

A Small Business of the Future Award
September 15, 2011 - January 15, 2012

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***I love you Sarah! I couldn't
have done it without you!***

Joseph Bihms



Mom and Dad: Thank you for your love and support! I couldn't have done it without you. Andrew: Thank you for being such a great role model! - Kyle

Kyle Robert Binder



Thank you to all my family. You've been so supportive as I have continued my education at ASU. I love you and thank you for coming to see me graduate.

Tanner Jacob Bitz



***Thanks for the support during this
time frame. I love you very much!!!***

Your Hubby

Cecil Ofier Blandon





Thanks god to make my dream come true. Also,without my parents support, courage,and faith I will never reach this point. Big thanks to my whole family

Abdulrahman Fareed S Bogari



***Thank you to my supportive
parents. I could not have done it
without you believing in me and
cheering me on all the way!***

Heather Lynn Borgard



***Thank you to everybody
who supported me,
especially my parents!***

Anthony Nicholas Boyd



Thank you Russ for all your support & Mom, Kate, friends, family and co-workers for being my cheerleaders!!

Tina Bradley





Thank you Mom (Debbie), Dad (Bryan), Nana (Sharon), and Catie for your support these last few years. I truly could not have achieved this without you!!

Alexander Bryan Briggs



Thanks Mum!

Matthew Jefferson Briggs



Would like to thank my mentor Dr. Bruce Towe for all of his help throughout the past year. Also I would like to thank Michael Juby and Nathan Deacon.

Cole Truman Brown



Thank you Brown family for enduring this process and believing in me. Thank you Jenny, Wyatt, Mom, Dad, and Shawn. I couldn't have done it without you

Jason William Brown





The Development of High

CADmarker

Introduction

1.7 million

Thank you to everyone who helped me get here. I would not be here without you!

Kyle William Brue



*Thank You, Mom Qua Cao, Dad Hoa Bui,
Wife Kim Ky, and Sons Chase and
Brenden Bui. This would not be possible
without your love and support.*

Hoc Van Bui



*Thank You all who have provided,
guided, and simply put up with
me over the last four years. I
greatly appreciate you all!*

Sean Buizer



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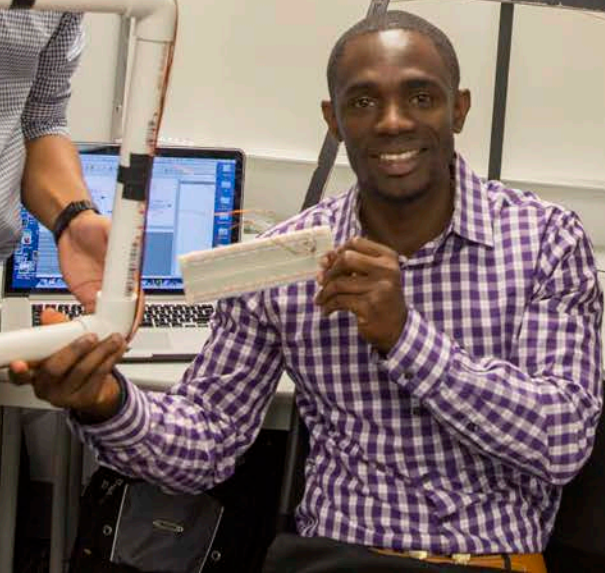
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Thanks to my Parents Chris and Teri Burger, my Grandparents Chris and Marie Burger and my wife Rachel for supporting through school.

Joshua Christian Burger





Project NFC
Advisor: Dr. Daniel Blum

Abstract
This project aims to create a low-cost, portable NFC (Near Field Communication) reader/writer device. The device is designed to be used for data transfer and communication between NFC-enabled devices and a central processing unit. The project is divided into three main sections: Theory, Hardware, and Software.

Theory
The theory section discusses the principles of NFC technology, including the electromagnetic induction process used for data transfer. It also covers the various applications of NFC, such as contactless payments, access control, and data exchange between mobile devices.

Hardware
The hardware section details the components used in the device, including an NFC module, a microcontroller, and various sensors. It also includes photographs of the physical components and the assembled device.

Software
The software section describes the development of the device's firmware and the user interface. It includes screenshots of the software interface and code snippets.

Results
The results section presents the performance of the device, including its range, data transfer speed, and reliability. It also includes a comparison of the device's performance to other NFC devices on the market.

References
The references section lists the sources used in the project, including academic papers, technical manuals, and online resources.

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*I couldn't have made it this far
without the support of my
Family, Friends, and most of all
my wife Lindsey! Thank you all!*

Ryan Joseph Burke



Thank you Mom & Ash for everything! I wouldn't be were I am today without you guys! I love you both!!

- Love Andrew

Andrew John Burnham



Shout to the Caffie, Barone, and ASU Engineering family for their continued love and support. You all have allowed me to mature and pursue my goals.

Brandon Ayanti Caffie



***It was good. Classmates, Hope
Christian Church, Navigators,
Beautiful Campus. 4 years of
experience and growth***

Joshua Lee Cantrell





***Special thanks to my parents
(Orhan & Beyhan) for their
support. Tesekkurler***

Koray Canturk



***Thank you to my family for
all of your sacrifice, love,
and support. I love you!***

Josiah Edward Carlon



***Thank you Redbull and
Google for making this
possible***

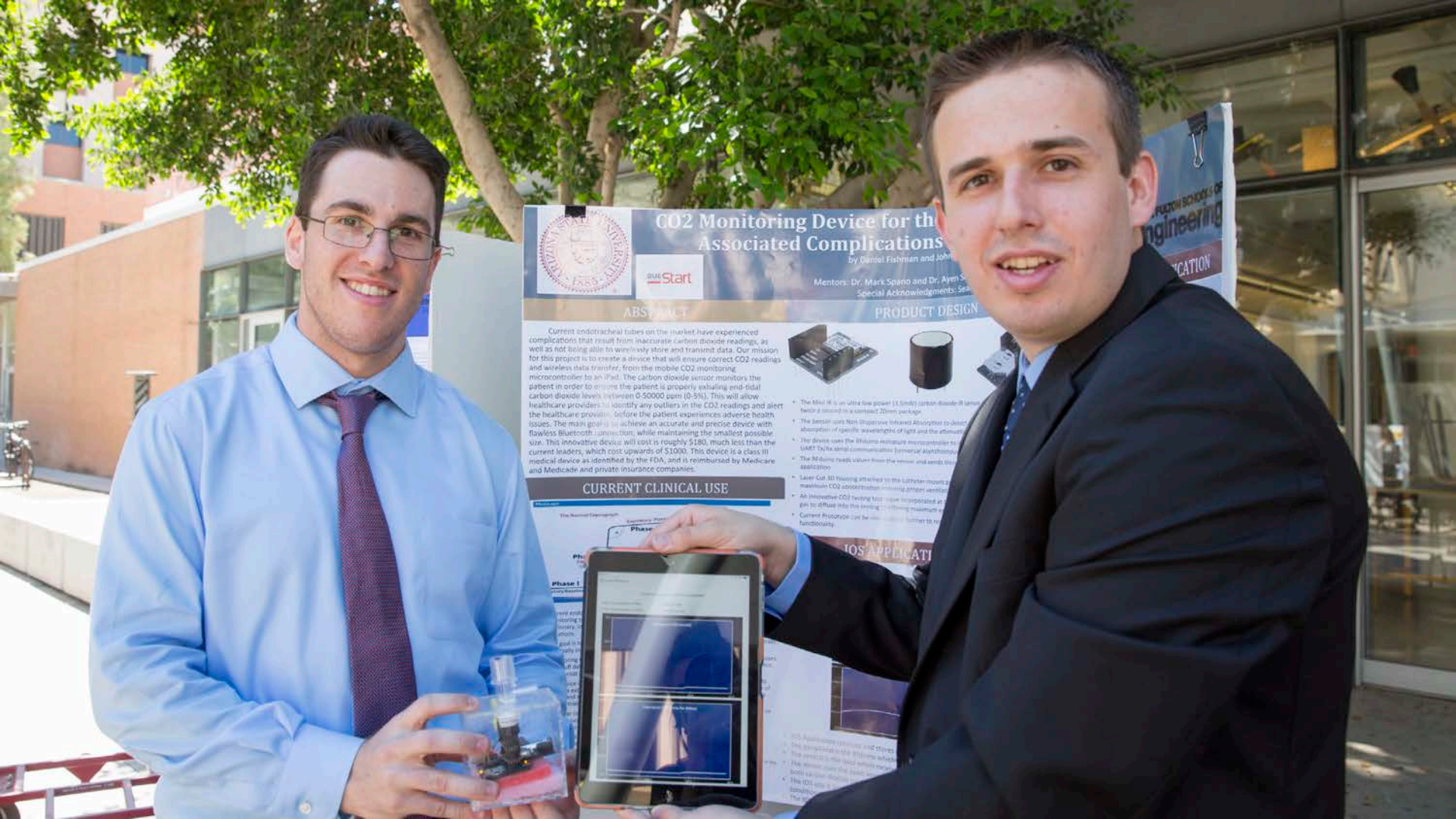
Ryan Michael Case



***OAK STREET!!! Thanks and
love to all my family, friends,
and classmates! I feel blessed,
WAY UP, I feel blessed!***

Parminder Singh Chanda





CO2 Monitoring Device for the Associated Complications

By Daniel Fishman and John



Mentors: Dr. Mark Spino and Dr. Ayan S
Special Acknowledgments: Sr

ABSTRACT

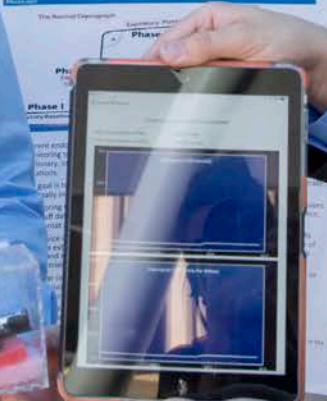
Current endotracheal tubes on the market have experienced complications that result from inaccurate carbon dioxide readings, as well as not being able to wirelessly store and transmit data. Our mission for this project is to create a device that will ensure correct CO2 readings and wireless data transfer, from the mobile CO2 monitoring microcontroller to an iPad. The carbon dioxide sensor monitors the patient in order to ensure the patient is properly exhaling end-tidal carbon dioxide levels between 6-50000 ppm (0-3%). This will allow healthcare providers to identify any outliers in the CO2 readings and alert the healthcare provider before the patient experiences adverse health issues. The main goal is to achieve an accurate and precise device with flawless Bluetooth connection, while maintaining the smallest possible size. This innovative device will cost roughly \$180, much less than the current leaders, which cost upwards of \$1000. This device is a class III medical device as identified by the FDA, and is reimbursed by Medicare and Medicaid and private insurance companies.

PRODUCT DESIGN



- The Mini Kit is an ultra low power (1.5mhz) carbon dioxide IR sensor which is housed in a standard 20mm package
- The sensor uses Non Dispersive Infrared Absorption to detect absorption of specific wavelengths of light and the attenuated
- The device uses the Atmel microcontroller to process the UART data sent communications (universal asynchronous
- The Arduino reads values from the sensor and sends them to the iPad
- Later Cut 3D Printing attached to the 1/8th inch ports to maximum CO2 concentration (allowing proper ventilation)
- An innovative CO2 having test case incorporated at the top to draw into the tubing, allowing maximum ventilation
- Current Prototype can be used, modified further to be functional.

CURRENT CLINICAL USE



IOS APPLICATION

- IOS Application captures and stores the data received to a database which can be accessed via a web browser
- The application also allows users to view the data on their mobile devices
- The IOS app is available on the App Store
- The IOS app is available on the App Store

***Go Air Devils! Thanks Dr. T, Don, Tyler,
Jeffrey, Brandon, Sid, James, Nathan,
Colton, Joseph, Morden, Nick, Ben,
Brendan, Lee, Ivan, & everyone else!***

Eric Chang



I want to thank my family for all the successes and failures to this point and many more in the future.

Jacob Ernest Chavez



***Thank you to my wife, mother,
step-father and father. Calling out my
brothers, sisters and siblings, I don't
want to be the only graduate, let's go!!!***

Antoine Jordean Chee



Thank you to my beautiful wife Lauren and my kids Genivieve & Luke, I love you! To all of my fellow ChemEs, It's been a real pleasure. We did it!

Brent Clarke Chesley



Hi Mom!

Thank you for your support.

- Robert

Robert Jay Chiang





AIRDEVILS

AIRDEVILS

AIRDEVILS

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Thank you Dave, Maria, Deanna, and Julia for always being there for me and being the best family in the world. I couldn't have done it without you.

Robert David Chittum



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Thank you to my mom and dad for raising me right. And a big thanks to all my family and friends; without your love I wouldn't be where I am today.

Matthew Ryan Christen



To my wife Summer and my daughter Leah: Thank you for standing by me and believing in me. It wasn't always easy but we did it!

Charles Brock Christiansen





Spatiotemporal Model

Abstract
nature changes for a surgical procedure call...
ch is used to rapidly close incisions. Tec...
samples, placing a solder material over...
power, laser exposure length, and...
and the effect on tissue temperature...
ing was that the addition of gold...
Future research will involve develo...
throughout the tissue.

Background
incisions in colorectal surgery are w...
often occurs and can lead to...
and even death.¹
ed is called laser tissue welding (LTW).
ed laser to weld a solder material to...
material provide heat and allow for protei...
native tissue protein.² LTW has been...
etration and heat transfer. Nanoparticles...
LTW a feasible clinical treatment. The...
ods (GRNs) and collagen type I (the mai...
protein matrix) will be used with a near...
a plasmonic photothermal response to...
tices, laser exposure lengths, and solder...
affect heat generation. The goal is to...
light, prevent infection, and heal faster

Methods
1. Collagen
2. GRNs
3. Solder addition

Regulated Amikabeads for P

Keyin Nan Lin, Chemical Eng...
Kauthal Rege, Assoc...
Engineering of M...

Importance of La

over 800,000 people in the US...
skeletal system. Surgical instrum...
by suturing or stapling. Howev...
experience post-operative tes...
tion leading to septic shock an...
welding with Plasmoner. Nan...
resilient, culture-free surgica...
tured tissue.

Synthesis of

composite, made...
backed over...
Radiation...
by the near...
deformation of tissue proteins to...
A

Acknowledging the consistent effort

***Thank you Mom and Dad for
all of your support and help
over the last few years!***

Sarah Elizabeth Churchwell



***Muchas gracias familia!
Agradezco su apoyo***

Javier Alfonso Corral Clayton



***Thank you to the Conaway and
Chance family for all of your
support! And welcoming our
baby girl to this world!***

Ian Taylor Conaway



Your support through this endeavor was important. I would not be here without it.

Genaro Contreras





Analyzing Social Networks

Speaker: [Name]
Moderator: [Name]
School of [Name]

Abstract: There is a growing amount of low-cost data for their system. The possibility to use research methods. Let us see...

***I am grateful for the love
and support from my
family. Love you all!***

Samantha Lynn Cooper



Thank you for the education and the opportunity arising from it, I appreciate all the learning I have done over the last four and a half years.

Ryan Joseph Copeland



*Learning about computer code
taught us that a compiler's
favorite word is: 'No'*

Joseph Franco Cosme-Bandola



Thanks for all the love and support over the years! We made it!

Alphonso Sean Crawford



To my Dad, Mom, and everyone else that has supported me: thank you so much for believing in me! My journey is just beginning.

Kyle Benjamin Crosner





MORYSSA
Moryssa
Student
Moryssa
Moryssa

2
adventure
engineering

Mom & Dad, thank you. Being here, is a dream come true. I am truly blessed in having a wonderful family who supports me in the pursuit of my dreams.

Erik Gabriel Rios Cruz



***Thank you Andrew, Mom
and Dad!***

Jonathan Daniel Davis



Thank you Mom and Dad for giving me this amazing opportunity. To my best friends Stephen Renee Marie & Alex thank you for making these the best 4 years

Brittany Debes



Thanks to my family for understanding what this meant for me and excusing me from countless family time to get this degree! I Love You!

Adam Jason Degner





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***Thanks to my family and friends
for support and love. Dad you
are my hero.
-Maddy.***

Madhure C. Desarda



Exceptionally appreciative for support from my family and friends throughout my education and especially thankful to my parents Rosa and Sergio Diaz.

Jose Filiberto Diaz



I would like to thank you all for the support of what I am doing, the long hours of work, and school, and training. I love you all so much!

Zachary Lee Dieman





Adsorption Capacity and Kinetics of ZIF 68

Jacob Langley, Chemical Engineering
Mentor: Jerry Lin, Regents Professor

School for Engineering of Matter, Transport and Energy

What are the optimal conditions for carbon dioxide adsorption using ZIF 68?

The adsorption capacities of 46 and 52 hour samples of ZIF 68 were measured using a Cahn D 102 microbalance, which measured the weight change of a 10 mg sample when exposed to gas containing various concentrations of CO_2 . Once collected, this data was used to calculate the diffusivity of CO_2 within the pores with the following equation:

$$D = \frac{r^2}{t} \ln \left(\frac{C_0 - C_t}{C_0 - C_\infty} \right)$$

The diffusivities calculated from the experimental data were generally higher for the 52 hour sample and ranged from 1.34×10^{-11} to 1.9×10^{-11} cm^2/s , with higher values corresponding to higher temperatures and CO_2 concentrations.

DISCUSSION

Based on the results of the SEM measurements, it was hypothesized that the 12 hour ZIF 68 sample would demonstrate the highest adsorption capacity. Despite the 52 hour sample would control their conditions were more fully formed, it was concluded that the data was used to calculate the diffusivity of CO_2 within the pores with the following equation:

Thanks Mom

Nickolas Gregory Dodd



***Thank you for everything
you've done and being there
for me since this all began.***

Alex Eleneski



***Thank you Mom, Dad, Lauren,
Grandpa Marv, Grandma Helen, Haley
and friends for supporting me!***

Love,

Tanner Michael Erickson



The heroism of my father empowered me on this journey. By defeating adversity through selflessness he taught me courage. My father Isidro is my hero.

Tomas Espinosa



***Gracias mi Familia te amo bastante!
Thank you very much family you
will always be there and thank you
DiTore family as well!***

Ricardo Manuel Farfan



Infrared Vasodilation Device (IVD)

Nathan DeWitt, Michael Jahn, Kyle Eyster, Gabrielle Maestas

Product Design

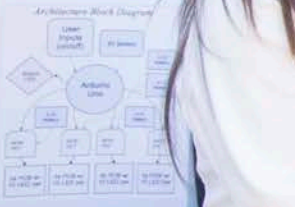
Alpha prototype - Integrates electrical components of 1.5W to a 3000mAh battery for an external power source used to heat the device through conduction from the bottom.

Beta prototype - Integrates all components of the device into a single unit. The IVD is a 1.5W device with a 3000mAh battery for a total of 4.5W. The IVD is a 1.5W device with a 3000mAh battery for a total of 4.5W. The IVD is a 1.5W device with a 3000mAh battery for a total of 4.5W.



Pre-production prototype - Integrates all of the above components for the device into a pre-production prototype. The device is a 1.5W device with a 3000mAh battery for a total of 4.5W. The device is a 1.5W device with a 3000mAh battery for a total of 4.5W.

Architecture Block Diagram



Key References

Variable Frequency Mechanical Indenter for Peripheral Nerve Stimulation

Design Team: Kyle Eyster and Gabrielle Maestas
Mentor: Stephen Hohns Tillery, Ph.D.
School of Biological and Health Systems Engineering
Arizona State University, Tempe, AZ 85281

Abstract

Peripheral nerve stimulation (PNS) is a non-invasive method of pain management. The current PNS devices are limited by their inability to deliver precise, localized, and variable frequency stimulation. This device is designed to overcome these limitations by providing a variable frequency mechanical indenter that can be used to stimulate peripheral nerves. The device is designed to be used in a clinical setting and is intended to be used by healthcare professionals.

Introduction

Peripheral nerve stimulation (PNS) is a non-invasive method of pain management. The current PNS devices are limited by their inability to deliver precise, localized, and variable frequency stimulation. This device is designed to overcome these limitations by providing a variable frequency mechanical indenter that can be used to stimulate peripheral nerves.

Method of Design

The device is designed to be used in a clinical setting and is intended to be used by healthcare professionals. The device is designed to be used in a clinical setting and is intended to be used by healthcare professionals.

Conclusion

The device is designed to be used in a clinical setting and is intended to be used by healthcare professionals. The device is designed to be used in a clinical setting and is intended to be used by healthcare professionals.



I would like to thank Dr. Stabenfeldt and my lab members for giving me the opportunity to be involved with research involving traumatic brain injury.

Chase Fauer



***Thank you Dad and Mom. Thank you
for supporting and respecting me
when I chose a way to adventure.
Thank you for loving me. I love you!***

Jingxian Feng



***Thank you Mom, Dad, and Landa
for your continuous support and
love. Thank you Alex for always
believing in me. I love you all!***

Kaylee Elise Fentnor



***Thanks Mom, Dad and
Charlie!!***

Mark Travis Ferry





IRA A. FULTON SCHOOLS OF ENGINEERING

IRA A. FULTON SCHOOLS OF ENGINEERING

IRA A. FULTON SCHOOLS OF ENGINEERING

IRA A. FULTON SCHOOLS OF ENGINEERING

IRA A. FULTON SCHOOLS OF ENGINEERING

IRA A. FULTON SCHOOLS OF ENGINEERING

*To my wife and son, thank
you for walking with me
into the future.*

Lhoussaine Ferza



***Thank you Jade, Mom, Dad,
Amanda and Craig for all of
your help.***

James Finch



I'd like to give a special thank you to my friends and family for supporting me both in school and in my personal life throughout the many years.

Fabian Josef Fink



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Postural Response to Cutaneous Plantar Perturbations
Sara Ingham, Mechanical Engineering B.S. & M.S.
Mentor: Dr. Evangelos Arseniades
School for Engineering of Matter, Transport, and Energy

...based in the skin on the bottom of the foot in regulating gait posture.

...with a perturbation device, as well as EMG transducers
...to measure foot activity on each leg

...to make the device push on the ball of subject's
...to the gait cycle while walking on a treadmill

...data is collected at a high sampling frequency
...with 40% body weight reduction and gait with
...for each subject

Future Steps:

- Accurate gait
- Test different
- Experiment
- Mechanisms

References:

1. Ingham, S., et al.
2. ...
3. ...

Control of Prosthetic Hand Using Audio Feedback
Joannis Kaneris, Computer Systems Engineering B.S. & M.S.
Mentor: Dr. Evangelos Arseniades
School for Engineering of Matter, Transport, and Energy

...audio-feedback as a mechanism for control of prosthetic

INDEX:

...force sensing glove equipped with 3 distinct gran
...and 3 distinct levels of grasp strength

Experiments:

...training (audio and visual feedback), Evaluation of Training
...and Generalization (audio feedback)
...ing (audio and visual feedback), Evaluation of Training

Figure 1
... Rise Time Subject 1

Figure 2
... Experiment 2 - Rise Time

***Thank you so much for
everything! I love you guys!***

Marcus Finney



Thanks to my family, friends, and 1st rates. Especially to Rawn, my fiancé Michael, and student loans. Would've lost my mind without all the support!

Brooke Olivia Fisher



Thanks for all the help and support family, finally made it!!

Jermaine Kyle Fowler



***Thank you to my family! I
love you all so much!***

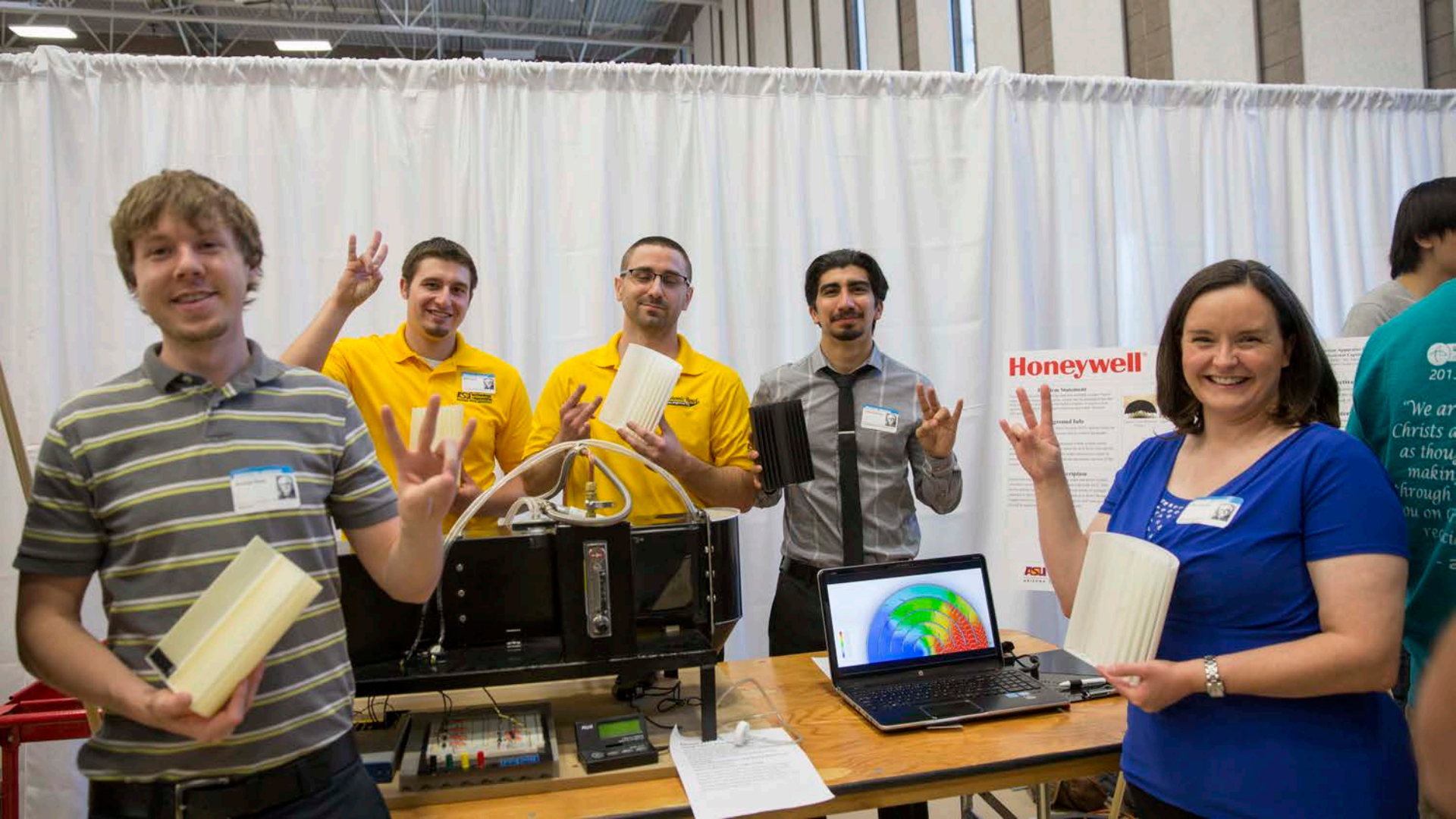
Amanda Rose Freed



***A big thanks to Madre and
Padre Gabrielson for
supporting a hopeless cause!***

Olaf M. Gabrielson





Honeywell

ASU

201

"We are
Christians
as though
making
through
you on
rejection
- a

***To all my friends and family,
thank you for your continual
support and motivation through
these years.***

Alex Mauricio Pompa Gale



***Thank you Mom, Dad and Sis
for all your love and support!
Couldn't have done it without
you!***

Kyle Alexander Galloway



To my parents, siblings and all other friends and family, thank you oh so very much. I wouldn't be here without your continual guidance and support <3

Aaron Henry Gardner



I first and foremost give thanks and glory to God - my Lord Jesus Christ. I also thank my family and friends for all their support. God Bless!!!

Isaac Garnica



ECG152

THE SCOPE: To design a fast heat-treated track for a vehicle.

THE GOAL: To ensure the system safely, quickly & efficiently, as far as possible, in the event of a competing car.

THE RESULT: A proof of concept design demonstrating the ability to manage the system as well as a layout of how to guide the design to production.



at outside temperatures that can peak at temperatures inside the car to cool the system. The temperature inside a car can be as high as 130°F.

70	80	90	100
110	120	130	140

market can be sufficient and/or



Thank you to my Mom for being the strongest rose with thorns To my Dad for being the noble soul he is and Thank you to my siblings for believing in me

Khrizya Yojarah Gastelum



Thank you to my family for supporting me through the last four years. It has been tough but very rewarding.

Nicholas Edward Giovannucci



Thank you for the great memories and for fostering an innovative environment for change.

Shardul Suresh Golwalkar



I want to thank my family for helping me out throughout these 4 years. I love you all.

Jimmy Alejandro Gomez



***Thank you for providing the
means to achieve a
privileged education.***

Gian Paolo Gonzalez



Thank you to my family in helping me graduate. When times were tough you were always there supporting and encouraging me to do my best.

TGood

Tyler Justin Good



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*I would like to thank my parents,
my sister, Rebecca, for all of
their support in completing my
education.*

Zachary Daniel Gordon



***Special thanks to my mother Teresa,
father Jesus, Jorge, Karla, Paty, Kathya,
Erick, and everyone who supported me
by making this day a reality
Thank You***

Jesus Guadalupe Granados





Thank you to my wife, my family, and all those who have supported me in this journey!

Tanner Blake Green



thanks mom

Katherine Elizabeth Grinstead



*To my family,
Thank you for always being my support system.
Your love and faith gave me the strength and
perseverance to follow my dreams.
I love you!*

Alicia Mae Guccione



***Thank you for all your
support & guidance. I love
you Mom & Dad!***

Ashley Denise Guerrero



Impacts of understanding conation on student satisfaction

Lagan Smith, Civil Engineering
Mentor: Dr. Thomas Jaeger, Australia
School of Sustainable Engineering and the Built Environment

Abstract
The purpose of this research is to investigate the impact of understanding conation on student satisfaction. The research was conducted using a survey of 100 students. The results show that students who understand conation are more satisfied with their learning experience. This is because they are able to see the value of their learning and are more motivated to learn. The research also found that students who understand conation are more likely to be successful in their studies. This is because they are able to manage their time and resources more effectively. The research has implications for educators and students alike. Educators should ensure that their students understand conation and that they are able to see the value of their learning. Students should ensure that they understand conation and that they are able to manage their time and resources more effectively.

Methodology
The research was conducted using a survey of 100 students. The survey questions were designed to measure student satisfaction and understanding of conation. The results were analyzed using statistical software.

Results
The results of the survey show that students who understand conation are more satisfied with their learning experience. This is because they are able to see the value of their learning and are more motivated to learn. The research also found that students who understand conation are more likely to be successful in their studies. This is because they are able to manage their time and resources more effectively.

Conclusion
The research has shown that understanding conation has a positive impact on student satisfaction. This is because students who understand conation are more motivated to learn and are more likely to be successful in their studies. Educators should ensure that their students understand conation and that they are able to see the value of their learning. Students should ensure that they understand conation and that they are able to manage their time and resources more effectively.

References
1. Smith, L. (2023). Impacts of understanding conation on student satisfaction. *Journal of Sustainable Engineering and the Built Environment*, 1(1), 1-10.
2. Jaeger, T. (2022). The impact of conation on student satisfaction. *Journal of Sustainable Engineering and the Built Environment*, 1(1), 1-10.

FURI honors thesis

How does the "bee" phase separate at the asphalt-aggregate interface?

Zachary Kopp, Civil Engineering
Mentor: Shane Underwood, Australia
School of Sustainable Engineering and the Built Environment

Reference
Kopp, Z. (2023). How does the "bee" phase separate at the asphalt-aggregate interface? *Journal of Sustainable Engineering and the Built Environment*, 1(1), 1-10.

Procedure
The "bee" phase is a mixture of asphalt binder and aggregate. The "bee" phase is formed by the separation of the asphalt binder from the aggregate. This is due to the different properties of the asphalt binder and the aggregate. The asphalt binder is a viscous material, while the aggregate is a solid material. The "bee" phase is formed by the separation of the asphalt binder from the aggregate. This is due to the different properties of the asphalt binder and the aggregate. The asphalt binder is a viscous material, while the aggregate is a solid material.

Results
The results of the research show that the "bee" phase is formed by the separation of the asphalt binder from the aggregate. This is due to the different properties of the asphalt binder and the aggregate. The asphalt binder is a viscous material, while the aggregate is a solid material. The "bee" phase is formed by the separation of the asphalt binder from the aggregate. This is due to the different properties of the asphalt binder and the aggregate. The asphalt binder is a viscous material, while the aggregate is a solid material.

FURI research program

"When everything goes to hell, the people who stand by you without flinching — they are your family."

I love you all. "Thank you" just isn't enough.

Cameron Alexander Gunn



*Thank you to my dad and mom,
thank you Yuki, thank you Alex
and Shane, love you all.*

Xin Guo



***Thank you to my parents
for all of their love and
support. This ones for you!***

Mayuri Gupta



*I would like to thank my mom,
dad and my sister Nikita!
Couldn't have done it without the
support and love from you guys!*

Nehal Gupta





Autonomous Swarm Transport

Abstract

Use of the 3rd Semester Driving application in these limited perspectives. An earlier study found that there are a number of factors which can reduce driver performance. These factors include: fatigue, distraction, and impairment. The current study aims to address these factors by using a swarm of autonomous vehicles. The vehicles are equipped with sensors and cameras to detect and avoid obstacles. They are also equipped with a communication system to coordinate their movements. The results of the study show that the swarm of autonomous vehicles can effectively transport a load in a controlled environment. This study has implications for the development of autonomous vehicle systems for use in a variety of applications, including: delivery, logistics, and emergency response.

Overview

The Autonomous Transport System consists of a fleet of autonomous vehicles and a central control system. The vehicles are equipped with sensors and cameras to detect and avoid obstacles. They are also equipped with a communication system to coordinate their movements. The central control system is responsible for managing the fleet and ensuring that the vehicles are able to transport a load in a controlled environment. The system is designed to be scalable and flexible, allowing it to be used in a variety of applications.

To all of my parents: Thank you so much for helping make all of this possible! I love you more than you can count to!

Love

Jenifer Marie Gura



Thanks Mom and Dad for providing me with this wonderful opportunity to better my future! I love and appreciate all the support you have given me! -Fav

Favian Guzman



I want to thank my wonderful wife and my three beautiful boys, Edwin, Samuel and Valentin.

Troy Alan Haddock



Guys I did it!!

Thank you for your unwavering love & support. I'm so blessed to have you all in my life, I love you all so much!

Mackenzie Ann Hagan



Thank you so much

***Jazakum Allah khairan for every
thing***

Hossam Ali M Halawani





Adaptable 3D Linear Rail System

K23

sbhse

School of biological health systems engineering

Presented by: Daniel Morano, Christopher Rosen, and Dr. P. David Adelman
Department of Mechanical Engineering and School of Biomedical Research Center

Abstract

Prototype



Stepper Motor

A stepper motor was included for convenient movement in the z-axis (up and down). The motor was driven by an Arduino Uno microcontroller, a stepper motor driver board, and an external power source. One can then easily move the device up and down by pressing down on two momentary push buttons. A rocker switch was also included to turn the device on and off for experiments that may be sensitive to electrical activity.



Key Features

- 3-dimensional linear movement
- 2 scales for precise location
- 2 stepper motor with push buttons
- Customizability
 - Can be used to mount different devices
 - Kits available for x- and y-axis stepper motors
 - Kits can be easily swapped for longer beams to accommodate needs
 - Anodized aluminum finish

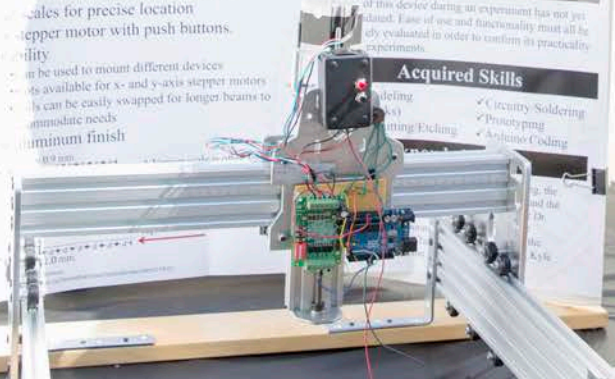
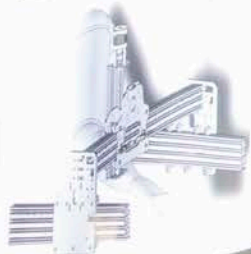
Future Work

Use of this device during an experiment has not yet started. Ease of use and functionality must all be fully evaluated in order to confirm its practicality in experiments.

Acquired Skills

- ✓ 3D Modeling
- ✓ Circuitry Soldering
- ✓ Prototyping
- ✓ Milling/Filing
- ✓ Anodizing Coating

3D Model



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Mom and Dad

***Thank you for the many years of
love and support! I could not have
accomplished this without you!***

Eric David Halverson



***Thanks for everything love
you all!!***

Tyler Charles Hansen



***Thanks for all of your
support!***

Cory Robert Harasha





engineering=je

ring=je^y

oo
er

***Mom and Dad, I love you! Thanks for supporting me for 4 years of college and 22 years of life!
P.S. Thank you for paying my tuition.***

Chad Jackson Hardgrove



I would like to thank my family for their continued support. I would also like to thank my friends and faculty who aided me in my success at ASU.

Keithan Anthony Harris



I have to honestly say that it was my sister that helped me stay "mostly" focused on college and to do what I loved, so thank you nee-chan!

William Skylor Haselwood



***Thank you for all your
loving support Mom, Dad,
Clay, and Chandler!***

Brandon Cory Hatathlie





*Thank you Mom, Dad and Melissa
for the support over the years.
Love you all, and can't wait to
spend my extra time with you!*

Aaron Craig Hatfield



Great to be graduating as a Sun Devil. I want to thank my family for all the support, this wouldn't have been possible without them. Love You all!

Anthony Hayer



***A special thanks to
everyone who supported
me and my crazy schedule!***

Colt Patrik Hegardt



Thanks for supporting me all these years, Mom and Dad! Much love; it wouldn't have been possible without you.

Stephen Edward Hermens



I wanted to thank my wonderful family for the support they have showed me during my time at ASU. I love you all very much, especially my son Ethan.

Michelle Hernandez





Sensitivity Analysis of a

Micr
Nati
Meritor:
School of E

Abstract
The concept of a cost-efficient HIV/AIDS can potentially
great benefits for those living in impoverished
areas, such as those who are living in poverty-stricken
countries, who have a scarce amount of medication for their
treatment. In this project, a method is presented
for the detection in the patient's blood. This is a
method that utilizes fluorescent molecules to sense the
presence of the HIV/AIDS viral load.

Introduction
HIV is a global issue for the past few decades and affects
25 million people. There are a number of different components to
the virus that need to be designed and tested to ensure accurate and
reliable detection. In this project, the test will filter the virus from
the blood and show the current viral load of the patient. The
test is for a microfluidic test that will filter the red blood cells
from the viral load that was present in the blood cells. The test was
using nitrocellulose paper, a plastic polymer vesicle, and glass.
Fluorescent molecules will also need to be utilized in
order to sense the viral load that is taken from the blood sample.
Teflon and nitrocellulose were utilized to create what could
be the workings of the test itself, which is what allows the blood
to flow. Biotin and APTES were experimented with in
order to figure out what would be an optimal binding agent for the

IRI



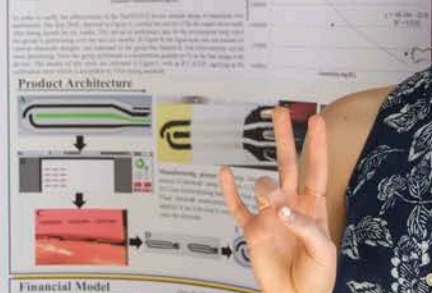
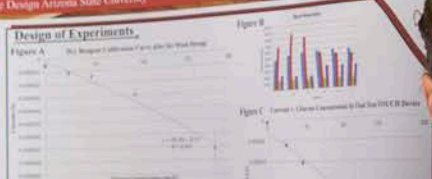
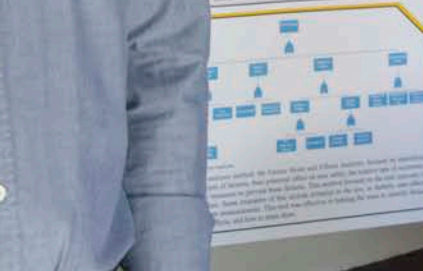
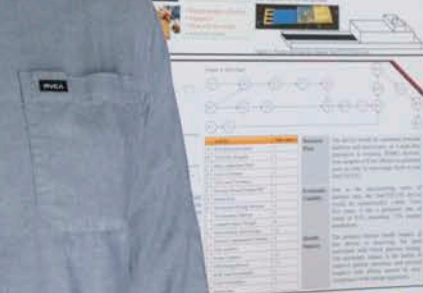
Ira A. Fulton
Schools of Engineering
ARIZONA STATE UNIVERSITY

TearTOUCH: Non-Invasive Glucose Monitoring Using Tear Fluid

Designer: Annalisa Adams^{1,2} & Cael Maggiora^{1,3}
Mentors: Jeffrey Labelle PhD^{1,4,5}, Laloni Harwell PhD^{1,5}, & Curtis Cook MPT¹
¹Biocengineering Design Center, ²Larrington Biocengineering Program, ³School of Biological and Health Systems Engineering, ⁴Mayo Clinic, ⁵Biodesign Institute
BMI 400 Capstone Design Arizona State University

Abstract & Background

Monitoring of the World Health Organization, there are over 357 million diabetic individuals. The number is expected to increase dramatically over the next few decades. There is a need for a more accurate and effective method of monitoring blood glucose levels. The TearTOUCH device is a non-invasive method for monitoring blood glucose levels. A major barrier to the development of a non-invasive method for monitoring blood glucose levels is the lack of a reliable and accurate method for measuring tear fluid glucose levels. The TearTOUCH device is a non-invasive method for monitoring blood glucose levels. The device is a small, portable, and easy-to-use device that can be used by patients at home. The device is designed to be used by patients at home. The device is designed to be used by patients at home. The device is designed to be used by patients at home.



Financial Model

References:

1. American Diabetes Association. (2014). Diabetes Statistics 2014. <http://www.diabetes.org/statistics/2014-new/>

2. World Health Organization. (2014). Diabetes Mellitus. <http://www.who.int/mediacentre/factsheets/fs104/en/>

3. National Institutes of Health. (2014). Diabetes Mellitus. <http://www.nlm.nih.gov/medlineplus/diabetes.html>

4. Mayo Clinic. (2014). Diabetes Mellitus. <http://www.mayoclinic.org/diseases-conditions/diabetes/symptoms-causes/whi12345678>

5. Larrington Biocengineering Program. (2014). TearTOUCH. <http://www.lbi.asu.edu/teartouch/>



*Thank you Elena and Jose,
mom and dad, for all your love
and support. Thank you Tia
Rosa y la familia Flores.*

Sayra Guadalupe Hernandez



Thank you to everyone who helped me get to this point in my life, I appreciate everyone for all their support. Thank you ma and dad, love you!

Shannon Lee Hertfelder



Hi Mom and Dad!

***Support S.683 - Compassionate Access, Research
Expansion, and Respect States (CARERS) Act of 2015***

Go Green!

Cameron James Hines



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***Thank you Mom and Dad, for
giving me the opportunity
Love you!! your son-Gary***

Gary Ho



***Mom, thank you for being my
biggest fan and supporter, I
couldn't have done it without
you! Love Matt***

Matthew J. Homco



*Thank you, Mom and Dad! I
truly could not have done it
without you.*

-Love,

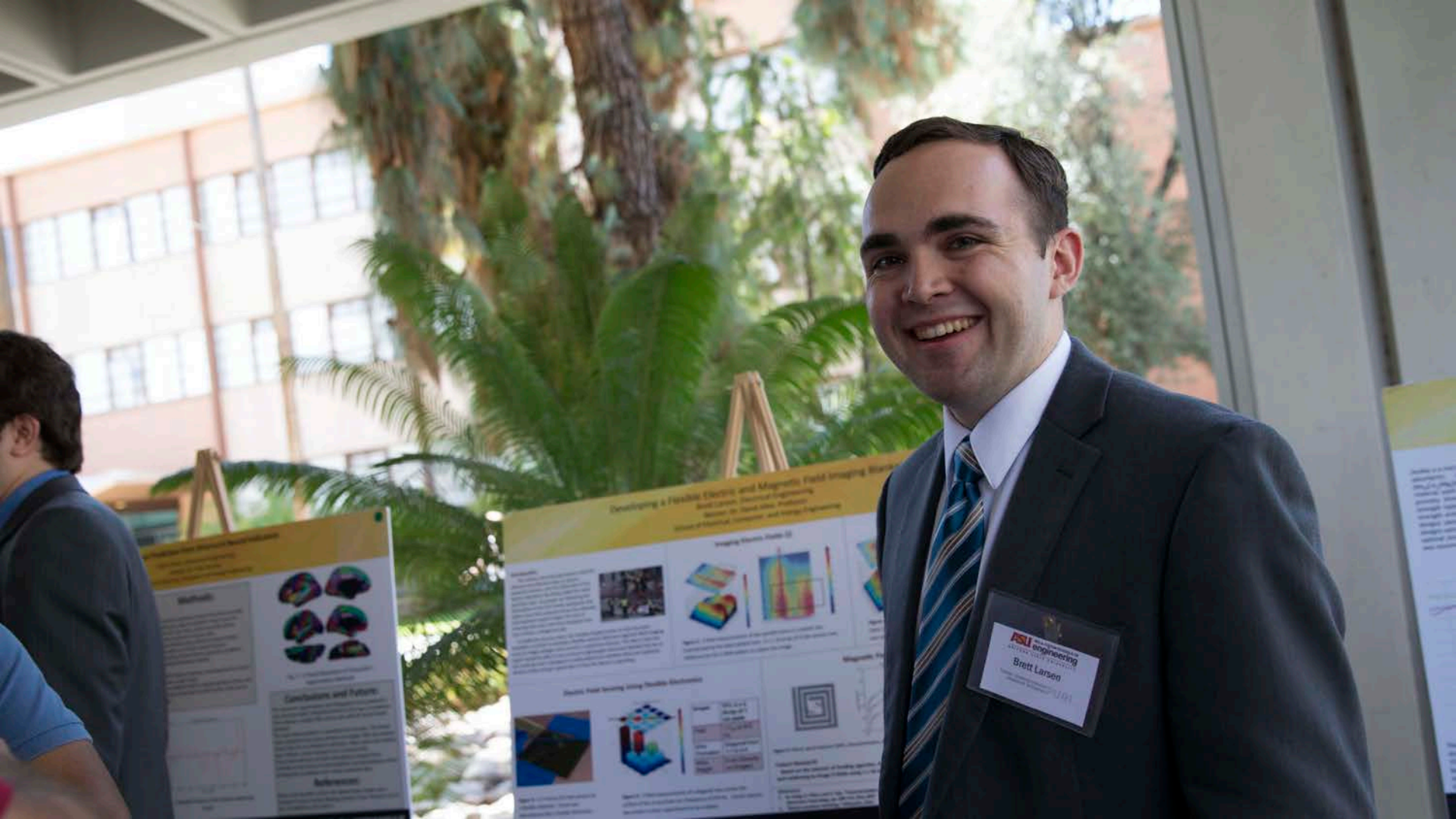
Molly Kindelan Hopcraft



***I have had an amazing time
and experience with ASU.
Rock on devils!!***

Fallon Marina Howard





Developing a Flexible Electric and Magnetic Field Imaging Sensor

Brad Cochran, Electrical Engineering
Mehmet Ali Ozkan, Physics
School of Electrical, Computer, and Energy Engineering

Imaging Electric Fields (E)



Double Field Sensing Using Flexible Electrodes



Thank you to everyone that has inspired me. I appreciate the support from friends and family that have brought us here today. Here's to the future!

Dallis Hughes



***Thank you friends and family,
for all your support. I could
never have done it without you
all.***

Scott Richmond Hughes



***My degree really needs two names on it,
mine and my wife's. I could not have
done this with out you Fabriza! Thank
You! I LOVE You!
XOXO***

Russel Hunt



A big thanks to my wonderful family Michele, Neil, and Angela Tugaoen for always being there and believing in me. I love you!

Neil-Richard Tugaoen II



At ASU I was able to meet brothers and sisters; therefore I now call ASU my home for life. I am and will always be a Sun Devil family. Go Devils!!

Innocent N Irakoze





*I am extremely grateful for
your help.*

Shinya Ishizaki



To my wife Nizhoni, my daughters (and future Sun Devils) Sydney, Nataani and Ella: You are the reasons I am here today! I love you all!

Kevin Ray Jacob



***Thank you mom, dad, family
and friends for all of your
support these past four years!***

Melissa Anne James



To my family and friends, thank you for all of your love and support through all the ups and downs.

Daniel Nolan Jameson





Thank you to my family and friends for their support through my years here at ASU. Finally done!

Martin Joseph Colmenero Jimenez



***To Lindsay Lynch, the love of my life,
thank you for pushing me to do this,
thank you for all of your support, I
love you like crazy! I crushed it :)***

Dana Royce Johnson



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Family you all mean the world to me. I would not be here now if it was not for you. Thank you for your love and support. I love you all!

Kristine Yvonne Johnson



How does the "bee" phase separation correlate to microstructure at the asphalt-aggregate interface?

Zachary Kopp, Civil Engineering
 Mentor: Shane Underwood, Assistant Research Professor
 School of Sustainable Engineering and the Built Environment

Relevance



The viscosity of asphalt is highly temperature dependent. Therefore, it tends to crack at moderately low temperatures due to the more brittle state of the asphalt. These cracks then propagate through the aggregate-asphalt interface. This can be better understood by examining the cracked interface image to the left. These surface cracks lead to porosity and eventual failure of asphalt roads over the long term. An understanding of the microstructure of the aggregate-asphalt interface will improve our knowledge of the material properties.

Procedure

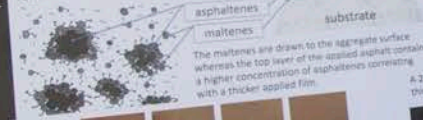


Left: A nitrogen purge reduces capillary effect of toluene evaporation from films.
 Right: A centrifuge is utilized as a spincoater and varies controller for controlling rotational velocity.

Atomic Force Microscopy



Atomic Force Microscopy is a topographical rendering of a surface at the nano-scale that utilizes a force displacement curve matrix to produce three dimensional images.



A 25 micron Atomic Force Microscopy scan of a 3.8 micron thick film asphalt coating applied to a marble tile

Results



Thank you for your love and support! Your guidance to make it through and make decisions was invaluable.

Scott Thomas Johnson



***A big thank you to my
sponsors. I promise it was
worth it.***

Nick Kealii Jorgenson



To my Family thank you for your support, we did it. I love you, and a special thank you to Baby Girl and Eli my greatest gifts, my support, my life!!

Frederick R. Morris Jr.



Gracias mamá y papá, es por todo el amor y apoyo que me han dado que estoy aquí haciéndolos orgullosos. Los quiero muchísimo!

Fernando Estrada Jr



***Thank you for all of your
support, patience, and
love!***

Joel Greig Wright Jr





Big shout out to Mom and Dad for giving the best advice when I would call home crying in frustration over school. #EngineeringProblems

Kelsey Kristine Jull



Thank you to my wife and kids for helping me through this. It was a long road but I did it. Couldn't have done it without you by my side. I love you!

Michael Dennis Boggs Junior



Thank you to my mom and dad for always putting my best interests first, pushing me to do my best, and being my support. I love you both very much.

Samantha Maria Juntiff



***Thanks for EVERYTHING
Mom and Dad! I love you
guys!***

Omar Karaboulad





imods
INSTRUCTIONAL MODULE DEVELOPMENT SYSTEM

FURI Research Project: finding omissions and inconsistencies in course design

IMODS™ is an open-source web-based tool created to guide STEM educators through an outcome-based education process.

RESEARCH OBJECTIVES

Develop an IMODS framework to guide instructional knowledge creation

Use of semantic technologies to provide intelligent interaction with users

Algorithm development for feedback on course design

RESEARCH ACTIVITIES



Ontology design for IMODS knowledge structure



Algorithms to detect inconsistencies and omissions in course design and alignment of various course elements



Front-end user interactions to provide feedback to users

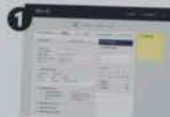


Testing scenarios and

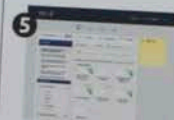
ONTOLOGY



IMPLEMENTATION



PC³ Model



Faraz joonaam, Maman, Baba, and Dadashi, I have the best family and friends that a person could wish for. Thank you for the support. I LOVE YOU all.

Bahareh Kargaran



I would not be standing here today without the support of my loving family. Words can not express how much I appreciate you all!

Kan Kawabata



*While today is full of light and hope,
they weren't always so. Here's to those
of you with whom I learned more
about the limits of my own strength.*

Brandon Patrick Keeber



***A heartfelt thank you to my
wonderful wife and children
who have been my compass on
this incredible journey!***

Tyler Cade Keeling





FORK EM DEVILS!!!

Ryan John Keen



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Thank you MOM and DAD for pushing me and supporting me through these years of hard work. Thank you Sarah for being with me during this experience.

Sean Vincent Keever



Thank you to my mom, dad, and sister Lexie for all your love and support. I have learned through your example the value of hard work and dedication.

Amanda Nicole Keil



***Dear Family, Thank you for your
unending support and constant
availability to take phone calls.
Carry the flag!***

Marion Zoe Branch Kelly





Gradational Solar Power Optimization and Monitoring System

Chris Raupp, Electronics Engineering Technology (Alternative Energy Technologies)
Mentor: Scott Pollat, MSEE Power Engineer, Senior Lecturer
The Polytechnic School

How to implement a tracking system for residential and small commercial buildings to improve the efficiency throughout the year?

Experimental Setup



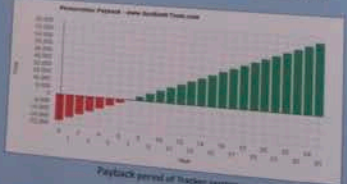
View of Fixed Tilt and Tracking Module

Cost Analysis

Installed Solar PV System Price: 35 m² Residential Rooftop (\$5.71/W_{DC})



2010 Average Cost per Ww of a Residential House reported by NREL



Payback period of Tracker system

***Thank you Vanessa for putting
up with my shenanigans! I did
it for my family.***

Matthew Zane Kilford



...King Family!...

*Thank you to my parents for being so supportive
and helping prepare me for the world.*

Hiieee Kenzie and Riley! I ran out of spac

Zakary Alexander King



***To my friends and family:
Thank you for all of your support;
without you this would not have been
possible!***

Jeffrey

Jeffrey Jordan Kirkman



*I want to thank all of my family
and friends for supporting me
during my college career.*

Dalton Kiss





engineering = $j e^y$

in a future schools of
engineering

ASU

engineering = $j e^{x y}$

engineering

engineering

***Thank you Mom, Dad &
Lisa for your support!***

Andrew John Klages



Thank you so much Mom, Dad, Elke and Scott for your support through these past 4 years. You're all amazing and I wouldn't have survived without you.

Madison Alexandria Klug



Thank you Mom & Dad for believing in me and helping me along the way. I couldn't have done it without you.

Jacob Thomas Korinko



***ASU sure has taken me for a ride,
but now it seems I have reached my
destination. I will miss everyone but
I am moving on to greater things!***

Gary Steven Krainz





*I just want to say thank you
to my Mom and Dad for being
the Ku-est parents I know.*

Michael Jason Ku



Thank you to my Dad and Mom, Naresh and Amarjit, I love you guys, I could not have done it with you. Congrats to my Brother Karan your next up buddy!

Rohan Kumar



***Thank you so much Mom
and Dad, I couldn't have
done it without you!***

Tyler Matthew Kunce



I would like to express my deepest gratitude to my parents, girlfriend Aijana, brother, and to the Bolashak IS Org for their invaluable support!

Olzhas Kurenov



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Thank you so much to my mother, father, sisters, brother, niece and nephew. I couldn't have done it without your support.

Noor Lallmamode



*Everyone, thank you for
everything you have done and
your support all these years.*

Cody Joseph Lane



***Thank you Christy, mom
and dad for your love and
support!***

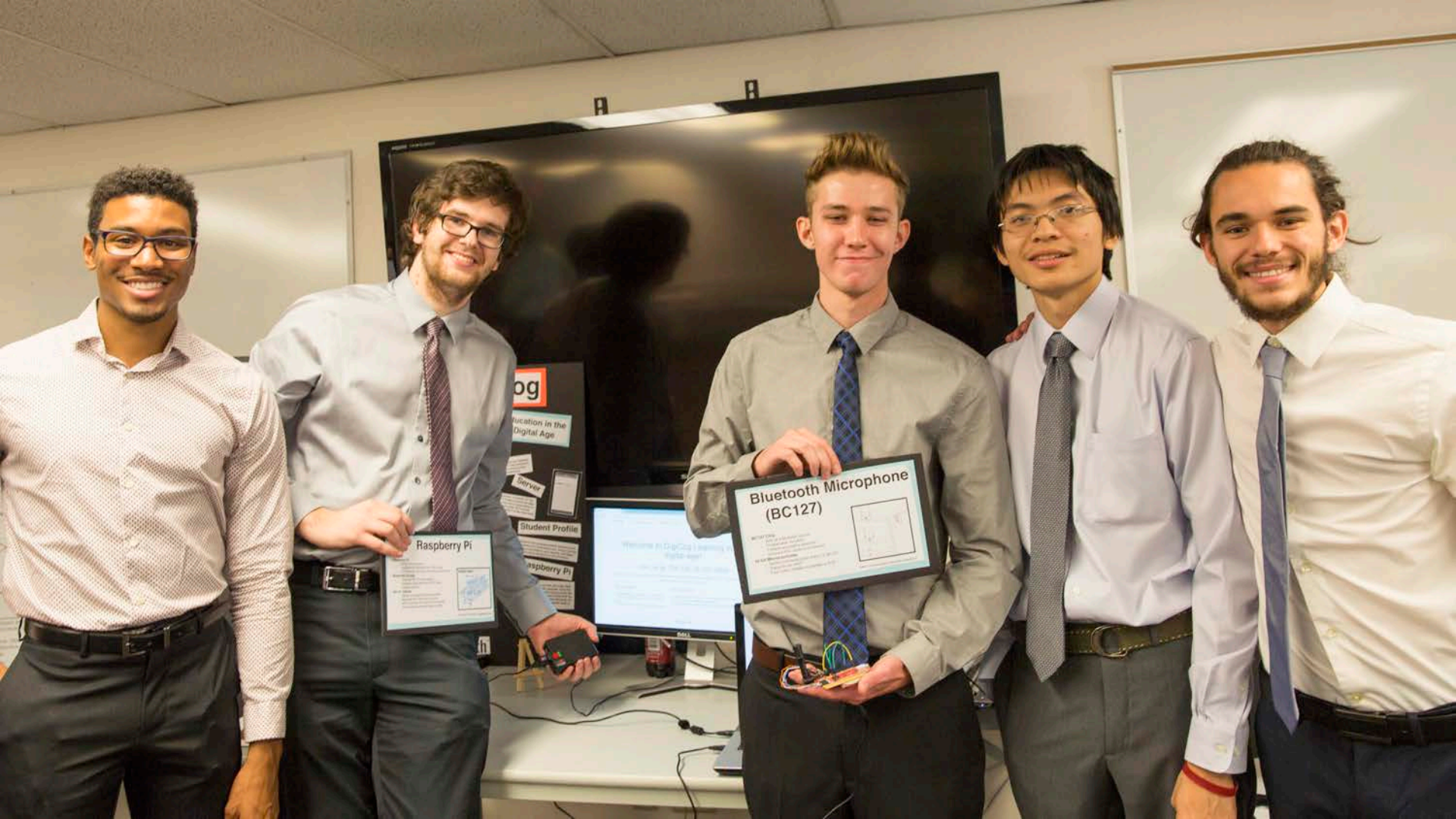
Winnie Ching Yan Lau



Shout out and thank you to all of my family, my girlfriend, Sarah, and my friends, for being here to celebrate this moment of my life! I love you all!

Tyler Christian Lavineta





Raspberry Pi

Bluetooth Microphone
(BC127)

It's been fun. Dueces!

John Mark Lillyblad



***What an adventure this has
been. Thanks everyone for
the support and memories!***

Colten Ray Lindauer



***Thanks and love to my
family***

Thomas Michael Linnen



***Thank you to my family, friends,
and especially the EE faculty for
the last four years. Go Devils!***

Shannon Dawn Lippincott





***Nico, FffKyle, Mikey B, Andrew,
Brett, Logan, James... you all
made my Barrett experience so
wonderful. I love you guys!!!***

Rebecca Ann Little



I would like to thank my wife, mother, father, siblings and their families for the support throughout my College experience. Thank you all.

Brian Neal Locksa



***Thank You Tamela, Without you I
wouldn't Be here today! I Love You!
Thank You GI Bill! Thank you Navy!
Thank you to my family! Thank you
USA!***

Christopher Allan Loff



To Mom and Dad,

Team LAMBO for the win!!! :)

Love you guys.

Steven Francis Lombardi



***A special I love you to my very caring
Arizona family! And Dad, I love you to
the moon and back! Thanks DEWSC
faculty and students! GO DEVILS!***

Keila Dawn Lombardozzi





***Thank you for all of your
support!***

Channing Ludden



***Thank you dad for all your help.
Thank you Michelle for your support
and love. And thank you Google for
all the answers and free textbooks.***

Eric James Luttenegger



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*Thank you for the support
throughout the years. I greatly
appreciate everything you've
done.*

Brandon Tyler Lyons





Thank you Jordan Paul, Mom and Dad! I couldn't have done this without your love and support. I love you Junior and Mia!

Juana Iriis Maes



***There was a never a moment
that I was without your support.
Thank you for being my
inspiration and my rock. -Gabby***

Gabrielle Elise Maestas



It takes incredibly dedicated parents to support me for as long as you have. Thank you for the best gift one could give - an education!

Ryan Mahadocon



***Thank you Mom and Dad for
everything you have given me
throughout all of my education!***

Alexander Ryan Mallison



Improving Damage Detection and Localization in Complex Composites

Zach Barnes, Mechanical Engineering

Mentor: Aditi Chattopadhyay, Regents' Professor, Aerospace Engineering
School for Engineering of Matter, Transport, and Energy

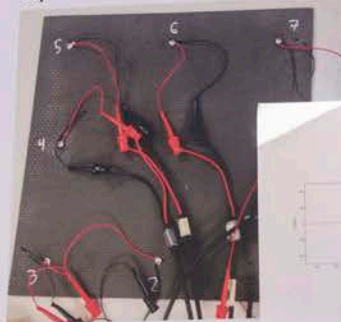
Goal

Improve damage detection techniques by using matching pursuit decomposition (MPD) on data collected using guided waves (GWs).

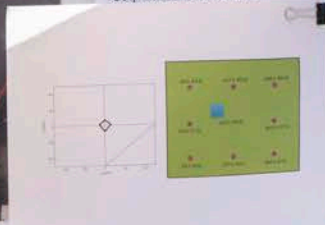
Method

A round-robin approach was used to collect GW data along each path between sensor. MPD analysis of the data provided the time of arrival of the first wave packet for each of these sensor paths. Paths with damage along them were found from discrepancies in the time of arrival along symmetric flight paths. The intersection of these paths reveals the region of delamination that was intentionally created during fabrication of the composite plates used for testing. The results of this method reveal a novel technique

Experimental system



One of the carbon fiber epoxy plates used for testing. The PZT sensors can be seen connected to alligator clips, which lead to the data acquisition controller.



Applications

Structural health monitoring plays an important role in the aerospace



*Thank you mom and Jordan for being
my greatest support throughout college!
I love you both!*

Love,

Eric William Malone



***Gracias mamá y papá.
Gracias familia por su
apoyo todos estos años***

Adrian Maranon



*Thank you Ernie and Jackie for
pushing me through the tough times.
Thank you to the rest of my family and
friends for all your support and help!*

Timothy John Marfori



*To my mom, for always
being there.*

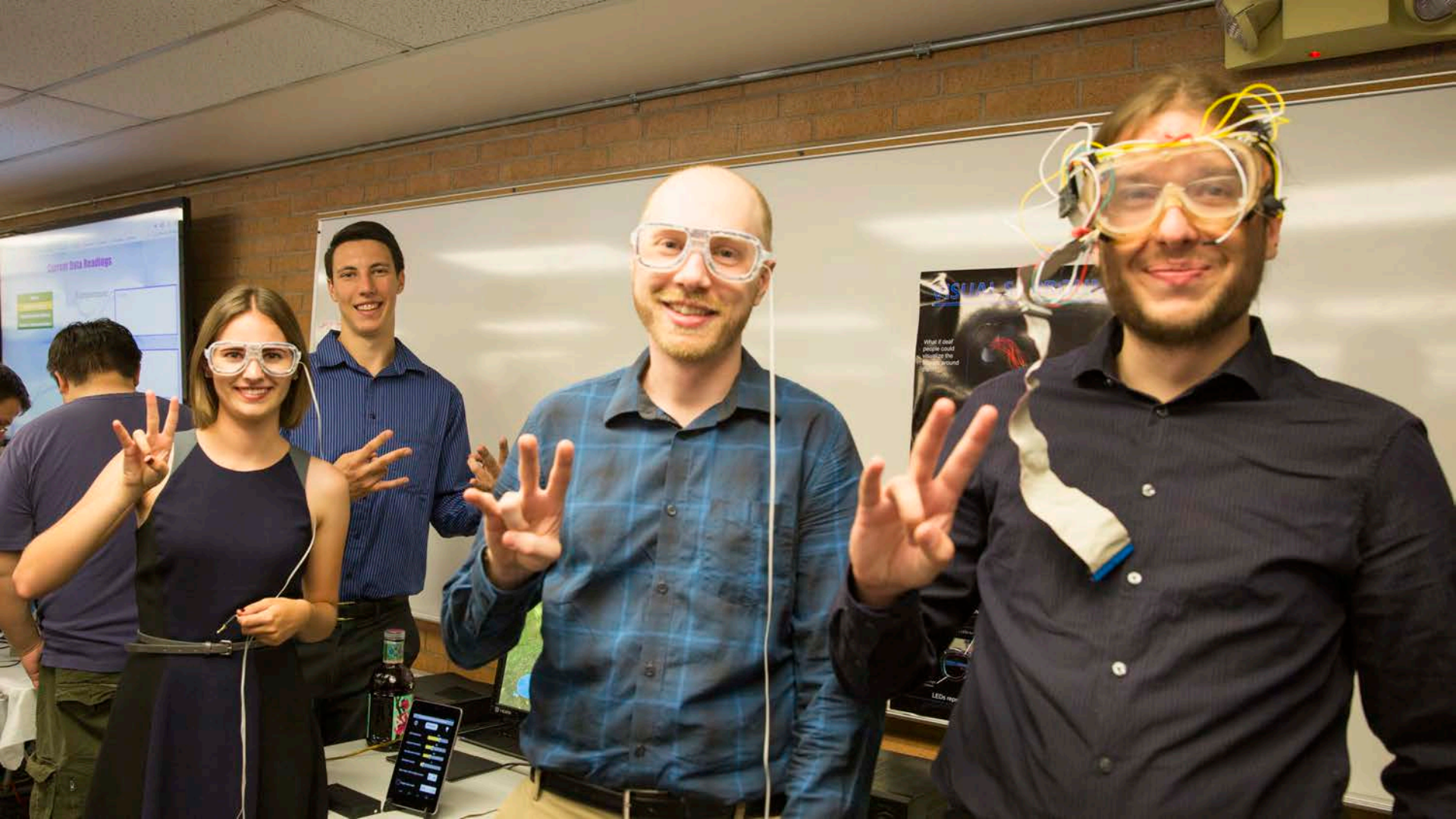
Seth Tyler Marquez



Sincerest thanks to Kristen and my entire family. Your love and support helped me reach the finish line. I couldn't have done this without you.
Tim

Timothy Roland Marshall





***Thank you Mom, Dad, and Mariah for
your unwavering support throughout
my college career! I love you all!
(even if one of you is a wildcat)***

Cole Davis Martin



"I have fought the good fight, I have finished the race, I have kept the faith"-2 Timothy 4:7

Marisa Lopez Martinez



I would like to thank my family & loved ones, for helping me throughout this journey. Your support and encouragement is what allowed me to reach goals

Kyanna Nicole Masick



I want to thank my entire family. I would not be here without your love and support.

Chelsey Denise Mcalpin





2-Axis

Otaif Gabrielson
Abdulhaziz Al-Taimim
Jacob Hawkins

Cameron Hines
Derek Bell
Bobby Boyd

Problem Statement
Design and build a mechanism capable of tracking the sun's position in two axes with a tolerance of $\pm 5^\circ$ to the angle of incidence

Design Requirements

- 30% more efficient vs. fixed
- 1/3 of that power for operation
- Morning daily-axis return feature
- Over 90 lbs. of panel capacity
- Under \$1000 budget
- Energy independent

I want to send a personal thank you to my mother. Without her help I would not be here today. I love you mom, thank you.

Edward Ivor McCray



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*To my family and friends: I couldn't have done this without your love, support and encouragement. Thanks for making my dream come true! Love,
Kymberli*

Kimberly Frances McGuinness



McKeand Family,

Thank you for helping me achieve my goals. Without your support and motivation, I would not be the man that I am today.

Love,

Brady Lawrence Mckeand





Thanks mom, you da best.

Jessica Reyne McLean



Thank you Mom and Dad and My brother for all the support over the last 4 years. It's been a hard ride but you've helped me get to be where I am today!

Travis James McMahon



Big thanks to the MSE students for always helping me, big thanks to the MSE professors for forcing me to learn while not being overwhelming.

Kyle Jonathan McMullan



*I want to thank everyone that
has supported me through this
amazing period in my life.*

Adam David McNabb



*Thank you to my wonderful
parents and to my loving
fiancee for always being by my
side and supporting me!*

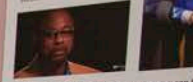
Brandon Lee Mead





Inspiration

- Is your luggage safe when you travel?
- Over the past decade close to 100 TSA employees for theft.
- As a janitorial employee, Pythias Brown confessed to \$400,000 over a 4 year period.
- He confessed that he was a part of a "culture" stolen from passenger luggage.



- Only using a ballpoint pen, most suitcases can be very easily opened.

Project Scope and Definition

- Initially: A theft proof bag that prevents valuable items being taken from the bag.
 - A secondary round of research led us to a product with a near-identical scope:
 - BagGo



- Currently: The goal is to create a suitcase that defies the expectations of a thief and thus increases the safety of luggage.
- The bag will accomplish this by incorporating a set of features:
 - Electronic and Internal Locking System
 - Internal Camera
 - Rechargeable Battery Unit
 - Locking internal compartments for added security
 - Simultaneous capabilities

I want to thank my family for their encouragement and their support. I also want to thank my wife for sticking by me and believing in me.

Michael Edward Medina



***Thank you Mommy, Damian,
Jack, Mya, and Emma for
supporting me! Daddy's coming
home!***

Timothy Alan Meier



Mom and Dad, thanks for making this possible. To my friends, neighbors and roommates who shared this time with me, welcome to the family.

Nikolas Emmanuel Meneakis



Thank you to all the people that supported me through this...Lilly, Jen, Howdy, Rose and my Mom and Dad! I couldn't have done it without you!

Justin Merritt





Examining titanium dioxide

Can development of nanoparticles

Introduction

Fluoride is a condition caused by the ingestion of daily doses of fluoride.

- Severity of health impacts increases with amount of fluoride
- Toxic effects are typically reported in young people (2002, 2004) and young people around the world

Fluoride in water

...that requires that are particularly

Results

Sample 1: Fluoride in water	Sample 2: Fluoride in water
High	Low
Sample 3: Fluoride in water	Sample 4: Fluoride in water
High	Low

***Thank you my amazing & beautiful wife
Nicole! I love you so much, you deserve
most of the credit for my success, I
could not have made it without you!***

Joshua Adam Michalak



*To all the people who
supported me through this
THANK YOU!!!*

Adam Saeed Midkiff



I started this magical journey 23 years ago...LOL!! Thank you Meghann for making me see that it normally takes 4.

Dean Todd Miller



***Thanks Mom, Dad and Sterling,
I couldn't have done it without
your support. Love you all!***

Jace Robert Moller





engineer
your best ideas

build
tomorrow's today

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orks up!
on Schools
tradition.

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***For the LORD gives wisdom: out of His mouth
comes knowledge & understanding! Prov. 2:6
Thank You Jesus!***

***Thanks Mom & Dad
Steve, Beq, Zab, Es, Maasa!***

Judah Heli Montenegro



All my family has been a great support throughout college and I am blessed to share this experience with them!

Brett Joseph Montgomery



Thanks Ma, Peanut, and Josh for your patience and support. Rhayne and Ashley, thank you for your encouragement and understanding. All my love to you.

Cheryl Elaine Moorcones



My years at ASU have been an amazing mix of learning, meeting great people, participating in incredible opportunities, and having fun! Thanks Devils!

Amanda Ray Moore



***SINGLE MOTHER GRADUATES IN TOP OF
BME CLASS because you cared, helped,
encouraged, believed, laughed, and loved.***

YOU gave me meaning and purpose. <3

Laina Dean Moussallem



Thank you for everything, Dad. I couldn't have done it without your leading example. I love you!

Skylar Mowery



*Thank you to my family and friends
that helped me complete my college
career. I would not have reached
this without your guidance.*

Maritza Mujica



I made it! I made it through because of all the support of my loving and supportive family and friends. I love you all! Thank you for all the support!

Kendra Niquelle Munns





I want to thank my family for pushing me to do my very best. You guys are amazing!

Timothy Alexander Munsil



*Here comes another Muradvich
Engineer! Thanks Mom and Dad for
always believing in me! I could not have
done it without your everlasting support
<3*

Meerna Muradvich



*Thank you for supporting me,
helping me, and making this
possible. I love you all so very
much!*

Emily Ann Murphy



Would like to thank everyone that has stood by me over these years. I will never forget what each one of you have done for me to help get me here.

Devin Edwin Lee Murray





Sustainable Soil Improvement via Abiotic Carbon Dioxide Sequestration

Stephen Hermens, Chemical Engineering
Mentor: Dr. Hamdallah Bearat, Senior Research Scientist
School of Engineering of Matter, Transport, and Energy

Materials Selection

Figure 1: Silica Gravel **Figure 2: Kaolinite (Clay) Flakes** **Figure 3: Granite Rock**

Carbonation Procedure

Each aggregate was mixed with calcium hydroxide in equal parts. The dry components were then hydrated and mixed thoroughly, using just enough water to make a paste (typically the same weight of the calcium hydroxide). Each mixture was plated into a cylindrical reactor boat and reacted at approximately 860 psi in a CO₂ reactor for 24-68 hours. The calcium hydroxide in the samples will react in the following manner: $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$. This results in a CaCO₃ matrix surrounding and binding the aggregate into a composite.

Research Purpose

- Portland cement is a very cost-effective and useful building material.
- However, Portland cement production results in approximately 5% of worldwide CO₂ emissions.
- Could Portland cement usage be reduced with novel methods for soil improvement?

Conclusions & Recommendations

A boundary layer effect roughly 4 mm thick was noted on the surface of all carbonations. This corresponds with the issues noted in previous reactions on a smaller scale. Each reacted sample had a noticeable layer that would separate easily after drying. Excellent carbonation was achieved on the surface (outer layer) in the samples.

I would like to thank my friends and family for helping me along the way, especially my Mom! Without her this dream would have never been possible.

Trevor John Murray



To my family: For all of the advice and wise words you've provided me throughout my life.

Thomas Joseph Myzia



Special thanks to my husband Rachad and my kids Omar, Ayah, Hajj, Khaled, Adam & RJ for your support during my journey. I love you!

Zakieh Nafeh



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***Because of these professors I am
crossing this stage tonight. Abramson,
Brewer, Liao, Chmouni, Patel, Calhoun,
Berman, Solanki, Reddy, Grewal,
Trimble***

James Robert Nelson



ctus

to west p

n up to join the adv

y begins every h

the hour and h

braham
a jenkins
mcdanell
nurabata
ie pillow
el slinker
williams

steam

5



Module

Machine

Module 1: For all my fellow students, please remember to always wear your seat belt.

Module 2: Don't drink and drive. It's the only way to stay safe on the road.

Module 3: Please don't drink and drive. It's the only way to stay safe on the road.



***Mom, Dad, Rob, Daniela:
Thank you for helping me to find my way,
to excel, to be respectful and loving.
Thank you for your love and care.
LOVE NICKY***

Nicolas Neve



Thanks for the memories.

Nicholas James Newberry



Life is never a journey alone. Thank you to my friends, family, professors, mentors, and girlfriend for helping me become who I am today.

Jeffrey Quang Nguyen



***Thanks Mom and Dad For
always supporting me. I could
not have made it this far without
you guys.***

Zack Niemeyer



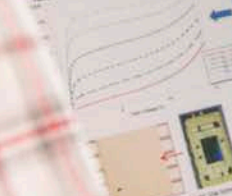


High Efficiency Electronics for Space Applications

John Kim, Electrical Engineering
Mentor: Dr. Trevor Thompson, Professor
School of Electrical, Computer, and Energy Engineering

Introduction

High efficiency electronics are essential for space applications. This research project aims to design a high efficiency power converter for space applications. The project focuses on the design of a high efficiency power converter for space applications. The project focuses on the design of a high efficiency power converter for space applications.



Method

The project involves the design and simulation of a high efficiency power converter. The project involves the design and simulation of a high efficiency power converter. The project involves the design and simulation of a high efficiency power converter.

Results

The results of the project show that the designed power converter achieves a high efficiency of approximately 95%. The results of the project show that the designed power converter achieves a high efficiency of approximately 95%.

Conclusions and Outlook

The project demonstrates the feasibility of designing a high efficiency power converter for space applications. The project demonstrates the feasibility of designing a high efficiency power converter for space applications.

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***Thank you to all of my friends,
family, and professors for your
support. It's been fun. Peace out
y'all!***

Sean Kelly Noel



***Thank you for always
supporting me!***

Nicolas javier Nogales



***Love and thank you friends, family,
Valerie (mom), Miguel (dad) and
Vanessa (GF)! Especially my mom and
dad for the unconditional love and
support.***

Miguel Angel Noriega



I'm grateful for my wife for supporting me in my dream;she & our kids have been an inspiration.Thanks to Mom & babysitters.Above all,thanks to my God

JOSE NUNEZ





ARIZONA STATE SUN DEVILS

Thank you to everyone for coming today and supporting me for the last four years. It has meant a lot to me! I love you all!

Alyssa Gillian Oberman



I have had a great four years at ASU. I am also thankful to my family for all the support and love throughout this time.

Grant Kiyoshi Ogawa



***When good ideas come together,
anything is possible!
Thank you to my family and friends
for their support and encouragement!***

Scott Douglas Olson



***Thank you to my family and
friends who have been with
me through this wild ride!***

James Logan Oplinger



Thanks to all my friends and family that supported me through this amazing journey! Especially, my mom. Love you mom!

Blake Kelly Ortiz



Thank you mom and dad for all your support throughout my college career. Without you, I would not be where I am today. I love you!

Brittany Renee Ortiz



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***Thank you friends and family
for all of the support. I couldn't
had done it without you.***

Diego Noe Ortiz



I want to thank my friends and family for helping me accomplish my dreams of becoming an engineer!

Gisela Ortiz





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Eric Chang, Air Devils
I Made An Impact!
Spring 2015

OUTSTANDING PIONEER
DEVELOPMENTAL PIONEER
COMMUNICATION L
GEORGE CHEE
EPA KAPPA NU
2014-2015

***Thanks, Mom and Dad! I'm
finally done!***

Joseph William Palaski



***Thank you so much for all
your help and support!***

Ryan Michael Palma



***Thank you to my dad and brother
for always supporting me and
encouraging me to continuously
strive for self-improvement.***

Andrew James Palmowski



thank you, my family!

Ethan Pan





***Thank you family for the help
and support you have given me
over the years to bring me to
this point.***

David Jose Pardo



Thank you to all my friends and family for supporting me through these formative educational years, and a special thanks to the Montgomery GI Bill.

Travis Luke Parker



***Thank you Mom & Dad, I
love you both!***

Michael Parra



Thanks family/friends! You were by far the best support for whenever i needed help. "yahoo for school, yahoo for me! Peace! I'm outta here!"

Sean Thomas Penkert



I want to thank God, my wife Ann, my kids Davina, Matthew and Lorraine. My mom, dad, brothers, family and friends who believed in me. This is for you!

Angel Perez





One-Step Pickering Emulsion Polymerization

Background
FURI
research

Polymers

ASU

F

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UNIVERSITY

I would like to give a special thanks to my lovely parents, sisters, and friends. Los quiero mucho. Y el shop Los G's.

Antonio Perez-Diaz



***Thank you friends and
family for everything!***

Joshua Perkins



*Thank you to my family for
all your support. I did it!
Ayóó Ánííníshní.*

JoAnne Pete-Deschenie



Thank you Mom and Dad for supporting me through all my years of schooling. I love you.

Timothy Daniel Peterson





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*I have finished a major section
of my life and am on my way to
the rest of my life. Thank you.*

Jacob Mccallister Phillips



Look I made it in one piece!

Thomas Perignon Picciano



I would like to thank my parents for their support in my dreams and aspirations. They helped make all of this possible.

Trevor Charles Pickrell





STERILITY

BUTLE

EASE- OF

***Thank you to all my family
and friends for all the love
and support!***

Kory Ray Pottorff



***Thanks for all the love and
support over the years
Prinsens family - Ryan***

Ryan Thomas Prinsen



I'd like to thank my family and my friends for all their support over the years. I could not have done it without guys. I love all of you.

Connor Timothy Pyle



Thank you everyone for believing in me and constantly encouraging me to be the best person I can. I am glad you were by my side.

Andre Esteban Reynoso Quihuis



To all my family and friends, I love you guys so much! Thank you for being supportive and positive.

Devinne Ramirez



Inorganic Coated Polypropylene Separators for Lithium Ion Batteries

Paul McAfee, Chemical Engineering
Mentor: Dr. Jerry Y.S. Lin, Regents Professor
School for Engineering of Matter, Transport and Energy

Research Objective: To improve the durability of lithium ion battery separator membranes while maintaining or improving cycle performance

Li-Ion Battery Background

- Higher energy density and operating voltage than other secondary batteries
- Significantly lower self-discharge rate (3% / month)
- \$30 billion growing industry: personal electronics and electric / hybrid cars

Industry Standard: Polypropylene (PP) Separators

Pros:
Adequate cycle performance with

My Work

- Dip-Coated PP Separators in 2 Inorganic Membranes**
- #1: Mesoporous gamma-alumina (Al₁, Al₂, Al₃)
 - #2: Macroporous yttria-stabilized zirconia (YSZ₁, YSZ₂, YSZ₃)
 - Control: 2 Pure-PP separators (PP1, PP2)

Built and Evaluated Batteries

- Assembled separators in coin cell with anode, cathode and electrolyte
- Performed constant current/constant voltage cycle test
- Determined discharge capacity over multiple cycles



Interpretation of Results

- Poor wettability of inorganic membrane layers hindered electrolyte diffusion
- Low porosity of YSZ provided additional resistance
- Delamination of gamma alumina caused slow/uneven diffusion



Wettability of various separator surfaces characterized by increase of drop size over time.



***Dear Mom & Dad,
I want to thank you for your continued
support and encouragement during my
time here at ASU. I could not have done
this without you!***

Mounica Rao



Thank you to my family for supporting me throughout my college education and thank you to all the people who helped along the way.

Christopher Raupp



Thank you mom and dad for trusting me and sending me to America. Today I am an engineer. Thank you to all my friends for making my ASU life memorable.

Naga Vamsi Rayaprolu



Dear Family-You are the reason I am here. This degree is partially yours and with that in mind, LET'S CELEBRATE!!! Thank you. It took a village. - JuJu

Julian Demetric Re'





***Mom, Dad, thanks for the
free room and board. -Jake***

Jacob Andrew Reber



***Thanks to all my friends
and family!***

Christopher Edward Recher



I appreciate the support of my family for my twenty years of schooling. Thank you to Mom, Dad, and Michael

Tyler Joseph Reeves



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engineer
your best ideas

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make
future happen

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build
tomorrow's today

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build
tomorrow's

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tomor

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ARIZO

tomor

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ARIZO

tomor

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up!
ools

*I wouldn't be here without
you. Thank you for
everything!*

Kyle McClure Reilly



***Thank you to all of my family, friends
and colleagues for your support
during my college career. I couldn't
have done it without you! Love you all!***

Dominick Nathaniel Renteria



Special thanks to my parents for letting me bring my dirty laundry home on weekends.

Q. How do CS students not drown?

A. They use floats.

Josiah James Rentschler



It took me a while, but I finally made it. Thank you to every single person that helped me through this journey. Gracias familia y amigos. Por fin!

Mariela Resendez



Thank you to Julie and my children for allowing me to complete my degree after many years!

Brandon Kyle Rickman



I have had a great experience at ASU. I want to thank my family and friends for helping me on this journey. Go DEVILS!

Frank Rivera



I want to thank my parents for all the support they have given me over the years. My graduation would not have been possible without them.

Zachary Michael Robbins



*Thanks to everyone who supported
me throughout my college journey!
I wouldn't have been able to
succeed without you!*

Armand Karel Roelens



Thank you so much for helping me and guiding me on my way through college. It has been a rough ride but I did it!

Timothy Adam Ros





Thank you mom and dad for believing in me and giving me the opportunity to further my education and always pushing me to strive to be the best.

Michael Paul Ruiz



I wish to thank my family for their support and my friends for their help in studying for classes. I couldn't have made it without all of you!

Phillip Rex Sabin



God has given me an awesome family and group of friends that helped me so much these past four years. Thank you all for being there for me!

Logan Salaki



I am truly thankful for your support and love the past four years. Always pushing me to do my best, I love you!

James Edward Salazar



Thanks to my Brenda as well as my family Paz and Salazar for all there support, they were there in the toughest times through out my academic career!

Johnathan Salazar



Mom, thanks for putting up with me for so long. Couldn't have gotten here with out you, love you!

Matthew T. Salazar



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Gracias a todos mis amigos, familia y Bianca. Gracias Mama y Papa. No fue facil pero ya finalmente estamos aqui. Yeahhhhh!

Ivan Ginez Sanchez



Mama y Ruben: Mil gracias por todo el apoyo y el amor que me dieron desde que llegue de Argentina. Gracias Che!

Joaquin Santeccchia





*Thank you mom and dad for your
endless support through this journey
and thank you Leslie and Sara for all the
laughs couldn't have done it without you*

Orlando Marcony Santos



***Dad, Mom, Laurie, Allan, Jessica,
Anthony, Papa Nanny, Kaley! Finally
made it 6 years later! Hope you're not
sweating bad in those seats love you all.***

Robert Michael Scarsella



I am so grateful for my parents supporting me as I found avenues I never saw myself going.

Jessica Hammitt Schiltz



I am grateful and appreciative of my family members, friends, and fellow students who have helped me to graduate. Thank you all.

Brian Matthew Schrock





A myoelectric...

Lisa Irimata, Dalton Moore
Mentors: Dr. Thurm...

School of Biological Health Systems

Project Overview
Hand dexterity is a characteristic of stroke patients where the ability to control fine muscles of the hand is compromised. In an effort to increase the quality of life for individuals with severe cases, hand type can device serves as an alternative to prosthetic limbs. Focused on assisting a wide range of activities, the device is designed to be a functional alternative to...

ASU School of Biological Health Systems

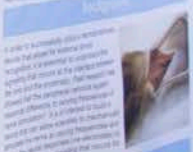
Infrared Vaso...

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Variable Frequency Mechan...

Design Teams
Members
of Biological Health Systems

The design of a mechanical system for stroke rehabilitation is a complex task that requires a deep understanding of the human hand and the specific needs of stroke patients. This project focuses on developing a device that can assist with fine motor control and dexterity. The device is designed to be a functional alternative to prosthetic limbs, allowing stroke patients to perform a wide range of activities. The project involves the design, construction, and testing of a hand type can device that can be used by individuals with severe cases of stroke. The device is designed to be a functional alternative to prosthetic limbs, allowing stroke patients to perform a wide range of activities. The project involves the design, construction, and testing of a hand type can device that can be used by individuals with severe cases of stroke.



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I would like to thank my family and also my beautiful and incredibly supportive fiance. I could not have done this without you. :)

Brandon Richard Schwartz



Thank you, Dad, for 28 years of loving support. I know you're looking down on me, proud, and I wish you could be here so I could hug you one last time

Carl William Scott



Thank you Mom and Dad for your love and support! And thank you to my lovely fiancée! I can't wait for what the future holds! Hooyah Navy!

Christopher Michael Scott



*Thank You to my beautiful wife
Suzanne for loving and supporting
me through this journey. I love you
always and forever. Love*

Tim Scripture





***Mom & Dad - Thank you for
making this all possible***

Benjamin Joseph Sears



*I would like to thank
sidewalks for keeping me
off the streets.*

Greg Eric Selby



I just want to thank God, my family, TBM, and my friends for all the support over the years.

Jonathan Shahani



Ake, Ana, Saule tate Rakhmet! I never thought tonight could ever be this close to me. We made it!

Abylay Sharip



Thank you Mummy and Papa for all you have done for me! I would not be here without you!

Also, a thank you to Swaran Bua and Kenneth, and my family!

Aman Sharma





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Andrew Palomares
Mechanical

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Jose Suarez
Mechanical

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***Thank you for all of your
support!***

Zachary Tyler Sherwin



***Thank you for your support
AniSangBhai!***

Shemal Shukla



Special thank you to my family for all their help and support during college.

Aaron S. Sidhu

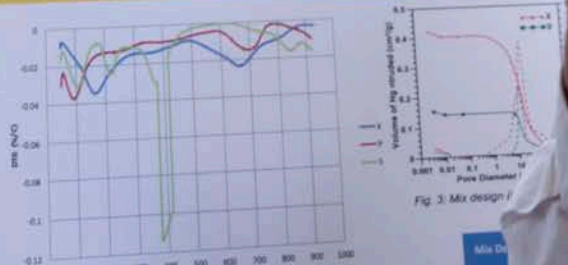


Synthesis and Structural Properties of FAU-Type Zeolite Prepared with Fly Ash

Francesco Ruta, Civil Engineering
Mentor: Narayanan Neithalath, PhD
School of Sustainable Engineering and the Built Environment

INTRODUCTION

porous, aluminosilicate mineral used primarily in the production of Zeolites are a broad class of minerals, which include faujasite $Al_4Si_4O_{20}(OH)_4$. The IUPAC code for faujasite is FAU. A zeolite as a filter medium would require an ideal balance of strength and porosity. In the experiment, the strength and porosity are inversely related in porous media: an increase in strength corresponds to a decrease in porosity. In the experiment, the porosity of several faujasite species were studied. Five different mixtures were prepared, each with three varieties labeled X, P and S. The mixtures were labeled (i) through (v). Since no mix design was able to achieve both strength and porosity, a material with a good balance of both properties was needed for engineering applications.



CHARACTERIZATION



***Thank you Mom and Dad for the love and support, and for making me into the man I am today. I love you and will miss you very much!
Love,
Chris***

Christopher Patrick Silvia



***Words can't explain enough how
thankful I am to you MAMAN & BABA.
Many thanks to all my friends too,
Especially Thomas. Love you all !!!***

Salar Simaie



Since I was a child I wanted to be a Sun Devil. I want to thank my family for helping my dream come true.

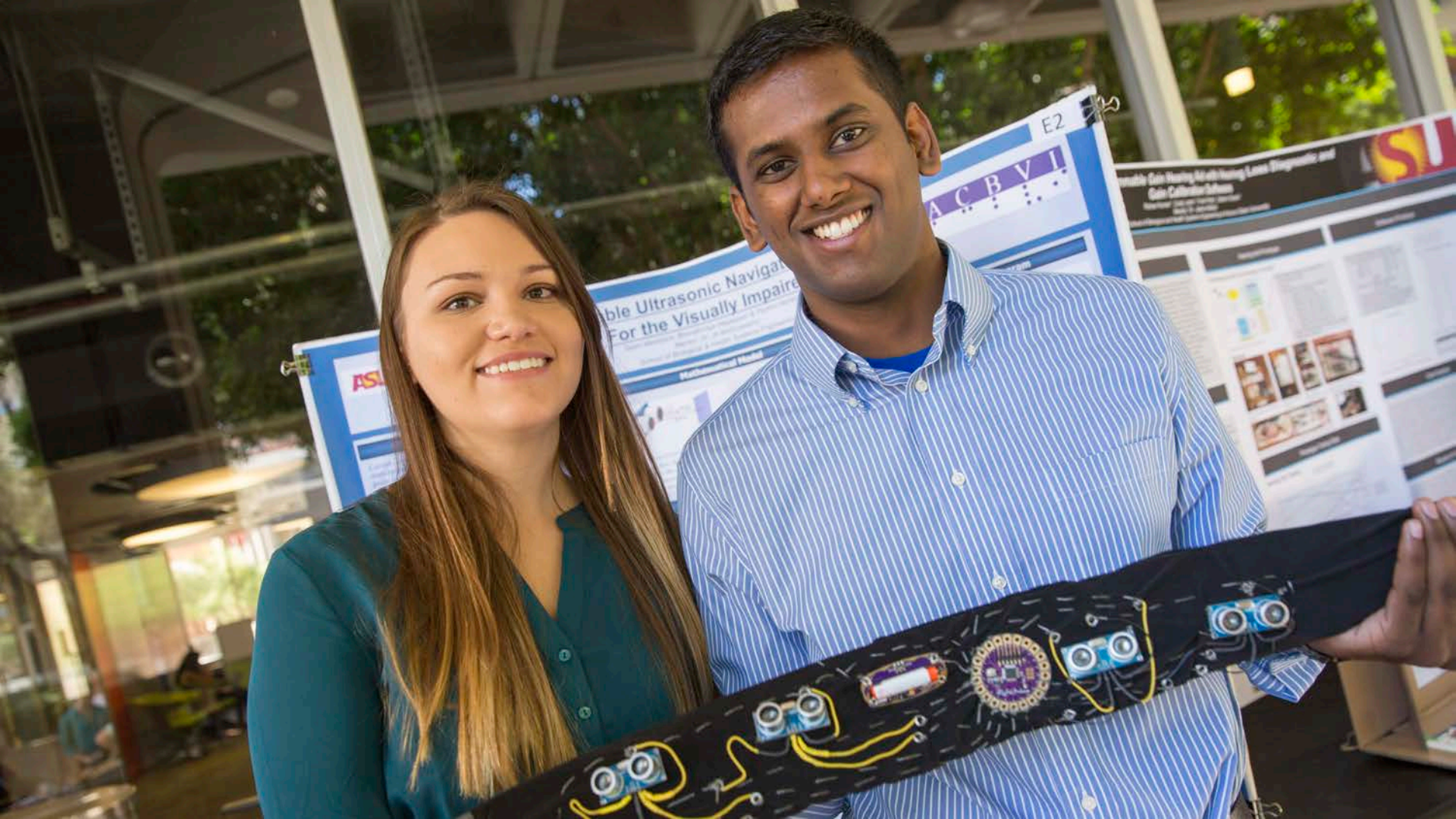
Evan Ian Slade



I would just like to say thank you to all my family and friends that supported me through my college experience. I love you all

Alexander Arlington Smith





E2
ACBVI

able Ultrasonic Naviga
For the Visually Impaired

ASU
Research on Using Artificial Intelligence to Diagnose and
Classify Cancer Lesions



***Thanks to family and
friends who stuck it out. I
finally did it!***

Dominic Lopez Smith



***Thanks for believing in me,
friends and family! I did it!***

Kristopher Jorge Smith



***Thank you for my family for
all the support during this
journey!***

Marc Christian Smith



I have loved my experience at the Fulton School. The professors and students are great, and I feel ready to take on the world.

Allison Marie Snodgrass



We did it!

Daniel Solis

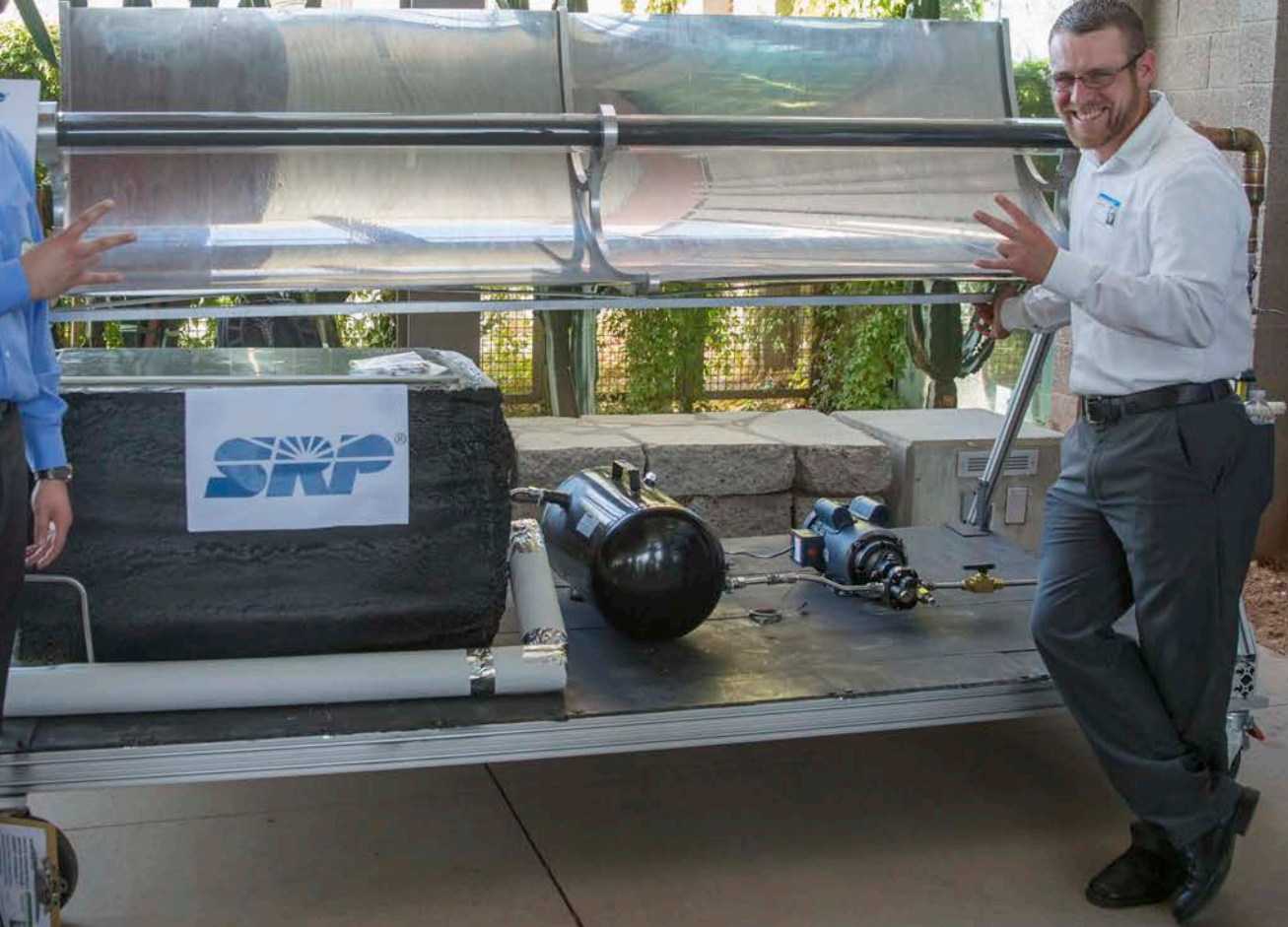


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Background

ASU Engineering is a leading provider of engineering education and research. Our programs are designed to meet the needs of industry and society. We offer a wide range of undergraduate and graduate programs in various engineering disciplines. Our faculty and staff are dedicated to providing the highest quality education and research. We are committed to innovation and excellence in all that we do.



***Thank you to all of my family
and friends for their love and
support! Especially my wife!
Love you baby!***

Vicente Solis



Thank You to all of you that have made me who I am and instilled the core beliefs that have helped me get to this very point in my life.

Love You All

Eric Andrew Soriano



***My sincerest gratitude to Dr.
Douglas Cochran, my mother
and father, the sake boys, and
my brothers in Pi Kappa Phi.***

Gregory Paul Spell



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I want to thank my wonderful fiancée, Alex Links, and my friends and family for supporting me throughout my time at ASU!

Mikaela Johanna Stadie



Thank you mom for all the sacrifice and love that you given me. Thank you Chetan for all the love and generosity that you have bestowed.

Dennis K. Stephen



***Mom, Dad, Lindsey, Seth, Dekota, and
Family,***

***Thank you for all your support and
encouragement!***

Love,

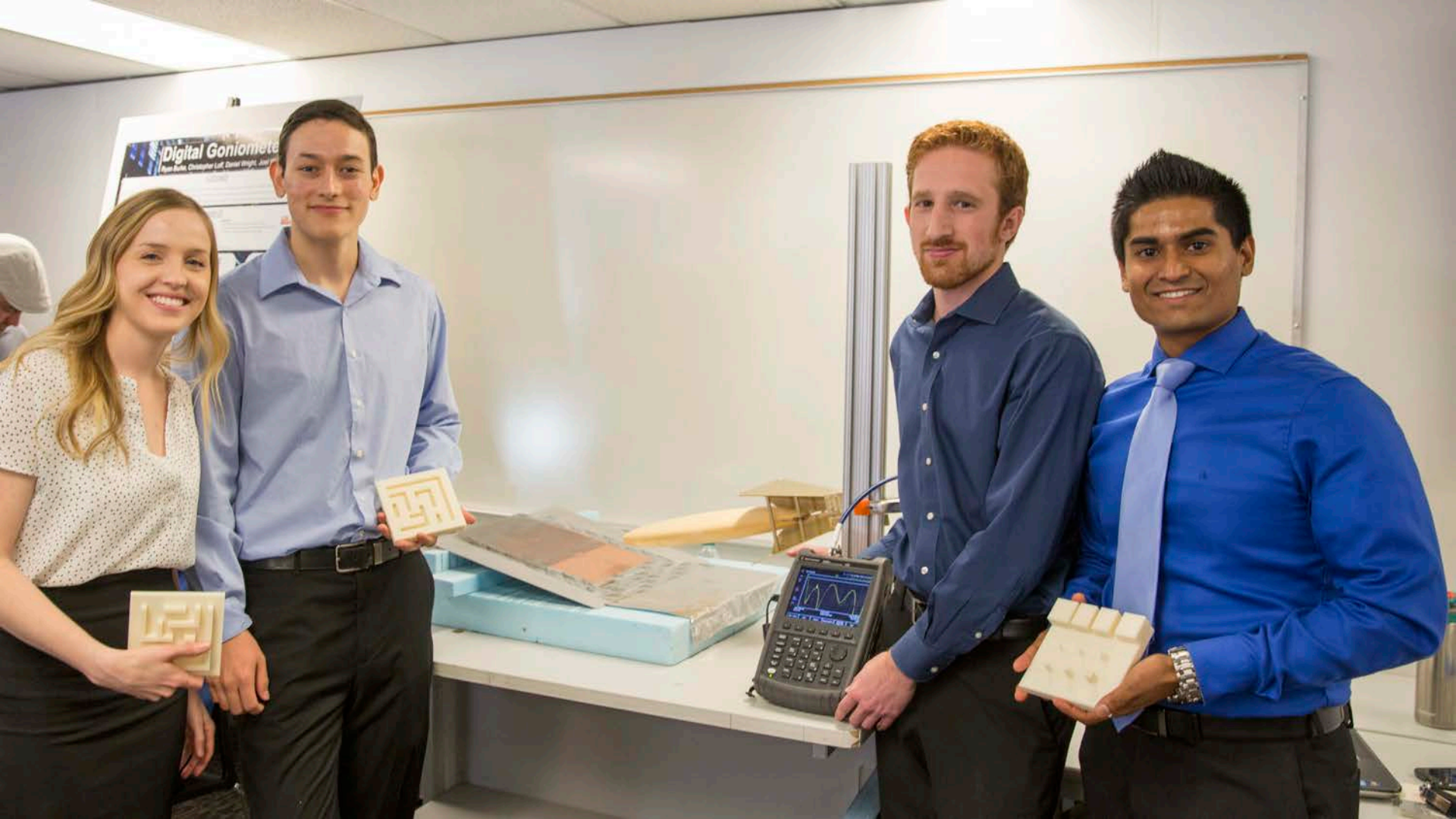
Lincoln Everette Stewart



***Thank you Mom, Dad, Courtney,
Brittany and Kyle for all the support you
guys have given me throughout the past
years! I love you all, GO DEVILS!!!***

Jake Louis Stiak





Digital Goniometer

From Beta, Christopher Lee, David Wright, Jason...

***Thank you so much for all of the
love and support over the years!
I am now an official "Enginerd"!***

Lynne Margaret Stocker



*Thank you to ASU for sparking
my interest in technology, and
thank you mom and dad for
helping me achieve my dreams.*

Joseph S Stratton



***Thank you for the help and
support peeps***

Ross Holiday Stuckert



Big thank you to my immediate and extended family, friends and neighbors. I would not have completed this accomplishment without your support.

John Joseph Swodeck



***Thank you Mom, Dad, and
Noel for believing in me.***

Timothy Daniel Szuberla





Nammo

Shooting Tunnel

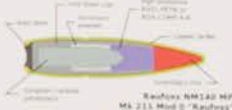
Christopher B. Ryan B. Brendan M. Juana M. Todd M. Dr. Kristine Csavina | Pete Charnisky



Design Challenge

Design an enclosed shooting tunnel safe for ballistic testing of ammunition produced by Nammo Inc.
Ammunition Range:
 223 Rem to 50 BMG
 Includes armor piercing & multi-purpose cartridges
Shoot House:
 Must be included in the tunnels
 Include recoil mounts for weapons and test targets
 Suppress noise emitted from shooting

.50 BMG MK 211 Raufoss



Acoustiblok Testing Results

Uncovered	Covered
130 db	110 db
100 db	80 db
90 db	70 db
60 db	40 db

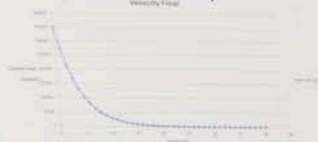
Using Acoustiblok material will achieve a 20 db reduction in sound levels emitted from the

Current Shooting Tunnel

Current tunnel designs include the use of a shipping container filled with shredded tire rubber which is easily flammable for the new use of ammunition. Nammo wants to test

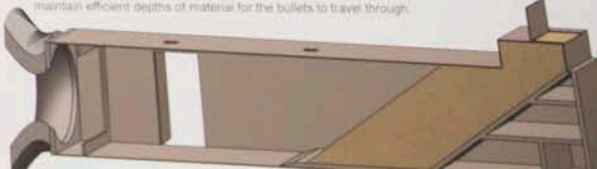


Testing of Bullet Trap Material



Bullet Penetration Depth
.338 Lapua
6 in
0.50 BMG MK 211
29 in

The new design will include a fine grain sand material backed by a metal support structure for added safety of bullet penetration. The sand will contain an auxiliary supply above to maintain efficient depths of material for the bullets to travel through.



I would like to thank my family (those present as well as those back in Cuba, who are with me in spirit) for their support, patience, n encouragement!

Rodolfo Tamayo



*I would like to thank my
parents for their love and
support.*

Kevin Tao



I would like to say thank you to all my loved ones who helped me get through everything these past four years. I love you.

Alysyia Tarin



This is as much your accomplishment as it is mine. Thank you for sacrificing your time and energy to make sure that I was successful.

Randi Michelle Taylor





Ira A. Tulton schools of engineering
ASI

Jessica
Schiltz

Dad, Mom, Schniz, Displet, Laura and Kaitlan, thank you for all your love & support! Tim Markison, thanks for being my role model. Love you all!

Timothy Douglas Taylor



I would like to thank my family for their continual support through the journey of engineering at ASU! I love you so much!

*Love,
Logan Taysom*

Logan Rex Taysom



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*Thanks Mama and Papa T for everything
you've done for me! LN, you know
whats up! Love you all!*

*Love,
John "BN"*

John Michael Templeton





Backyard Brew Labs

The Brewhouse

Mission

The mission of Backyard Brew Labs is to provide a safe and educational environment for students to learn about the science of brewing beer. We aim to demystify the process and show how it can be done at home.

Goals

Our primary goal is to educate students on the scientific principles behind brewing, such as fermentation and the role of yeast. We also aim to foster a sense of community among students who share a passion for homebrewing.

Objectives

By the end of the semester, students should be able to identify the key components of a brewing system, understand the stages of the brewing process, and brew a batch of beer at home.

The Brewing Process

The brewing process is a complex one, involving several key steps: mashing, lautering, boiling, and fermenting. Each step plays a crucial role in determining the final flavor and quality of the beer.

Microbial Lab

Microbiology is a key component of brewing, as it involves the use of yeast to ferment the sugars in the wort. Understanding the different strains of yeast and how they affect the beer's flavor is essential for a brewer.

Liquor Production

While our focus is on beer, we also explore the science of other alcoholic beverages, such as wine and spirits. This allows students to compare and contrast the different brewing and distillation processes.

Microbrew

Microbrewing is a growing industry, and it offers a unique opportunity for students to learn about the business side of brewing. We discuss the challenges of small-scale production and the importance of quality control.

Future Prospects, Considerations

As the homebrewing community continues to grow, it's important to consider the future of the industry. This includes exploring new technologies, such as automated brewing systems, and addressing the environmental impact of brewing.



I would like to thank all God, my family, my fraternity brothers and all my friends for helping achieve this goal. I love you all.

Abeal Bealem Tezera



***Thanks to my family for all
the support!***

Logan Kyle Thompson



Mom, dad, my sisters Linda and Savannah, and my love Jungbin, I couldn't have gotten this far without you! LOVE YOU and THANK YOU! <3

Juhui Thorn



***Thank you for all your support
and motivation, I honestly could
not of done this without your
help.***

Thomas Keating Thurber



Thanks to my family for always supporting me through the last four years of school! I never would have made it through without you!

Sarah Elizabeth Toews





Solution-Cast Membranes for Wastewater Recovery: A New Chemical Resistant Nanocomposite

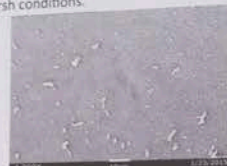
Sofia Herrera, Chemical Engineering
Mentor: Dr. Mary Laura Lind, Assistant Professor
School of Engineering of Matter, Transport and Energy

Abstract

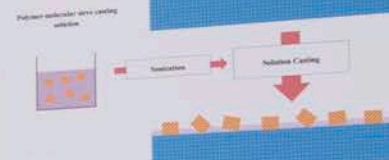
The research goal is to create a membrane with an impermeable polymer layer that can withstand very acidic environments but still be used to purify water. Nanoparticles called zeolites act as a water selective pathway through this impermeable layer and allow water to flow through the membrane. If this research is successful, many more water sources can be tapped since the membranes will be able to withstand harsh conditions.



Polypropylene supports spin coated at 4000 rpm with 2 grams with Silicalite 1



Nylon supports spin coated at 2000 rpm with 2 grams using dimethyl as the filler material.



Research Methods

The research has been focused on the bottom hydrophobic layer. In this research, spin coating at 4000 rpm with polyacrylonitrile proved to make the most permeable and thinnest film. This was applied to new supports to try to make a more cost-effective membrane.

Results

- The larger pores of new supports (nylon and polypropylene) form consistent films
- An increase in polymer and lower spinning rate improved the coverage of the support as well as the use of a filler material
- The zeolite components were well anchored to the polymer matrix as the amount of polymer used increased

Future Plans

***Gracias Mommy, Dad, &
Big brother I love you!***

Perla Verdugo Torres



I want to thank my family for helping to guide me through college. I appreciate your continuous support in my educational pursuits. It was invaluable.

Samuel Joshua Turner



I would like to thank my parents, friends, and family for all their help and support the past 4yrs even though I didn't visit that often.

Samantha Ann Twet



***THANKS TO MY FAMILY AND FRIENDS
FOR ALWAYS PUSHING ME EVEN
WHEN YOU FRUSTRATED ME DOING
SO. I LOVE YOU AND I DID IT :) ASU
CLASS OF 2015***

Alexis Danielle Valencia





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make your future happen

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engineer your best ideas

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make your future happen

don't just learn, learn to do

engineer your best ideas

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build your future today

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make your future happen

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connect

Build

***Thank you for all of the support
from my family, friends and
brothers. Phi Alpha.***

Robert Valenza



***Thank you for all your
support!***

Anthony Vargas



Only took 7 years to get here...Thanks to all for the support!

Todd Vargas



Thank you so very much to my family and friends for putting up with everything my degree and I have put you through, I couldn't have done this alone.

Rebecca Lee Veerman





***To Big Red, Quint, Mr. Prime
and the Rhino family: Thank you
for everything. I'm here because
of you.***

Lina Melissa Villa



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Thank you Mom and Dad for the love and support the past four years. I couldn't have done it without you guys!

Andrew Joseph Villareal



***Thank you for all your
support.***

Sandeep Gautam Vora



***I couldn't have done it
without your constant
support. Love Adri***

Adri Shelton Walker





Mom, Dad and Marley, thank you for all of your love and support! I couldn't have done it without you.

Dylan Chase Walker



My time at ASU was filled with memorable experiences. I acquired friendships and valuable skills during my time here. I am appreciative to everyone!

Christopher James Walmsley



***Thank you everyone for your love
and support, especially my wife
Cassie, who worked her butt off so I
could go to school! I love you all!***

Connor Jeffrey Walther



***Thanks mom and dad for
the support system you've
built for me, I love you!***

Nader Warrayat





The Department of
Mechanical Engineering
SAE engineering
Felix
2018

The hands on work done was exhilarating. I will miss the late night studies most of all, and my parents worrying that I have not rested properly.

Reda Warrayat



Without my family, I wouldn't be the man I am today. By supporting me and giving me the freedom to chase my dreams, I am forever thankful.

Drew James Watkins



***Thank you to my family for
supporting me in my
education!***

Kyle Wade Weeks



Kaitlin,

You are my rock, my sure footing, and my guiding star. Because of you I am here today; thank you. "You have stolen my heart" now and always.

Brian Robert Welty





Digital Control

Ryan Burke, Christopher Loft, Dan [unclear]

Concept

Research

Hardware Design

User Interface

Thank you to everyone who helped baby me through this degree! I couldn't have done it without you :)

James Brant Werra



Thank you Mom and Dad!

Matthew Lee West



***I would like to thank my Family
and Friends for all of their
unending support and
motivation! Thanks!***

Kevin Westgard



***ASU has provided the best 4 years of my life. Thank you Mom, Dad, Jim & Jill for your unconditional love and support!
I DID IT!***

Erika Marie White



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Programmable Inertial and Nutrition Tracker Integrated with a Mobile Application to Promote Health
Chase Fauver¹ and John Templeton¹
Mentor: Dr. Thurmon Lockhart¹
¹School of Biological and Health Systems Engineering

Functional Diagrams and Mathematical Models



Application Design

Sensor Image

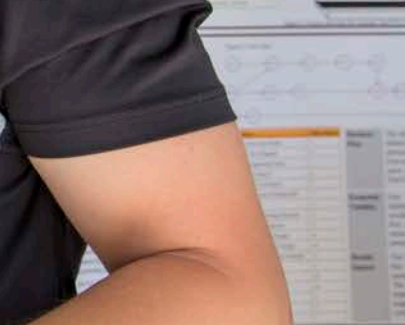


Sensor Average PPA Exhaled Between

ASU Ira A. Fulton Schools of Engineering
ARIZONA STATE UNIVERSITY
TearTOUCH: Non-Invasive Tear Analysis
Mentor: Jeffrey L. ...
Engineering Design Center, Harrington Bioengineering ...

Abstract & Background

This poster describes a new, non-invasive method for measuring tear volume and tear protein concentration. The method is based on a novel, non-invasive, optical method for measuring tear volume and tear protein concentration. The method is based on a novel, non-invasive, optical method for measuring tear volume and tear protein concentration. The method is based on a novel, non-invasive, optical method for measuring tear volume and tear protein concentration.



The results of the TearTOUCH method show that it is a highly accurate and reliable method for measuring tear volume and tear protein concentration. The method is based on a novel, non-invasive, optical method for measuring tear volume and tear protein concentration. The method is based on a novel, non-invasive, optical method for measuring tear volume and tear protein concentration.

To my mother: thank you for helping me persevere through illnesses and failures. I hope you're as proud as I am grateful.

James Phillip White



***Thanks Ed, Mom, Karol and
Lilly for your support these
past few years!***

Dominika Wilk



This is for you Morgan, Ian, and Zack! You were my motivation through this whole journey. I did it and one day you will too!

Angela Marie Williams



***Thank you to my wonderful family
for your love and support! Without
you, this wouldn't be possible.
Love,***

Micah Teresa Windsor





Developing a Flexible Magnetic Field Imaging Array

Mark Lavin, Gregory Swift, Chris Ma, William Lagace, Muzen Du, David Eder
#Sense Your Environment

Other Potential Applications

The imaging of magnetic fields is a critical component of many scientific and industrial applications. This work focuses on the development of a flexible magnetic field imaging array, which can be used in a variety of settings. The array is composed of a series of small, flexible sensors that can be arranged in a grid pattern. This allows for the measurement of magnetic fields in a wide range of environments, from laboratory settings to industrial applications. The array is also designed to be highly sensitive and accurate, allowing for the detection of even the smallest magnetic fields. This work is part of a larger effort to develop new, flexible magnetic field imaging technologies that can be used in a variety of applications.

Types of Magnetic Field Sensors

Magnetic field sensors are used to measure the strength and direction of magnetic fields. There are several different types of magnetic field sensors, each with its own advantages and disadvantages. Hall effect sensors are the most common type of magnetic field sensor, and they are used in a wide range of applications. Other types of magnetic field sensors include fluxgate sensors, magnetoresistive sensors, and superconducting quantum interference device (SQUID) sensors. Each type of sensor has its own unique characteristics, and the choice of sensor depends on the specific application. This work focuses on the development of a flexible magnetic field imaging array, which is a new type of magnetic field sensor that can be used in a variety of applications.

*Finally done. Thank you God
and thank you everyone who
has been there for me.*

Jang Hoon Won



***The past 4 years here at ASU
have been incredible. Thanks
to my family for all the support!***

Thomas Joel Wong



***Aero Pirates Abroad! Keep
the cider flowing!***

Donald Leland Wood



Thank you to my entire family and friends for your support and love throughout my college career. Thank you also to my professors. Thank you Steph.

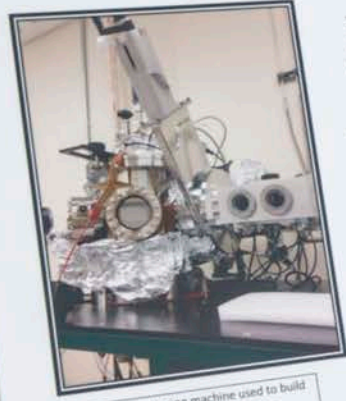
Miriam Arna Woolley



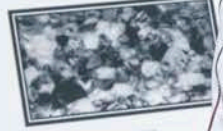
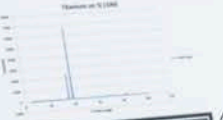
EFFECT OF SPUTTERING CONDITIONS ON THE MICROSTRUCTURE OF TITANIUM THIN FILMS

Cole Snider, Mechanical Engineering
Mentor: Dr. Jagannathan Rajagopalan, assistant professor
School for Engineering of Matter, Transport and Energy

How does the grain size, distribution and orientation of titanium films vary with different sputtering parameters?



This is the sputtering machine used to build titanium films. The experiments were conducted on (100) and (111) Silicon wafers. The sputtering parameters included: heating to 35 degree Celsius, and a



Top: Titanium on HF etched silicon
Middle: TEM data for the same
Bottom: Stress/Strain Curve for



Thank you to everyone who has ever supported me in this long journey. I'll devote my accomplishment to helping others in positive and supportive way.

Daniel Mead Wright



*Personal thanks to my
parents for their loving
support throughout school.*

Tanner Lee Wright



*Thanks to ASU, my friends and family,
and most importantly my Mom and
Dad. Couldn't have done this without
their incredible support! Go Devils!*

Brian James Wyatt



Thank you mom!

Weidong Ye



*Thank you to everyone for
helping me get even this
far.*

Stephen Michael Yonts





***Thanks mom,dad,Cindy, all my family
for ur love n support.I did it,its been
worth it.To JCs this is proof u can do
anything u set ur mind 2.love u all***

Julio Cesar Zavala



Thank you Alyssa for being there for me even on those late homework nights. Thank you family for your encouragement.

Christopher Thomas Zeigler



share your victory



#ASUGrad

#FultonGrad

#ASUengineering

*Thank you to my amazing wife, Angela,
my beautiful son, Ashton and the
greatest parents, William & Lana. Would
not be here without U! I Love you all!!*

William Anthony Zibert





tables:
5
5
5
5
6

System:
John Patten, Elizabeth Calabrese
Ohio State University, Tempe, AZ

Methods

To everyone who has stuck by me through the rough times. I could have never come this far w/o your patience, love, and support.

-WE DID IT!

Jeremy Michael Zinkofsky

