2020 Virtual Summer Research Symposium

August 14, 2020

The Grainger College of Engineering and the Center for Power Optimization of Electro-Thermal Systems (POETS)
# 2020 Virtual Summer Research Symposium

This event will feature remote research projects from 5 undergraduate students (REUs) and 7 high school students (Young Scholars) who were mentored by faculty members at the University of Illinois Urbana-Champaign, Stanford University and University of Arkansas. Several Young Scholars worked as a team over the summer and will be giving a joint presentation.

## Schedule At-A-Glance

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All posters are available for viewing at [https://wyse.engineering.illinois.edu/2020-summer-research-symposium/](https://wyse.engineering.illinois.edu/2020-summer-research-symposium/)

All researchers will be presenting during all three sessions, moving to different breakout rooms for each session. This provides the presenters with the opportunity to hear more of their peers’ presentations. Viewers are free to move between rooms. We will do our best to stay within the scheduled times in each room.

### Virtual Poster Session Etiquette

- Keep microphones muted unless invited to unmute
- Keep videos turned off
- Interact with presenters and viewers using the Chat function
Schedule of Events

1:00-1:30 Session 1

Room A
1:00-1:10
**Multipoint Design Optimization of an Electric Aircraft Wing**
Presenter: Tyler Turman  
Clemson University  
Collaborators: Ranjan Prateek & Kai James

1:10-1:20
**Hydrogen Fuel-Cell Powered Vehicles**
Presenters: Grace Lietz & Klein Powell  
Mahomet-Seymour High School  
Collaborators: Jeremy Davis & Phillip Ansell

1:20-1:30
**Drying Foodstuffs Using a Stored Solar Oven-powered Thermoelectric Generator**
Presenters: Lily Weaver & Jasmine O’Connor  
Central High School  
Collaborators: Thomas Gelsthorpe

Room B
1:00-1:10
**The Enabling Technologies of a More-Electrified Aircraft**
Presenter: Trinity Wilkins  
San Antonio College  
Collaborators: John Reband & Kiruba Haran

1:10-1:20
**Remodeling a Non-Intrusive Load Monitoring Power System Using Existing Data Sets and Algorithms**
Presenter: Carlos Santana  
Cañada College  
Collaborators: Anand Lalwani & Debbie G. Senesky

1:20-1:30
**Thermal Simulation Design Flow**
Presenter: Eric Allee  
University of Arkansas  
Collaborators: Chris Farnell & Alan Mantooth

Room C
1:00-1:10
**Effect of molecular structure on thermal conductivity of epoxy resins**
Presenter: Elynn Jensen  
University of Illinois  
Collaborator: Guangxin Lyu & David Cahill

1:10-1:20
**Quantitative Imaging Algorithm for a Non-Destructive Holdup Monitoring Robot**
Presenter: Noah Rebei  
University Laboratory High School  
Collaborators: Ming Fang & Angela Di Fulvo

1:20-1:30
**Recharging Lithium-Ion Batteries Using Energy Efficient Methods**
Presenters: Ella Greer & Madeline Keenan  
University Laboratory High School  
Collaborators: David Bergandine & Joseph Muskin

1:30-1:45 Session Break
Schedule of Events

1:45-2:15 Session 2

Room A

1:45-1:55
The Enabling Technologies of a More-Electrified Aircraft
Presenter: Trinity Wilkins  San Antonio College
Collaborators: John Reband & Kiruba Haran

1:55-2:05
Quantitative Imaging Algorithm for a Non-Destructive Holdup Monitoring Robot
Presenter: Noah Rebei  University Laboratory High School
Collaborators: Ming Fang & Angela Di Fulvo

2:05-2:15
Hydrogen Fuel-Cell Powered Vehicles
Presenters: Grace Lietz & Klein Powell  Mahomet-Seymour High School
Collaborators: Jeremy Davis & Phillip Ansell

Room B

1:45-1:55
Remodeling a Non-Intrusive Load Monitoring Power System Using Existing Data Sets and Algorithms
Presenter: Carlos Santana  Cañada College
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Presenter: Eric Allee  University of Arkansas
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2:05-2:15
Effect of molecular structure on thermal conductivity of epoxy resins
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Collaborator: Guangxin Lyu & David Cahill

2:15-2:30 Session Break
Schedule of Events

2:30-3:00 Session 3

Room A
2:30-2:40
*Multipoint Design Optimization of an Electric Aircraft Wing*
Presenter: Tyler Turman
Clemson University
Collaborators: Ranjan Prateek & Kai James

2:40-2:50
*Remodeling a Non-Intrusive Load Monitoring Power System Using Existing Data Sets and Algorithms*
Presenter: Carlos Santana
Cañada College
Collaborators: Anand Lalwani & Debbie G. Senesky

2:50-3:00
*Effect of molecular structure on thermal conductivity of epoxy resins*
Presenter: Elynn Jensen
University of Illinois
Collaborator: Guangxin Lyu & David Cahill

Room B
2:30-2:40
*Thermal Simulation Design Flow*
Presenter: Eric Allee
University of Arkansas
Collaborators: Chris Farnell & Alan Mantooth

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*Recharging Lithium-Ion Batteries Using Energy Efficient Methods*
Presenters: Ella Greer & Madeline Keenan
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*Drying Foodstuffs Using a Stored Solar Oven-powered Thermoelectric Generator*
Presenters: Lily Weaver & Jasmine O'Connor
Central High School
Collaborators: Thomas Gelsthorpe
Schedule of Events

3:30-4:30  Closing Ceremony

Welcome and Program Highlights

Keynote Speakers

Andrew Alleyne, Director of the Power Optimization of Electro Thermal Systems Center at the University of Illinois at Urbana–Champaign

Jonathan Makela, Associate Dean for Undergraduate Programs

Mentor and Mentee Shout-Outs

Awards

Best Presentation (REU & YS)

Best Poster (REU & YS)

Closing
Acknowledgements

Coordination Team: Jessica Perez Joe Muskin
Lara Hebert

Staff Support: Jodi Gritten Owen Doyle Harpal Singh
Courtney Steele
John Wierschem Shannon Davis Vicky Shimkus Isabel Diaz

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Chris Perez Doug Beck
James Eyrich
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Tasha Mamaril Philippe Geubelle
Meg Siebenhar Marielle Aromin
Mindy Wagenmaker
Ria Narayan
Rey Martin
Lewis Hill
Debbie Senesky Jose Cantu
Omayra Ortega Kortney Jones
Victor Cervantes Angie Wolters
Cole BenVau

JUMP and additional philanthropic givers
Young Scholars

The Young Scholars Research Program provides an opportunity for academically talented high school students from under-represented groups to gain authentic research experience, typically in our world-class labs. 2020 was different, due to COVID-19. A smaller cohort of students worked with their faculty and/or graduate student mentors on a wide range of projects, from hydrogen fuel cells as an alternative fuel for aircraft to food preservation using a stored solar oven-powered thermoelectric generator. Regular programming was provided throughout the summer to allow scholars to build their college and career readiness, whether through strengthening their ability to communicate in academic settings or improving their understanding of the admissions process.

The Grainger College of Engineering at the University of Illinois recognizes and seeks to correct the harmful history of institutional exclusion of certain groups from STEM fields including, but not limited to, African Americans, Latinos, American Indians, and women of all races and ethnicities. We seek to build on our new legacy of diversity and inclusion as the linchpin of excellence in all research, teaching and innovation efforts in the College. Programs like this one reflect our commitment to shared values of equity, inclusion, and excellence in science and engineering and all of STEM.

Through participation as Young Scholars Researchers, high school students have hopefully gained a better understanding of how scientific knowledge and engineering innovations are created and developed the skills and confidence to contribute to this process. As they actively work to cultivate ever stronger networks of support, we hope that our Scholars will be bold and tenacious in the pursuit of their education and career goals.

https://wyse.engineering.illinois.edu/2020-summer-research-symposium/
Instagram: wyse_il
Facebook/LinkedIn: Worldwide Youth in Science and Engineering at Illinois
Twitter: WYSE_IL
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