

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

1:00-1:30	Session 1 (<i>details on page 2</i>)
1:30-1:45	Break
1:45-2:15	Session 2 (<i>details on page 3</i>)
2:15-2:30	Break
2:30-3:00	Session 3 (<i>details on page 4</i>)
3:00-3:30	Deliberations & Break
3:30-4:00	Closing Ceremonies (<i>details on page 5</i>)

All posters are available for viewing at
<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
Collaborators: Ranjan Prateek & Kai James
Clemson University

1:10-1:20

Hydrogen Fuel-Cell Powered Vehicles

Presenters: Grace Lietz & Klein Powell
Collaborators: Jeremy Davis & Phillip Ansell
Mahomet-Seymour High School

1:20-1:30

Drying Foodstuffs Using a Stored Solar Oven-powered Thermoelectric Generator

Presenters: Lily Weaver & Jasmine O'Connor
Collaborators: Thomas Gelsthorpe
Central High School

Room B

1:00-1:10

The Enabling Technologies of a More-Electrified Aircraft

Presenter: Trinity Wilkins
Collaborators: John Reband & Kiruba Haran
San Antonio College

1:10-1:20

Remodeling a Non-Intrusive Load Monitoring Power System Using Existing Data Sets and Algorithms

Presenter: Carlos Santana
Collaborators: Anand Lalwani & Debbie G. Senesky
Cañada College

1:20-1:30

Thermal Simulation Design Flow

Presenter: Eric Allee
Collaborators: Chris Farnell & Alan Mantooth
University of Arkansas

Room C

1:00-1:10

Effect of molecular structure on thermal conductivity of epoxy resins

Presenter: Elynn Jensen
Collaborator: Guangxin Lyu & David Cahill
University of Illinois

1:10-1:20

Quantitative Imaging Algorithm for a Non-Destructive Holdup Monitoring Robot

Presenter: Noah Rebei
Collaborators: Ming Fang & Angela Di Fulvo
University Laboratory High School

1:20-1:30

Recharging Lithium-Ion Batteries Using Energy Efficient Methods

Presenters: Ella Greer & Madeline Keenan
Collaborators: David Bergandine & Joseph Muskin
University Laboratory High School

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
Collaborators: Anand Lalwani & Debbie G. Senesky

1:55-2:05

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2:05-2:15

Drying Foodstuffs Using a Stored Solar Oven-powered Thermoelectric Generator

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Room C

1:45-1:55

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Collaborators: Ranjan Prateek & Kai James

1:55-2:05

Thermal Simulation Design Flow

Presenter: Eric Allee University of Arkansas
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2:05-2:15

Effect of molecular structure on thermal conductivity of epoxy resins

Presenter: Elynn Jensen University of Illinois
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

2:40-2:50

Recharging Lithium-Ion Batteries Using Energy Efficient Methods

Presenters: Ella Greer & Madeline Keenan
University Laboratory High School
Collaborators: David Bergandine & Joseph Muskin

2:50-3:00

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2:30-2:40

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2:50-3:00

Drying Foodstuffs Using a Stored Solar Oven-powered Thermoelectric Generator

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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 Lara Hebert
Joe Muskin

Staff Support: Jodi Gritten John Wierschem
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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

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WYSE 2020

UNIVERSITY OF ILLINOIS

TECHNOLOGY INNOVATION **CREATIVITY**
LEADERSHIP PROBLEM SOLVER **MATH**
DETERMINED

IMPACTFUL **EXPLORING**

PROGRAMMERS

DESIGN EXPERIENTIAL

STEM

HANDS-ON

D INVENTING **LEARNING**

DETERMINED

FOSTERING EXCELLENCE

SCIENCE

UN DEMONSTRATIONS **ENRICHMENT**
CHALLENGES

EXPERIENCE **WELCOMING**

GRAINGER ENGINEERING

WHAT IT TAKES