

University of Northern Iowa

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7-28-2023

### 2023 Summer Undergraduate Research Program

University of Northern Iowa. Sumer Undergraduate Research Program.

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#### Recommended Citation

University of Northern Iowa. Sumer Undergraduate Research Program., "2023 Summer Undergraduate Research Program" (2023). *Summer Undergraduate Research Program (SURP) Symposium Programs*. 11. [https://scholarworks.uni.edu/surp\\_programs/11](https://scholarworks.uni.edu/surp_programs/11)

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# SURP

Summer Undergraduate Research Program



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**July 28, 2023**

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**Scholar Space, Rod Library**

# SURP

Summer Undergraduate Research Program

University of Northern Iowa

Visit: [scholarworks.uni.edu/surp/](http://scholarworks.uni.edu/surp/)

*A message from Dr. John Fritch,*

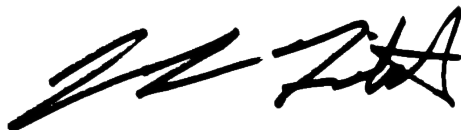
**DEAN, COLLEGE OF HUMANITIES, ARTS AND SCIENCES**

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Welcome to the Summer Undergraduate Research Symposium!

Today recognizes and celebrates the work of UNI undergraduate researchers this summer. We, as a college, are exceptionally proud of the work of these students. While many students are working at odd jobs to earn money over the summer and some are enjoying their time off from classes, these students are putting forth hours of work to develop themselves through hands-on research in a laboratory or field setting. Their summers have been filled exploring questions in which they are interested and working closely with UNI faculty. They have learned a variety of lessons: how to formulate questions, how to develop answers to those questions, how to work with faculty and peers, and how to break (and repair!) instrumentation. Today we celebrate the work of these students, and we thank those who made their work possible. Many of the students are supported by generous gifts from alums and friends of UNI; others are supported by the hard-earned grants of the faculty with whom they work. I am grateful to the donors and faculty for their support of these students.

*Please enjoy the day.*



# SYMPOSIUM SCHEDULE

11:00 AM - 1:30 PM

*Welcome & Keynote*

11:00 – 11:30 am

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Welcome by **Marcy Seavey**, STEM Coordinator

Alumni Keynote by **Jeffery C. Rathmell**, PhD,  
Director, Vanderbilt Center for Immunobiology,  
Cornelius Vanderbilt Professor of Immunobiology,  
Department of Pathology, Microbiology, and  
Immunology, Vanderbilt University Medical Center

*Poster Session & Luncheon*

11:30 am – 1:15 pm

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*Luncheon Sponsored by the College of Humanities, Arts and Sciences*

*Closing Remarks*

1:20 – 1:30 pm

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After the alumni Keynote, the Symposium is an open house style event. Please feel free to come and go as you are able. The 2023 SURP Symposium will be located on the third floor of the Rod library with presentations and a light lunch provided in the ScholarSpace. Poster presentations will be presented by undergraduates from the Biology, Chemistry & Biochemistry, Computer Science, Earth and Environmental Science, Mathematics, and Physics. Army Education & Outreach Program High School STEM Apprentices and visiting High School Scholars will also present as special guests of SURP.

UNI utilizes the Scholarworks Digital Scholarship platform to store and showcase student and faculty work. This summer's SURP research will be added to the SURP Collection in Scholarworks after the event.

*Thank you to the individuals, foundations, and organizations which have made this year's SURP research possible.*

# PARTICIPANTS

(1) **JOEL LADO**, AI WEN, KENNETH ELGERSMA (BIOLOGY)

*Assessment of DNA Concentration and Degradation from Extracted Bumble Bee Thorax Muscle*

(2) **ETHAN DICKEY**, AI WEN, KENNETH ELGERSMA (BIOLOGY)

*Changes in Floral Resources and the "Bee Plants" within CRP-42 Restorations in Northeast Iowa*

(3) **MADLINE ROUBIK**, AI WEN (BIOLOGY)

*Forming a Comprehensive Pollen Library for the Purpose of Native Bee Pollen Identification and Analysis*

(4) **SRIYA KALALA**, AI WEN (BIOLOGY)

*Comparison of Gut and Leg Pollen Composition in female *Halictus ligatus* with Flower Source*

(5) **RYDER DOWNEY**, MARTIN CHIN (CHEMISTRY AND BIOCHEMISTRY)

*Synthesis and Reactivity of Dihydrogen Diruthenium Complexes*

(6) **ABBIE BANGS**, JUSTIN PETERS (CHEMISTRY AND BIOCHEMISTRY)

*Investigating Gene Looping in Yeast*

(7) **EVELYN LOPEZ**, JOSHUA SEBREE (CHEMISTRY AND BIOCHEMISTRY)

*Wind Cave Zebra Calcites and Their Laboratory Analogs*

(8) **JACQUILINE HEGGEN**, JOSHUA SEBREE (CHEMISTRY AND BIOCHEMISTRY)

*Entrance to Entrance: A Hunt for Astrobiological Analogs at Wind Cave*

(9) **ELIZABETH GUEVARA**, KIRK MANFREDI (CHEMISTRY AND BIOCHEMISTRY)

*Analysis of Biologically Active Secondary Metabolites from Fungi*

(10) **JOHN BRUSTKERN**, DHERYTA JAISINGHANI (COMPUTER SCIENCE)

*SocioApp: Neural Networks to Detect how Social Are You?*

(11) **XIAOWEN WANG**, DHERYTA JAISINGHANI (COMPUTER SCIENCE)

*Integrating External Sensors with CrazyFlie Drones*

(12) **VESA XERSA**, DHERYTA JAISINGHANI (COMPUTER SCIENCE)

*Applications of WiFi Probe Requests*

# PARTICIPANTS

(13) **WINFRED AFEANEKU**, ANDREW BERNIS, (COMPUTER SCIENCE)  
*Understanding Node-Capacitated Overlay Networks Through Analysis and Simulation*

(14) **SARA LEISINGER**, ANDREW BERNIS (COMPUTER SCIENCE)  
*Understanding Self-stabilizing Node-capacitated Overlay Networks Through Simulation*

(15) **JACE BELL**, MOHAMMAD IQBAL (EARTH AND ENVIRONMENTAL SCIENCES)  
*A Tale of Two Rivers: Unveiling Water's Secrets across Continents*

(16) **KEVIN DU**, ALEXA SEDLACEK (EARTH AND ENVIRONMENTAL SCIENCES)  
*Forecasting Wildfire Smoke Particulate Matter Using HYSPLIT Model*

(17) **ISABEL HARMS**, ALEXA SEDLACEK (EARTH AND ENVIRONMENTAL SCIENCES)  
*Exploration of PocketLab Devices for UNI's Campus, Classrooms, and Community*

(18) **STARR CLAUSSEN**, CHAD HEINZEL (EARTH AND ENVIRONMENTAL SCIENCES)  
*USGS-EDMAP Suficial Geology of the Jackson Count, Iowa, Fulton Quadrangle*

(19) **AVERY MERKLEY**, CHAD HEINZEL (EARTH AND ENVIRONMENTAL SCIENCES)  
*USGS-EDMAP Suficial Geology of the Jackson Count, Iowa, Fulton Quadrangle*

(20) **MEGAN CARLSON AND RAIDER TAYLOR**, KIMBERLY CONNER (MATHEMATICS)  
*Connecting the Dots: Analysis of Teachers' Questions during Dot and Number Talks*

(21) **ISAIAH DEMPSEY**, BILL WOOD, (MATHEMATICS)  
*Geometric curves from  $p$ -circles*

(22) **BRIANNA WILLIAMS**, PAUL SHAND (PHYSICS)  
*Investigation of a Magnet Falling through a Copper Pipe*

(23) **BLAINE WILLIAMS**, ALI TABELI (PHYSICS)  
*Stochastic Simulation of RAD51 protein interactions with DNA lattice*

# PARTICIPANTS

(24) **BRANDON SCHMIDT**, PAVEL LUKASHEV (PHYSICS)

*Electronic, magnetic, and structural properties of CoVMnSb: ab initio study*

(25) **DYLAN SEIFFERT**, TIM KIDD (PHYSICS)

*Flow Through Processing of Nanocellulose for Space Exploration Applications*

(26) **MARIANNA TORRES**, TIM KIDD (PHYSICS)

*Molybdenum Disulfide (MoS) as a Nanocellulose Substrate*

(27) **ELISE HONG-MILLER**, TIM KIDD (PHYSICS)

*Impacts and Applications of Vegetable Glycerin on Nanocellulose*

(28) **SAGE CAPPI**, CHAD HEINZEL (EARTH AND ENVIRONMENTAL SCIENCES)

*USGS-EDMAP Surficial Geology of the Jackson Count, Iowa, Fulton Quadrangle*

(29) **SAMANTHA HEYER**, JERREME JACKSON (BIOLOGY)

*Enterococcus faecalis Persistence in the Insect Midgut*

(30) **THOMAS MANTERNACH**, TILAHUN ABEBE (BIOLOGY)

*Analysis of the role of gamma-aminobutyrate (GABA) in drought tolerance in barley using virus-induced gene silencing*

(31) **AMMAR AHMED SHAIKH**, TILAHUN ABEBE (BIOLOGY)

*Functional Analysis of Spermidine Synthase (SPDS) using Virus-Induced Gene Silencing in Barley*

(32) **KYRAN HINES**, TILAHUN ABEBE (BIOLOGY)

*Iowa's agricultural landscape: is tef a viable option?*

# PRIVATE DONORS

*Private individuals who support undergraduate research with gifts of \$1000 or more:*

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Drs. Jeff and Kim Rathmell	Dr. Virginia Weimar-Mutters
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Dr. Brian Raue	Randy and Josena Wadle
Dr. Becky and Danny Rose	Jim and Diane Sass Research Fund





# EXTERNAL FUNDING

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**ARMY EDUCATION AND OUTREACH PROGRAM (AEOP)  
HIGH SCHOOL APPRENTICE PROGRAM**

**GARDEN CLUB OF AMERICA (GCA)**

**LOUIS STOKES ALLIANCE FOR MINORITY PARTICIPATION (LSAMP)**

**NATIONAL ATMOSPHERIC AND SPACE ADMINISTRATION (NASA)  
IOWA SPACE GRANT CONSORTIUM (ISGC)**

**NATIONAL SCIENCE FOUNDATION (NSF)**

**NSF ESTABLISHED PROGRAM TO STIMULATE COMPETITIVE  
RESEARCH (EPSCOR)**

**UNITED STATES GEOLOGICAL SURVEY (USGS)**

## INTERNAL FUNDING

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**UNI SUMMER UNDERGRADUATE RESEARCH PROGRAM**

**UNI STEM SUPPORT SERVICES**

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