



MINNESOTA ACADEMY OF SCIENCE
—Promoting Excellence in Science Since 1873—

**88th Annual Meeting of the
Minnesota Academy of Science
&
34th Winchell Undergraduate
Research Symposium**

Celebrating 34 Years of Excellence in Undergraduate Research



Hamline University, St. Paul, MN

April 23, 2022

Planning Committee

Dr. Irina Makarevitch
(Chair)
Hamline University

Dr. Jessica Bell
Century College

Dr. Lifeng Dong
Hamline University

Kristine K. Fowler
MAS Winchell
Coordinator

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Dr. Leif Hembre
Hamline University

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Hamline University

Dr. Betsy Martinez-Vaz
Hamline University

Lara Maupin
MAS Executive Director

Dr. Nick Schlotter
Hamline University

Dr. Jamie Spaulding
Hamline University

About the Annual Meeting & Winchell Undergraduate Research Symposium

The Annual Meeting & Winchell Undergraduate Research Symposium provides a forum for undergraduate students to present original STEM research, learn from professionals in fields they aspire to enter, and receive recognition for their accomplishments.

The first Annual Meeting of the Minnesota Academy of Science was held on April 15,

1933 at the University of Minnesota. Over the years, the annual meeting took on several forms, ranging from lectures to archaeological excursions. In 1981, the Board of Directors decided to add an undergraduate research symposium hosted in conjunction with the Annual Meeting.

The main components of the meeting and symposium are a keynote lecture, student presentations, and breakout sessions. More than 125 students, research advisors, MAS members, faculty, and other interested members of the community attend the symposium each year.

Thank You to our 2022 Sponsors

American Chemical Society, Minnesota Section

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University of St. Thomas, Departments of Biology and Chemistry

Schedule of Events – April 23, 2022

8:00-8:45 am Registration and Poster Set-Up (*Anderson Hall 111/112*)
and Refreshments (*Anderson Hall second floor*)

8:45-10:00 am Welcome and Keynote Address (*Anderson Hall 111/112*)
Dr. Irina Makarevitch and Dr. Nick Schlotter, Hamline University
Dean of the College of Liberal Arts Marcela Kostihova, Hamline University
“Achieving your Sustainability Goals for an Industrial Company”
Dr. John Banovetz, Executive Vice President, Chief Technology Officer and
Environmental Responsibility

10:15-11:00 am Breakout Session 1

- **“CURE as a Teaching Method,”** Dr. Tamara Mans, North Hennepin Community College (*Anderson Hall 304*)
- **Panel of STEM Industry Professionals** (*Anderson Hall 111/112*)
- **Panel of STEM Graduate & Professional Students** (*Anderson Hall 305*)
- **MN Junior Academy of Science Meeting** (*Robbins 11*)
- **Tour 1 (ticketed event):** Renewable Energy & Environmental Research Laboratory

11:15 am-12:00 pm Breakout Session 2

- **Panel of STEM Industry Professionals** (*Anderson Hall 111/112*)
- **Panel of STEM Graduate & Professional Students** (*Anderson Hall 305*)
- **MN Academy of Science (MAS) Annual Meeting** (*Robbins 11*)
- **Tour 2 (ticketed event):** Renewable Energy & Environmental Research Laboratory

12:00-12:45 pm Lunch Buffet (*Anderson Hall second floor*)

12:45-1:00 pm set-up for Oral Presentations

1:00-2:00 pm Oral Presentations (see pp. 8-10)

- Session A (*Anderson Hall 111/112*)
- Session B (*Anderson Hall 304*)
- Session C (*Anderson Hall 305*)
- Session D (*Robbins 11*)
- Session E (*Robbins 12*)

2:15-3:00 pm Poster Session F (*Anderson Hall 111/112*)

- Odd numbered posters (**see pp. 11-13**)

3:00-3:45 pm Poster Session G (*Anderson Hall 111/112*)

- Even numbered posters (**see pp. 14-16**)

3:45-4:00 pm Refreshments (*Anderson Hall second floor*)

4:00-4:15 pm Closing Remarks and Awards (*Anderson Hall 111/112*)

4:15 pm Poster Take-Down (*Anderson Hall 111/112*)

Presenters: Please help us by putting away your easel. Thank you!

Keynote Speaker

Dr. John Banovetz

Executive Vice President, Chief Technology Officer and Environmental Responsibility



Dr. John Banovetz leads more than 8,000 scientists who connect 3M's 51 technology platforms to solve the real-world needs of customers around the world. John and his team also oversee 3M's environmental responsibility efforts, with a focus on advancing environmental stewardship and accelerating 3M's environmental commitments. In this role, he leverages his many years of experience as both a technology and business leader.

John came to 3M in 1995 as a research chemist in the corporate R&D organization, working primarily on acrylic adhesives and tapes. In 2003 he joined McKinsey & Company, and in 2007 rejoined 3M to assume responsibility for the overall planning and implementation of corporate strategic initiatives. He served in that role until 2012, when he became global business director for 3M's Industrial Adhesives and Tapes Division. Three years later, he was tapped to lead 3M's corporate research lab.

In 2016, John moved to West Europe to serve as managing director of 3M's D-A-CH region, which represents the company's combined operations in Germany, Austria, and Switzerland. He was appointed 3M's chief technology officer and senior vice president of research and development in July 2017.

In his position, John remains focused on driving change, challenging the status quo and helping develop the 3M leaders of tomorrow. "Leadership is about serving more than yourself," he says. "It's about creating an environment that unlocks the full potential of teams and individuals and, as a result, achieves even higher performance and more engaged employees."

John has a Ph.D. in inorganic chemistry from Stanford University, and a bachelor's degree in chemistry from Hamline University. In his free time, he enjoys spending time with his wife and three kids, as well as a variety of outdoor activities including hiking, biking and fishing.

Table of Contents

Planning Committee	2
Schedule of Events	3-4
Keynote Speaker, Dr. John Banovetz	4
Judges	5
Breakout Sessions	6-7
Student Oral Presentation Schedule	8-10
Student Poster Presentation Schedule	11-16
Student Oral/Poster Presentations by Last Name	17-18
Student Oral/Poster Presentations by Category	18
About the Minnesota Academy of Science	10-20
2022 Winchell Symposium Sponsors	2, 21

Special Thanks to our Judges

Teresa DeGolier PhD, Bethel University
Jason Draper PhD, University of Northwestern - St. Paul
Kristine Fowler MS, Minnesota Academy of Science
Lisa Gentile PhD, College of St. Benedict - St. John's University
Rita Majerle PhD, Hamline University
Irina Makarevitch PhD, Hamline University
Debra Martin PhD, Saint Mary's University of Minnesota
Betsy Martinez-Vaz PhD, Hamline University
Molly McNicoll PhD, Luther College
Heather Sklenicka PhD, Rochester Community and Technical College
Francesca Socki, University of Minnesota - Twin Cities
Jennifer Sweatman PhD, Concordia College - Moorhead
Mikayla Thatcher PhD, Concordia University - St. Paul
Aeisha Thomas PhD, Crown College
Amy Verhoeven PhD, University of St. Thomas
Graeme Wylie PhD, Concordia College - Moorhead

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log in to your **Eduroam** account

Breakout Session 1 (10:15 – 11:00 am)

“CURE as a Teaching Method” (*Anderson Hall 304*)

Speaker: **Tamara L. Mans PhD**, Faculty member, Department of Biology, North Hennepin Community College

Panel of STEM Industry Professionals (*Anderson Hall 111/112*)

This panel will be repeated in Breakout Session 2

Moderator: **Leif Hembre PhD**, Professor of Biology, Hamline University

Panelists: **Leah Hall MS**, Conservation Project Manager, The Nature Conservancy

Selam Melka PharmD, Clinical Pharmacist, Mercy Hospital

Jake Walsh PhD, Aquatic Invasive Species Research & Grants Coordinator, MN DNR

Mark Ellis PhD, Senior Division Scientist, 3M

Panel of STEM Graduate & Professional Students (*Anderson Hall 305*)

This panel will be repeated in Breakout Session 2

Moderator: **Nick Schlotter PhD**, Chair of Chemistry, Hamline University

Panelists: **Maddy Bygd**, 2nd year MS student in the Microbial Engineering program, University of Minnesota - Twin Cities

Fathima Mohamed, 5th year MD/PhD Candidate in Immunology Graduate Program, University of Minnesota - Twin Cities

Anna Ries, 4th year DVM candidate in the College of Veterinary Medicine, University of Minnesota - Twin Cities

Beza Tuga, 3rd year Chemistry PhD candidate, University of Minnesota - Twin Cities

MN Junior Academy of Science Inaugural Meeting (*Robbins 11*)

MJAS is an honorary society and leadership group of high school and college students from MN who have demonstrated excellence in scientific research. Top scoring high school student researchers from this year's State Science & Engineering Fair and Junior Science & Humanities Symposium are invited to attend Winchell and discuss MJAS plans for the upcoming year.

Moderator: **Lara Maupin MEd**, Executive Director, Minnesota Academy of Science

Tour 1 (ticketed event): Renewable Energy & Environmental Research Laboratory

If you signed up for this tour, see your email for details.

Breakout Session 2 (11:15 am – 12:00 pm)

Panel of STEM Industry Professionals (*Anderson Hall 111/112*)

Moderator: **Nick Schlotter PhD**, Chair of Chemistry, Hamline University

Panelists: **Leah Hall MS**, Conservation Project Manager, The Nature Conservancy
Selam Melka PharmD, Clinical Pharmacist, Mercy Hospital
Jake Walsh PhD, Aquatic Invasive Species Research & Grants
Coordinator, MN DNR
Mark Ellis PhD, Senior Division Scientist, 3M

Panel of STEM Graduate & Professional Students (*Anderson Hall 305*)

Moderator: **Leif Hembre PhD**, Professor of Biology, Hamline University

Panelists: **Maddy Bygd**, 2nd year MS student in the Microbial Engineering program,
University of Minnesota - Twin Cities
Fathima Mohamed, 5th year MD/PhD Candidate in Immunology
Graduate Program, University of Minnesota - Twin Cities
Anna Ries, 4th year DVM candidate in the College of Veterinary Medicine,
University of Minnesota- Twin Cities
Beza Tuga, 3rd year Chemistry PhD candidate, University of Minnesota -
Twin Cities

MN Academy of Science (MAS) Annual Meeting (*Robbins 11*)

MAS members are invited to hear updates on the state of the organization and current programs, and to discuss upcoming strategic plans.

Moderator: **Lara Maupin MED**, Executive Director, Minnesota Academy of Science

Tour 2 (ticketed event): Renewable Energy & Environmental Research Laboratory
If you signed up for this tour, see your email for details.

Oral Presentation Sessions (1:00-2:00 pm)

*[Student presenters are shown in **bold**.]*

Oral Presentation Session A (Anderson Hall 111/112)

A.1 Chemistry: **ANALYZING ROCHESTER TAP WATER FOR PHOSPHATE**

Nasra Arte and Heather Sklenicka (Advisor)

Department of Chemistry

Rochester Community and Technical College, Rochester, MN

A.2 Ecology / Environmental Science, Genetics: **EXPLORATION FOR THE PRESENCE OF POTENTIAL BIOREMEDIATION GENES IN THE MISSISSIPPI RIVER WATERSHED**

Teagan L. Kuckkahn and Aeisha Thomas (Advisor)

Department of Biological & Health Sciences

Crown College, St. Bonifacius, MN

A.3 Chemistry, Ecology / Environmental Science: **UNIQUE CHEMICAL SIGNATURES ACROSS TWO WILD BERGAMOT (*Monarda fistulosa*) ECOTYPES: A COMMON GARDEN STUDY**

Olivia A. Meyer, Moni C. Berg-Binder¹ (Advisor), and Brett R. Bodsgard² (Advisor)

¹*Department of Biology,* ²*Department of Chemistry*

Saint Mary's University of Minnesota, Winona, MN

A.4 Physics: **INCREASED SENSITIVITY FOR LEAD DETECTION IN DRINKING WATER USING SURFACE ENHANCED RAMAN SPECTROSCOPY (SERS)**

Joshua B. Sedarski, Maddie R. Sowinski, and Lifeng Dong (Advisor)

Department of Physics

Hamline University, St. Paul, MN

Oral Presentation Session B (Anderson 304)

B.1 Organismal / Physiological Sciences: **THE CONTRACTILE EFFECTS OF PURPLE HOLY BASIL (*Ocimum tenuiflorum*) ON MOUSE UTERINE MUSCLES**

Madelyn J. Mehr and Teresa DeGolier (Advisor)

Department of Biological Sciences

Bethel University, St. Paul, MN

B.2 Cellular / Molecular Biology: EFFECTS OF OVEREXPRESSION OF FOXA2 GENE AND DEVELOPMENTAL EFFECTS ON ENDODERMAL ORGAN EXPRESSION IN *Xenopus laevis*

Abigail M. Simpkins and Brian A. Hyatt (advisor)

Department of Biological Sciences

Bethel University, St. Paul, MN

B.3 Cellular / Molecular Biology, Organismal / Physiological Sciences: CHARACTERIZING CELL POPULATIONS MOST IMPACTED BY NORMAL MICROBIAL EXPOSURE FOR PRECLINICAL RESEARCH AND HEALTHCARE TREATMENT DEVELOPMENT SUCCESS

Adhvaith Sridhar and Nathan Schuldt (Advisor)

Department of Pediatrics

University of Minnesota - Twin Cities, Minneapolis, MN

B.4 Biochemistry, Cellular / Molecular Biology: A MODEL OF A CHOLANGIOCARCINOGENIC PHENOTYPE WITH IDH1 MUTATION

Jack Strotbeck and Megan Girtman (Advisor)

Department of Biology

Saint Mary's University of Minnesota, Winona, MN

Oral Presentation Session C (Anderson Hall 305)

C.1 Chemistry: GREEN SYNTHESIS OF CONDUCTING POLYMERS FOR ORGANIC PHOTOVOLTAIC APPLICATIONS

Hannick Biermeier, Ted Pappenfus, and Daron Janzen (Advisor)

Department of Chemistry

St. Catherine University, St. Paul, MN

C.2 Cellular / Molecular Biology: DISCOVERING CANDIDATES FOR ANTIBIOTIC PRODUCTION THROUGH THE TINY EARTH PROJECT

Christine V. David and Joanna Klein (Advisor)

Department of Biology and Biochemistry

University of Northwestern - St. Paul, St. Paul, MN

C.3 Cellular / Molecular Biology: *Helichrysum italicum* ESSENTIAL OIL PRE-TREATMENT DIMINISHES PRO-INFLAMMATORY ACTIVATION BY IFN- γ /LPS IN THE RAW 264.7 MACROPHAGE CELL LINE

Kenneth J. Kwan and Joyce Doan (Advisor)

Department of Biological Sciences

Bethel University, St. Paul, MN

C.4 Chemistry: ANALYSIS OF COMMERCIAL PEROXIDE BLEACHES

Adam E. Pagnano and Heather Sklenicka (Advisor)

Department of Chemistry

Rochester Community and Technical College, Rochester, MN

Oral Presentation Session D (Robbins 11)

D.1 Cellular / Molecular Biology: **THE EFFECT OF FOXF1 OVER AND MISEXPRESSION ON FOREGUT ORGAN DEVELOPMENT IN *Xenopus laevis* EMBRYOS**

Chase A. Hemme and Brian A. Hyatt (Advisor)

Department of Biological Sciences

Bethel University, St. Paul, MN

D.2 Organismal / Physiological Sciences: **CAPRYLIC ACID AND ITS RESULTING SIGNIFICANCE ON MALE RAT SPERMATOGENESIS AND REPRODUCTIVE ORGANS**

McKenna M. Stoner and Jonathan Van Berkom (Advisor)

Department of Biological Sciences

Bethel University, St. Paul, MN

D.3 Cellular / Molecular Biology: **IDENTIFICATION OF POTENTIAL THERAPEUTIC TARGETS IN AGE-ASSOCIATED TUMORS USING BIOINFORMATICS**

Andy Y. Yang and Aeisha Thomas (Advisor)

Department of Biological & Health Sciences

Crown College, St. Bonifacius, MN

Oral Presentation Session E (Robbins 12)

E.1 Organismal / Physiological Sciences: **CONTRACTILE EFFECTS OF *Matricaria chamomilla* ON *Mus musculus* ISOLATED UTERINE TISSUE**

Brittany L. Kothari and Teresa F. DeGolier (Advisor)

Department of Biological Sciences

Bethel University, St. Paul, MN

E.2 Cellular / Molecular Biology, Organismal / Physiological Sciences: **EFFECTS OF NATURAL SUPPLEMENTS ON AN ANXIETY-INDUCED PLANARIA MODEL SYSTEM**

Taylor N. Krueger and Aeisha Thomas (Advisor)

Department of Biological & Health Sciences

Crown College, St. Bonifacius, MN

E.3 Ecology / Environmental Science: **DIFFERENCES IN THE PREDATION OF BROWN TROUT BY TERRESTRIAL PREDATORS BASED ON FISH MATURITY**

Karah Stangret and Jennifer L. Biederman (Advisor)

Department of Biology

Saint Mary's University of Minnesota, Winona, MN

Poster Session F (2:15-3:00 pm) (Anderson 111/112)

[Student presenters are shown in **bold**.]

F.21 Biochemistry, Cellular / Molecular Biology: **3D PHYSICAL MODELS OF THE SARS-CoV-2 SPIKE PROTEIN: EXPLORING MUTATIONS ASSOCIATED WITH HIGH VIRAL TRANSMISSIBILITY**

Patricia Hill, Dean Young, Lauren McDonald, and Betsy Martínez-Vaz (Advisor)
Department of Biology and Biochemistry Program
Hamline University, St. Paul, MN

F.23 Chemistry: **ALKANETHIOL FUNCTIONALIZATION OF GOLD NANOSHELLS**

Ezequiel Pena and Annette F. Raigoza (Advisor)
Department of Chemistry
College of Saint Benedict & Saint John's University, St. Joseph and Collegeville, MN

F.25 Chemistry: **CHITOSAN-COATED MESOPOROUS SILICA NANOPARTICLES FOR APPLICATIONS IN AGRICULTURE**

Allamagan Anod, Tana O'Keefe, Wade Elmer, Jason White, and Christy Haynes (Advisor)
Department of Chemistry
University of Minnesota - Twin Cities, Minneapolis, MN

F.27 Organismal / Physiological Sciences: **COMPARING MORPHOLOGICAL AND MOLECULAR DATA TO DIFFERENTIATE BETWEEN *Peromyscus leucopus* AND *Peromyscus maniculatus***

Kelly M. Lorenz, Lauryn P. Petrich, Vanessa D. Petrich, Taylor M. Devine, Amelia F. Landsverk, Cole R. Nowacki, and Joseph C. Whittaker (Advisor)
Department of Biology
Concordia College-Moorhead, Moorhead, MN

F.29 Cellular / Molecular Biology: **DISCOVERY AND ANALYSIS OF ANTIBIOTIC PRODUCING *Streptomyces* FROM SOIL**

Nicholas Waughtal and Joanna Klein (Advisor)
Department of Biology and Biochemistry
University of Northwestern - St. Paul, St. Paul, MN

F.31 Cellular / Molecular Biology: **EFFECT OF RELATIVE HUMIDITY ON VIABILITY OF EX OVO CHICK EMBRYO CULTURING SYSTEMS**

Dylan Holtmeier, **Abigail Lewerenz**, **Kora Kritzberger**, and Mong-Lin Yang (Advisor)
Department of Biology
Concordia University - St. Paul, St. Paul, MN

F.33 Chemistry: **ELECTROCHEMICAL DETECTION OF REACTIVE OXYGEN/NITROGEN SPECIES: THE EFFECT OF DIFFERENT ELECTRODE COATINGS ON ROS DETECTION**

Astrid C. Hernandez, Eleni M. Spanolios, and Christy L. Haynes (Advisor)

Department of Chemistry

University of Minnesota - Twin Cities, Minneapolis, MN

F.35 Neuroscience: **EXPRESSION OF PRIMARY CILIA-RELATED GENES IN CHICK CRANIAL NEURAL CREST CELLS**

Mai P. Yang and Bridget T. Jacques-Fricke (Advisor)

Department of Neuroscience

Hamline University, St. Paul, MN

F.37 Biochemistry: **INVESTIGATING THE GENETIC REGULATION OF THE ENZYMES IN THE METFORMIN DEGRADATION PATHWAY**

Anna Schultz and Betsy Martinez-Vaz (Advisor)

Department of Biology and Biochemistry Program

Hamline University, St. Paul, MN

F.39 Ecology / Environmental Science: **INVESTIGATING THE TROPHIC EFFECTS OF RAINBOW TROUT PREDATION ON *Daphnia* IN SQUARE LAKE USING A PALEOECOLOGICAL APPROACH**

Indigo L. Rowland, Marcella G. Meneguzzi, and Leif K. Hembre (Advisor)

Department of Biology

Hamline University, St. Paul, MN

F.41 Chemistry: **MECHANISTIC INSIGHTS OF CATALYST FREE HYDROAMINATION**

Michael L. Le, Max H. Marron, and Eric H. Fort (Advisor)

Department of Chemistry

University of St. Thomas, St. Paul, MN

F.43 Physics: **OPTIMIZING STRUCTURE AND FABRICATION PROCESS OF THIN-FILM SOLID-STATE LITHIUM-ION BATTERIES**

Sydney R. McCutchen and Lifeng Dong (Advisor)

Department of Physics

Hamline University, St. Paul, MN

F.45: Biochemistry: **PROLINE TO VALINE CHANGE IN THE ACTIVE SITE LOOP OF MALATE DEHYDROGENASE REDUCES SPECIFIC ACTIVITY BY 85%**

Alvina N. Che, Daneisha Bergquist, Mariamu Kamara, and Tamara L. Mans (Advisor)

Department of Biology

North Hennepin Community College, Brooklyn Park, MN

F.47 Ecology / Environmental Science: **QUANTIFICATION OF CYCLIC PEPTIDE AND ALKALOID CYANOBACTERIAL TOXINS IN THE LEAF FLUID OF THE INSECTIVOROUS BOG PLANT, *Sarracenia purpurea***

Jack Jurmu, Hunter Lindsay, Zayid Dakane, and Paul Melchior (Advisor)

Department of Biology

North Hennepin Community College, Brooklyn Park, MN, and Bemidji State University (Twin Cities), MN

F.49 Cellular / Molecular Biology: **SCREEN FOR ANTIBIOTIC PRODUCING BACTERIA FROM SOIL**

Christophe Niyonkuru and Joanna R. Klein (Advisor)

Department of Biology and Biochemistry

University of Northwestern - St. Paul, St. Paul, MN

F.51 Biochemistry: **SERTRALINE BINDING TO NMDA GLUN2D S1S2 DOMAIN**
Megan A. Wolf and Lisa Gentile (Advisor)

Department of Chemistry

College of Saint Benedict & Saint John's University, St. Joseph and Collegeville, MN

F.53 Chemistry: **SYNTHESIS AND CHARACTERIZATION OF A FLUORESCENT PROBE FOR THE DETECTION OF HYDROGEN SULFIDE**

Benjamin J. LeBeau, Hunter A. Backholm, and Katie L. Peterson (Advisor)

Department of Chemistry

Bemidji State University, Bemidji, MN

F.55 Neuroscience: **THE IMPACT OF NSD3 KNOCKDOWN AND THE EXPRESSION OF PRDM12 IN CHICK NEURAL CREST CELLS**

Kendra J. Yoder and Bridget T. Jacques-Fricke (Advisor)

Department of Biology

Hamline University, St. Paul, MN

F.57 Biochemistry: **TOTAL PROTEIN AS A MORE RELIABLE AND REPRODUCIBLE INTERNAL CONTROL FOR CANCEROUS LIVER SAMPLE WESTERN BLOT ANALYSIS**

Young Y. Vue and Mong-Lin Yang (Advisor)

Department of Biology

Concordia University - St. Paul, St. Paul, MN

F.59 Biochemistry, Cellular / Molecular Biology: **WATERMELON GLYOXYSOMAL MALATE DEHYDROGENASE: MUTATION OF PHENYLALANINE TO TYROSINE AT AMINO ACID POSITION 134 REDUCES SPECIFIC ACTIVITY**

Esmail El-shekeil, Abdalla Hassan, Riley Reed, and Tamara L. Mans (Advisor)

Department of Biology

North Hennepin Community College, Brooklyn Park, MN

Poster Session G (3:00-3:45 pm) (Anderson 111/112)

[Student presenters are shown in **bold**.]

G.22 Chemistry: **A GREEN CHEMISTRY APPROACH TO A BIOBASED POLYMER OF CARVACROL**

Swetha Ramaswamy, William McKewan, Marites Guino-o, and Eric H. Fort (Advisor)

Department of Chemistry

University of St. Thomas, St. Paul, MN

G.24 Cellular / Molecular Biology: **ASSESSING THE TINY EARTH ESKAPE MICROBES FOR ANTI-TUMOR ACTIVITY**

Kylie M. Ross, Ayden F. P. Chapman, and Jodi E. Goldberg (Advisor)

Department of Biology and Biochemistry Program

Hamline University, St. Paul, MN

G.26 Chemistry: **DESIGN AND SYNTHESIS OF SILICA-COATED SWELLING POLYMERS FOR SUSTAINABLE AGRICULTURE**

Andrea T. Ligocki, Beza S. Tuga, Hyunho Kang, and Christy L. Haynes (Advisor)

Department of Chemistry

University of Minnesota - Twin Cities, Minneapolis, MN

G.28 Cellular / Molecular Biology: **DISCOVERING THE TINY EARTH OF ANTIBIOTIC PRODUCING BACTERIA**

Talila R. Baskaran and Joanna R. Klein (Advisor)

Department of Biology and Biochemistry

University of Northwestern - St. Paul, St. Paul, MN

G.30 Biochemistry, Cellular / Molecular Biology, Biology: **DYSREGULATION OF PROLINE PATHWAY ENZYMES IN HCC VS FLHCC**

Young Vue, **Heenu Kamboj**, Gabe Nkumu, **Richard Wauer**, and Mong-Lin Yang (Advisor)

Department of Biology

Concordia University - St. Paul, St. Paul, MN

G.32 Chemistry: **EFFECTS OF SILVER NANOPARTICLES BINDING ON THE ESTERASE-LIKE ACTIVITY OF HUMAN SERUM ALBUMIN**

Jack Adamietz and M. Abul Fazal (Advisor)

Department of Chemistry

College of Saint Benedict & Saint John's University, St. Joseph and Collegeville, MN

G.34 Physics: **EXPERIMENTAL OBSERVATION OF HIGH-SPEED FLUCTUATIONS IN SURFACE ENHANCED RAMAN SPECTROSCOPY**
Makayla M. Schmidt, Marit A. Engevik, Sarah E. Bense, Tryg R. Burgau, Eric J. Katsma, and Nathan C. Lindquist (Advisor)
Department of Physics and Engineering
Bethel University, St. Paul, MN

G.36 Ecology / Environmental Science: **INVASIVE EARTHWORM RESPONSE TO GRAZING MANAGEMENT OF EUROPEAN BUCKTHORN (*Rhamnus cathartica*)**
Mary M. McTeague and Molly McNicoll (Advisor)
Department of Environmental Studies
Luther College, Decorah, IA

G.38 Biochemistry: **INVESTIGATING THE ROLES OF MUTATIONS IN THE MOBILE LOOP OF MALATE DEHYDROGENASE**
Fadumo A. Bashir, Nikki Amaya Rapalo, and Betsy Martinez-Vaz (Advisor)
Department of Biology and Biochemistry Program
Hamline University, St. Paul, MN

G.40 Cellular / Molecular Biology: **INVESTIGATION OF *Pseudomonas* STRAINS WITH ANTIBIOTIC ACTIVITY**
Sarah E. Zimmermann and Joanna Klein (Advisor)
Department of Biology and Biochemistry
University of Northwestern - St. Paul, St. Paul, MN

G.42 Chemistry: **NEW ROUTE TO NITROGEN RICH POLYMERS**
Max H. Marron, Michael L. Le, and Eric H. Fort (Advisor)
Department of Chemistry
University of St. Thomas, St. Paul, MN

G.44 Organismal / Physiological Sciences: **PHOTOPROTECTIVE MECHANISMS OF RED VS. YELLOW DECIDUOUS PLANT SPECIES DURING AUTUMN SENESCENCE**
Emma H. Miller and Amy S. Verhoeven (Advisor)
Department of Biology
University of St. Thomas, St. Paul, MN

G.46 Biochemistry: **PROTEIN ENGINEERING OF A SPECTROSCOPIC PROBE INTO MALATE DEHYDROGENASE**
Equoia S. Gibson, Mary E. Ludwig, Olivia H. Thompson, Genevieve M. Woods, and **Ella M. Young**, and Lisa N. Gentile (Advisor)
Department of Chemistry
College of Saint Benedict & Saint John's University, St. Joseph and Collegeville, MN

G.48 Ecology / Environmental Science: **RESURRECTION ECOLOGY: A TIME TRAVELER'S APPROACH TO STUDYING EVOLUTION**

Marcella G. Meneguzzi, Indigo L. Rowland, and Leif K. Hembre (Advisor)

Department of Biology

Hamline University, St. Paul, MN

G.50 Cellular / Molecular Biology: **SEEKING TO DISCOVER A NEW ANTIBIOTIC FROM SOIL SAMPLES**

Abigail L. Parker and Joanna Klein (Advisor)

Department of Biology and Biochemistry

University of Northwestern - St. Paul, St. Paul, MN

G.52 Ecology / Environmental Science: **SOIL PROPERTIES AND VEGETATION COMPOSITION IN RESTORED GRASSLANDS IN WINNESHIEK COUNTY, IOWA**

Ethan Braun¹, **Sophie Epps**¹, **Logan Olson**², Molly McNicoll¹ (Advisor), and Laura Peterson² (Advisor)

¹*Department of Biology*, ²*Environmental Studies Program*

Luther College, Decorah, IA

G.54 Biochemistry: **THE EFFECT OF BULK SOURCE PEPTONE MEDIA, CHEMICALLY DEFINED MEDIA, AND PARTIALLY DEFINED MEDIA ON *Escherichia coli* GROWTH**

Monique C. Demuth, **Abigail R. Kisch**, **Leo R. Pfarr**, and Thomas C. Marsh (Advisor)

Department of Chemistry

University of St. Thomas, St. Paul, MN

G.56 Ecology / Environmental Science: **THE PREVALENCE OF MICROPLASTICS IN NORTH DAKOTA WATERFOWL**

Duong Nguyen and Jennifer Sweatman (Advisor)

Department of Biology/Environmental Studies

Concordia College – Moorhead, Moorhead, MN

G.58 Chemistry: **TUNABLE ORTHOESTER MICELLES FOR USE IN CONTROLLED HYDROPHOBIC DRUG DELIVERY**

Andrew K. Morse, Francesca M. Ippoliti, and Lisa E. Prevette (Advisor)

Department of Chemistry

University of St. Thomas, St. Paul, MN

G.60 Biochemistry, Cellular / Molecular Biology, Microbiology: **DISCOVERY OF ANTIBIOTIC-PRODUCING BACTERIA FROM SOIL**

Jade E. Le Bris^{1,2}, Annalisa M. Jordan² (Advisor), Kim N. Ha² (Advisor), and Tami R. McDonald¹ (Advisor)

¹*Department of Biology*, ²*Department of Chemistry*

St. Catherine University, St. Paul, MN

Student Oral/Poster Presentations by Last Name

- Adamietz, Jack** Poster Session G.32
Amaya Rapalo, Nikki Poster Session G.38
Anod, Allamagan Poster Session F.25
Arte, Nasra Oral Session A
(*Anderson 111/112*)
Backholm, Hunter Poster Session F.53
Bashir, Fadumo Poster Session G.38
Baskaran, Talila Poster Session G.28
Biermeier, Hannick Oral Session C
(*Anderson 305*)
Braun, Ethan Poster Session G.52
Che, Alvina Poster Session F.45
Dakane, Zayid Poster Session F.47
David, Christine Oral Session C
(*Anderson 305*)
Demuth, Monique Poster Session G.54
El-shekeil, Esmail Poster Session F.59
Epps, Sophie Poster Session G.52
Gibson, Equoia Poster Session G.46
Hemme, Chase Oral Session D
(*Robbins 11*)
Hernandez, Astrid Poster Session F.33
Hill, Patricia Poster Session F.21
Jurmu, Jack Poster Session F.47
Kamboj, Heenu Poster Session G.30
Kisch, Abby Poster Session G.54
Kothari, Brittany Oral Session E
(*Robbins 12*)
Kritzberger, Kora Poster Session F.31
Krueger, Taylor Oral Session E
(*Robbins 12*)
Kuckkahn, Teagan Oral Session A
(*Anderson 111/112*)
Kwan, Kenneth Oral Session C
(*Anderson 305*)
Le Bris, Jade Poster Session G.60
Le, Michael Poster Session F.41
LeBeau, Benjamin Poster Session F.53
Lewerenz, Abby Poster Session F.31
Ligocki, Andrea Poster Session G.26
Lindsay, Hunter Poster Session F.47
Lorenz, Kelly Poster Session F.27
Ludwig, Mary Poster Session G.46
Marron, Max Poster Session G.42
McCutchen, Sydney Poster Session F.43
McTeague, Mary Poster Session G.36
Mehr, Madelyn Oral Session B
(*Anderson 304*)
Meneguzzi, Marcella Poster Session G.48
Meyer, Olivia Oral Session A
(*Anderson 111/112*)
Miller, Emma Poster Session G.44
Morse, Andrew Poster Session G.58
Nguyen, Duong Poster Session G.56
Niyonkuru, Christophe Poster Session F.49
Nkumu, Gabe Poster Session G.30
Olson, Logan Poster Session G.52
Pagnano, Adam Oral Session C
(*Anderson 305*)
Parker, Abigail Poster Session G.50
Pena, Ezequiel Poster Session F.23
Pfarr, Leo Poster Session G.54
Ramaswamy, Swetha Poster Session G.22
Ross, Kylie Poster Session G.24
Rowland, Indigo Poster Session F.39
Schmidt, Makayla Poster Session G.34
Schultz, Anna Poster Session F.37
Sedarski, Josh Oral Session A
(*Anderson 111/112*)
Simpkins, Abigail Oral Session B
(*Anderson 304*)
Sridhar, Adhvaith Oral Session B
(*Anderson 304*)
Stangret, Karah Oral Session E
(*Robbins 12*)
Stoner, McKenna Oral Session D
(*Robbins 11*)
Strotbeck, Jack Oral Session B
(*Anderson 304*)

Thompson, Olivia Poster Session
G.46
Vue, Young Poster Session F.57
Wauer, Richard Poster Session G.30
Waughtal, Nicholas Poster Session
F.29
Wolf, Megan Poster Session F.51

Yang, Andy Oral Session D (*Robbins
11*)
Yang, Mai Poster Session F.35
Yoder, Kendra Poster Session F.55
Young, Ella Poster Session G.46
Zimmermann, Sarah Poster Session
G.40

Student Oral/Poster Presentations by Category

Biochemistry: Presentations B.4, F.21, F.37, F.45:, F.51, F.57, F.59, G.30, G.38, G.46, G.54, G.60

Cellular/Molecular Biology: Presentations B.2, B.3, B.4, C.2, C.3, D.1, D.3, E.2, F.21, F.29, F.31, F.49, F.59, G.24, G.28, G.30, G.40, G.50, G.60

Chemistry: Presentations A.1, A.3, C.1, C.4, F.23, F.25, F.33, F.41, F.53, G.22, G.26, G.32, G.42, G.58

Ecology/Environmental Science: Presentations A.2, A.3, E.3, F.39, F.47, G.36, G.48, G.52, G.56

Neuroscience: Presentations F.35, F.55

Organismal/Physiological Sciences: Presentations B.1, B.3, D.2, E.1, E.2, F.27, G.44

Physics: Presentations A.4, F.43, G.34

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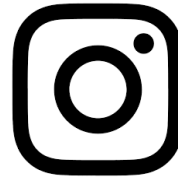
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