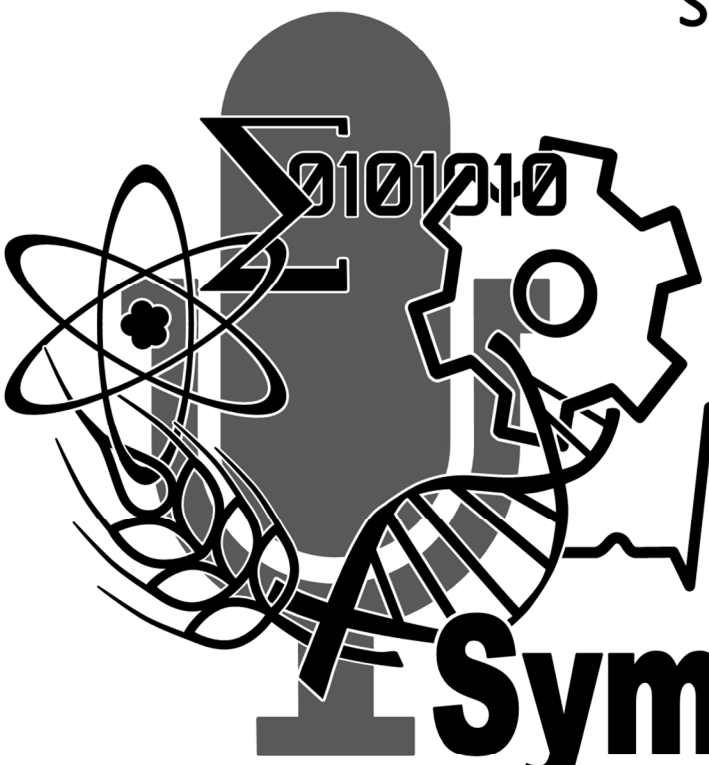
MESSIAH UNIVERSITY

SCHOOL OF SCIENCE
ENGINEERING
AND HEALTH



Symposium

twenty-third annual

FRIDAY,
MAY 1, 2026

A Word from the Dean

We in the School of Science, Engineering and Health at Messiah University welcome you to our 23rd Annual Symposium.

Please celebrate with our students, staff, and faculty as you hear and see professional presentations that showcase our students' basic and applied research in science and health fields.

The outcomes of scientific research expand intellectual understanding and have tremendous impact on quality of life, environmental health, and human flourishing.

We warmly welcome you as guests for the day.

Angela C. Hare, Ph.D.
Associate Provost
Dean of the School of Science, Engineering and Health
Professor of Mathematics

Special thanks to…

Megan Myers, Administrative Assistant to the Dean of the School of Science, Engineering and Health, for coordination of room reservations, advertising, catering, and hospitality.

Timothy Van Dyke, Ph.D., Department of Engineering, for coordination of Engineering submissions, and development and maintenance of the web-based Symposium site.

John Harms, Ph.D., Department of Biological Sciences, for management of Symposium communication, layout and scheduling of the Symposium, and program design.

We're also online.

Visit **https://huggs.messiah.edu/seh_symposium**
to view abstracts accompanying each presentation

Welcome to the 23rd Annual Symposium of the School of Science, Engineering and Health.

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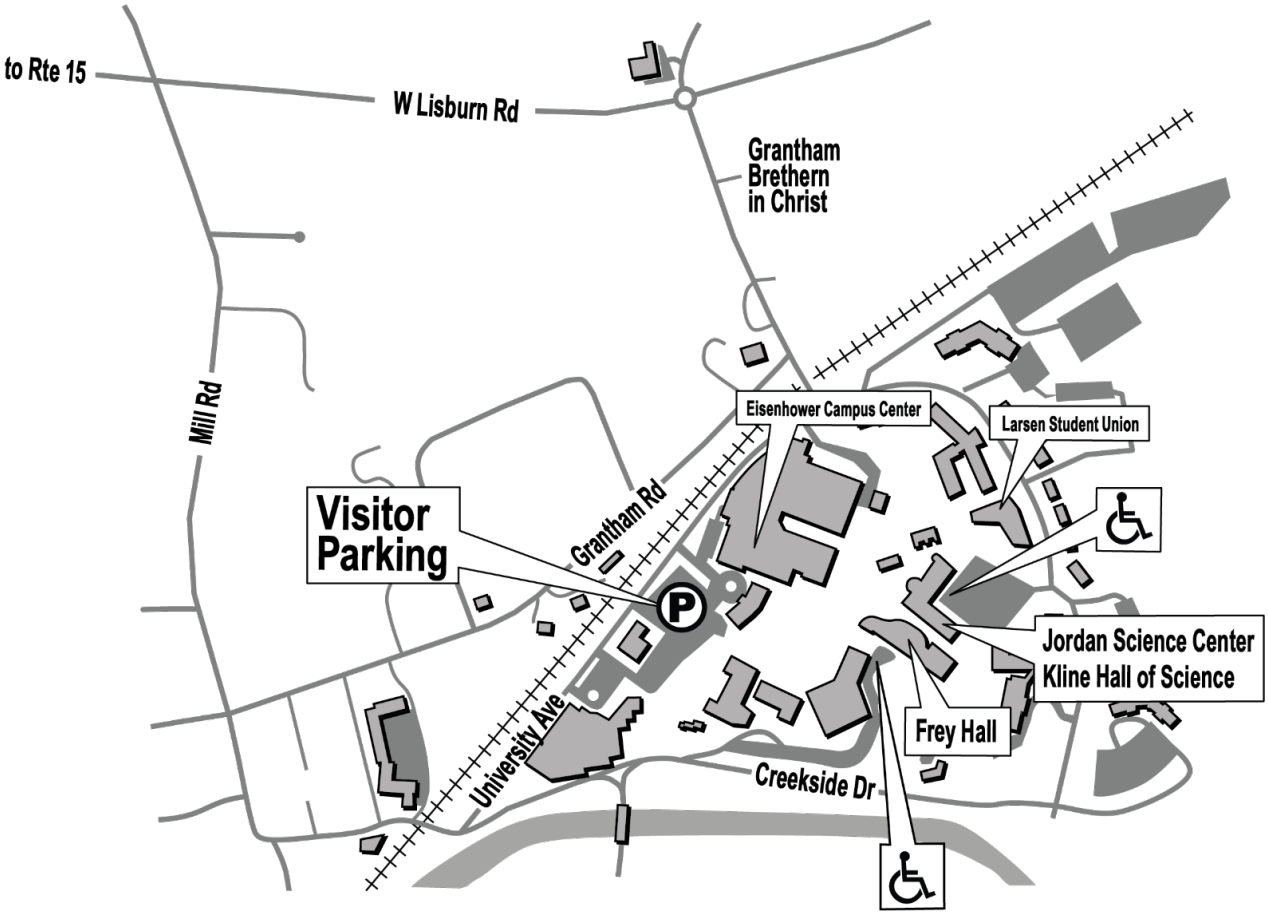

Welcome to Messiah University!

Visitor Parking: Parking is provided in the main Visitor Parking lot (VV) accessed from University Avenue, between Old Main and the Eisenhower Campus Center. Parking tags are not required during the Symposium. While designated handicapped parking is distributed throughout campus, spots closest to Symposium venues are available in the employee parking lots behind the Jordan Science Center (WW) and in the circle at the heart of campus (YY).

Dining facilities: The Lottie Nelson Dining Hall (upper level) and The Falcon (lower level; soup, paninis, salads) are located in the Eisenhower Campus Center. The Union Café (pizza, grill, wraps, salads) is located in the Larsen Student Union.

Using this Booklet

This **Program booklet** provides times, locations and titles for all presentations in the Symposium**.** A consolidated "**Schedule at a Glance**" (page 4) summarizes the schedule of all Oral Presentations and Poster Presentations.

Presentation Number: Each presentation has been assigned a unique Presentation Number. This number is used throughout the booklet to facilitate cross-referencing.

Authorship: All contributing co-authors and mentors are listed in this program. The name of each **presenting author** is in **bold font**. An **Index of Authors** at the end of the booklet (page 26) lists the names of all authors alphabetically with the number(s) of each presentation on which each is included.

Program & Symbols: Presentations are organized in discipline-specific sessions. Throughout the program and "**Schedule at a Glance**," unique icons (see box at right) indicate the discipline of each presentation.

Abstracts: Abstracts for each oral and poster presentation in the Symposium are provided on our accompanying website:
https://huggs.messiah.edu/seh_symposium

Acknowledgments: All faculty mentors, external mentors and collaborators, and nursing professionals are recognized. Sources of financial and material support are also listed (page 21) with corresponding presentation numbers.

Authorship Legend:

bold	Presenting author
†	Research or project mentor
‡	Off-campus contributor
§	Lightning Showcase presenter

Discipline Categories:

- Biopsychology
- Cellular & Molecular Biology
- Chemistry & Biochemistry
- Computer & Information Science
- Engineering
- Exercise Science
- Mathematics
- Nursing
- Organismal & Ecological Biology
- Physics

Additional Symbols:

- This oral presentation is accompanied by a poster
- This poster is accompanied by an oral presentation
- This project was supported by the Steinbrecher Undergraduate Summer Research Program
- This project was supported by the Collaboratory for Strategic Partnerships and Applied Research

SCHEDULE AT A GLANCE

Engineering I

Alexander Auditorium
Frey 110

12:30 Collaboratory Lightning Showcase

12:40 **19** Schied

1:00 **1** Renner, Dolfe

1:20 **2** Hoskins, Eaby, Zimmerman

1:40 **3** Schrim, Sarkett

2:00 **4** Esslinger, Armstrong

2:20 **5** Hege, Jo, Rivas

2:40 **6** Lamberton, Liney

Engineering II

Frey 150

7 Naylor, Frederick

8 Myers, Walls

9 Lea, Shatney, Walker

10 Cruzan, Doan, Ekstrom

11 Coakley, Davis, Yost

12 Gaigler, Kreider, Martin, Quinn

Computing

Frey 145

13 Epps, Pomeroy, Chez, Symons

14 Espenshade, Kagoro, Birch, Almanzar

15 Lau, Le, Paleveda, Snow

16 Patey

17 Risser, McIntire, Neff, Serufusa

18 Wilson, Miller, Shay

Physics & Mathematics

Kline 113

19 Schied

20 Kelly, Prettyman

21 Bolin

22 DiPrimeo

23 Rice, Raley

24 Tan

25 Wittman, DiPrimeo, Lim, Aviles

Poster Session 3:00-4:00

Engineering — Hollinger Atrium & Hollinger Lounge

47 Baughman, Ndayishimiye

48 Sakore, Smucker

49 Gibbons, Iwaneczko, Klingler, Krcma, Striebig

50 Anderson, Thompson

51 Behrens, Crawford, Kozubal, McLaughlin

52 Seo, Simons

53 Noll, Sheaffer, Whitney

54 Prekup, Carter, Fox, Russo, Skaggs

55 Seeburger, Frazho, Rody

56 Anthony, DiMarco, Dishongh, Wertz

57 Kovalcik, Mayne, Radell, Weaver

58 Brackman, Bahr, Carter, DeArville, Souders

59 Miller, LaRoche, Richert

60 Carnwath, Cielecki, Haseltine

61 Kagarise, Harvey

62 Burgos, Hecker, Nace, Porter

63 Brenneman, Miller, Porcelli

64 Rivera, Keefer, Merrill

65 Cooney, Frueh, Homnack

66 Clark, LeuamChampassak, Mansberry, Miller

67 Musser, Blagbrough, Furman, Jacob, Parks

Engineering III

Alexander Auditorium
Frey 110

4:00 **89** Moyo, Zarate

4:20 **90** Lutz, Gilbert, Mazak

4:40 **91** Crane, King

5:00 **92** DeVries, Kinch, Zook

Engineering IV

Frey 150

93 Rice, Penchansky, Redcay

94 Bell, Fan, Yoho

95 Dykes, Heller

96 Pinto, Baxter

	Exercise Science	Organismal Biology	Chemistry & Biochemistry	Cell & Molecular Biology
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1:00	**26** Chong, Mark	**31** Sopirak	**35** Adomanis	**41** Miedel
1:20	**27** Hejeebu	**32** Paris	**36** Alunni	**42** Besaly
1:40	**28** Rice, Samwell	**33** Gonzalez	**37** Barnes	**43** Turner
2:00	**29** Sagna	**34** Lee	**38** Humpert	**44** Kirkwood
2:20	**30** Walker		**39** White	**45** Blymire
2:40			**40** Le	**46** Turnow

Poster Session
3:00-4:00

Evidence-Based Nursing Care — Hollinger Lounge

68 Mitchko, Preston, Keller, Hordinski, Burleigh, Bruno

69 Klingler, Keitel, Miller, Lovern, Shearer, Wert

70 Cochran, Kreider, Kuhn, Mason, Rickabaugh, Zerbe

71 Abraham, Eddinger, Kim, Rembold, Staver

72 Xenides, Ogburn, Bermudez, Garcell, Vertz, Lim

73 Leigey, Opala, Puffenberger, Mwangi, Tumey, Hockman

74 D'Amato, Haney, Kauffman, Robinson, Thomas

75 Caldwell, Ehst, Gizinski, Haldeman, Hamilton, Kline

Natural Sciences — Oakes Museum & Jordan Science Center

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84 Kersten

85 Brightbill

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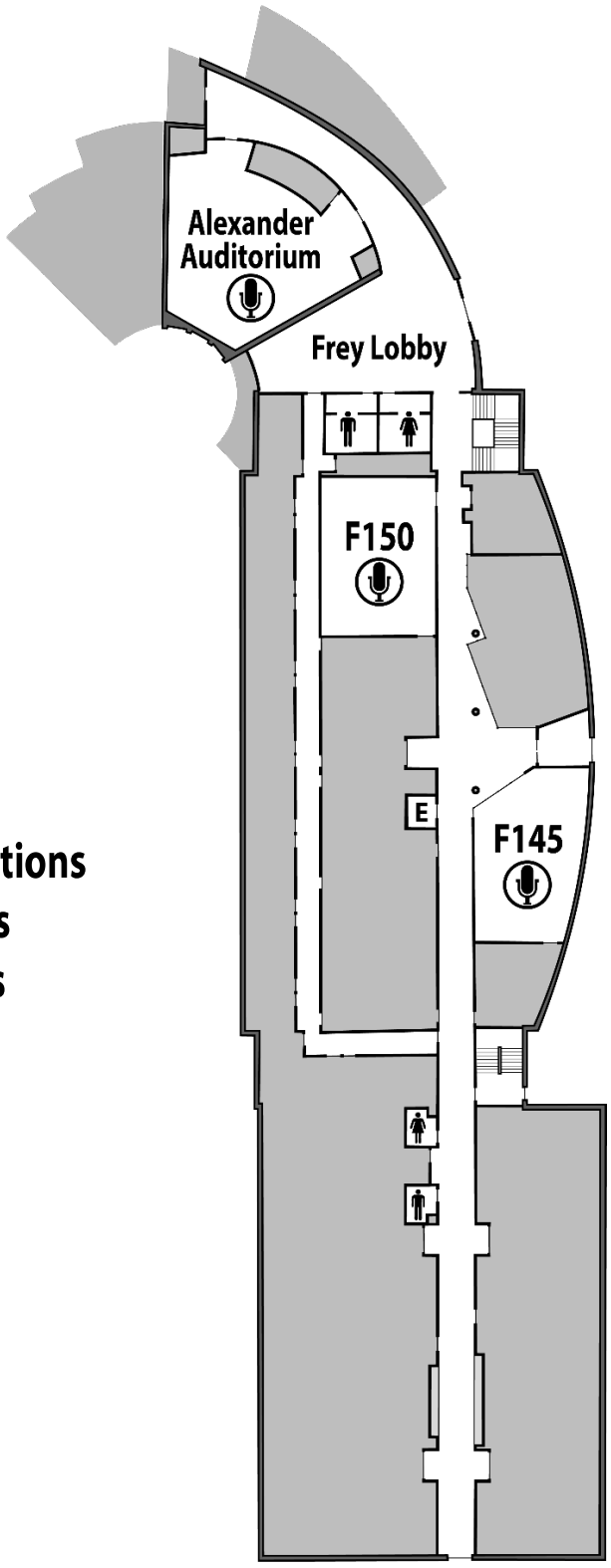
87 Hofecker, Ellis

88 Mynio, Cordero

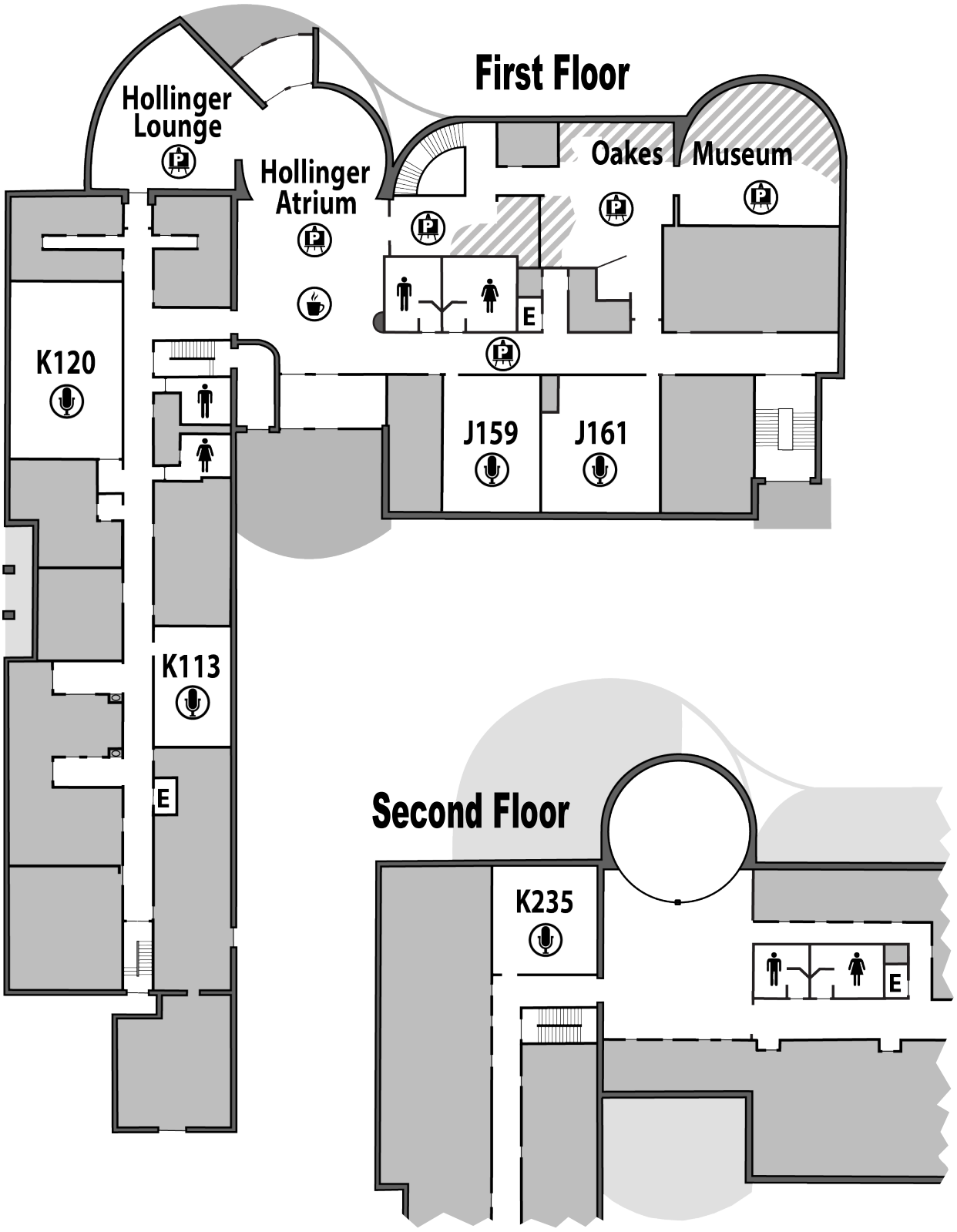
SCHEDULE AT A GLANCE

Frey Hall



Oral Presentations
Poster Venues
Refreshments

Jordan Science Center · Kline Hall of Science



Oral Presentations (Early Afternoon)

Collaboratory Lightning Showcase

Alexander Auditorium (Frey 110); 12:30 – 1:00

"21 Innovations in 21 Minutes"

Physics & Mathematics

Kline 113; 12:40 – 3:00

19 **12:40** *Nuclear Fusion*
Ryan Schied, Abaz Kryemadhi†

20 **1:00** *Searching for Light Dark Matter with SNIPE Hunt Collaboration*
Franklin Kelly, **Zoe Prettyman**, Abaz Kryemadhi†

21 **1:20** *On The Internal Dynamics of Neutron Stars: The Newest Models and Theories*
Ethan Bolin, Abaz Kryemadhi†

22 **1:40** *Hilbert's Theorem*
Sophia DiPrimeo

23 **2:00** *When Corrections Don't Cut It: Multiple Testing in Microbiome Analyses*
Caleb Rice, **Jack Raley**, Nicholas Weaver†

24 **2:20** *Modeling College Choice as a Multi-Objective Optimization Problem*
Regan Tan

25 **2:40** *The Distribution of Columns in Staircase Tableaux*
Tyler Wittman, **Sophia DiPrimeo**, **Hazel Lim**, **Nehemiah Aviles**

Engineering I

Alexander Auditorium (Frey 110); 1:00 – 3:00

1 **1:00** *An Assistive Technology for Pressing a Piano Sustain Pedal* 47
Caitlin Renner§, **Shep Dolfe**, Catie Baughman, Simon Kyllonen, Angelo Ndayishimiye, Philip Graybill†, Dereck Plante†

2 **1:20** *An Eye-Triggered Alarm for Late-Stage ALS Patients* 48
Alexander Hoskins§, **Aaron Eaby**, **Jeron Zimmerman**, Will Keane, Jasmine Sakore, Wyatt Smucker, Philip Graybill†, Dereck Plante†

3 **1:40** *Improving Handpump Technology for Reliable Water Access* 49
Collin Schrim[§], **Evan Sarkett**, Elijah Gibbons, Rory Iwaneczko, Jacob Klingler, Tyler Krcma, Robert Striebig, Tim Burdett[†]

4 **2:00** *Solar Controller for Senegalese Farmers* 50
Chris Esslinger, **Gibson Armstrong[§]**, Owen Anderson, Jonathan Saikia, Marc Sauder, Dakota Thompson, Randall Fish[†]

5 **2:20** *Development of a Reliable, Low-Cost Wind Turbine Monitoring System* 51
Noah Hege[§], **Ethan Jo**, **Carlos Rivas**, Jonathan Behrens, Eliza Crawford, Drew Kozubal, James McLaughlin, Tim Burdett[†]

6 **2:40** *Cyclic Durability and Nonlinear Force Analysis of Cunningham and Steenbeek Clubfoot Braces* 52
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Engineering II

Frey 150; 1:00 – 3:00

7 **1:00** *Developing a Manual Cashew Shelling Machine for Senegalese Farmers* 53
Caleb Naylor[§], **Zach Frederick**, Elijah Noll, Timothy Sheaffer, Dave Whitney, Chris Becking[†]

8 **1:20** *Developing a Ugandan Agricultural Crimper for Sustainable Farming* 54
Cole Myers, **Emma Walls[§]**, James Carter, Brayden Fox, Alaina Prekup, Anthony Russo, Micah Skaggs, Chris Becking[†]

9 **1:40** *Design, Manufacture, and Performance Evaluation of a Locally Maintainable Manual Seeder for Zambia* 55
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10 **2:00** *A Modular Mobility Solution for People Living with a Disability in Low Income Countries* 56
Jacob Cruzan[§], **Caleb Doan**, **John Ekstrom**, Elizabeth Anthony, Reid Bartles, Bella DiMarco, Mitchell Dishongh, Corina Martin, Ryan Mowery, Grayson Wertz, John Meyer[†], David Vader[†]

11 **2:20** *Designing Freedom: A Locally Manufacturable Wheelchair for Sikalongo, Zambia* 57
Gabe Coakley[§], **Jed Davis**, **Noah Yost**, Nathan Kovalcik, Gaven Mayne, Logan Radell, Ethan Weaver, Timothy Van Dyke[†]

12 **2:40** *Developing a Locally Manufacturable Standing Wheelchair for Nepal* 58
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Computing

Frey 145; 1:00 – 3:00

13 **1:00** *Backing Education for All: Creating a Backup Module for Kolibri*
Nicholas Epps, **Annika Pomeroy**, **Nathanael Chez**, **Elijah Symons**

14 **1:20** *Dum-Bel*
Ethan Espenshade, **Alex Kagoro**, **Bryan Birch**, **Jaylene Almanzar**

15 **1:40** *CoopCheapGoods*
Stephen Lau, **Ethan Le**, **Miles Paleveda**, **Chord Snow**

16 **2:00** *Quantum Carnage*
Josh Patey

17 **2:20** *FalconTeams*
Luke Risser, **Jake McIntire**, **Micah Neff**, **Mukisa Serufusa**

18 **2:40** *A Full-Stack Medical Portal for Ausadham Clinic*
Luke Wilson, **Ezra Miller**, **Tj Shay**

Exercise Science

Kline 120; 1:00 – 2:40

26 **1:00** *Impact of Strength Training on Age-Related Musculoskeletal Health: An Analysis of PREP Data*
Leanne Chong, **Hannah Mark**, Nate Nester, Kris Hansen-Kieffer

27 **1:20** *Creativity, Physical Therapy, and Healthcare Delivery in Rural Tanzania*
Grace Hejeebu, H. Scott Kieffer†

28 **1:40** *Investigating the Seed Oil Controversy: A Framework for Evaluating Credible Research*
Noah Rice, **Nada Samwell**, Nate Nester, Kris Hansen-Kieffer

29 **2:00** *The Effect of Meditation on Heart Rate Variability and Serum BDNF Following an Acute Stress Event*
Grace Sagna, Sophia Gray-Baublitz, H. Scott Kieffer†, Jennifer Thomson†

30 **2:20** *Anaerobic Power Associated with Caffeine and Genotypes*
Owen Walker, Bella Heckman, Michael Shin, H. Scott Kieffer†

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Kline 235; 1:00 – 2:20

31 **1:00** *Determining If Coloration Signaling of Male Atelopus varius and A. zeteki is Related to Sexual Selection*
Peyton Sopirak, Erik Lindquist†

32 **1:20** *Flowering of Cranberries and Canopy Cover*
Wesley Paris, David Foster†

33 **1:40** *Evaluating the Effects of Antibiotic Treatment on Microbial Load in Second Instar Monarch Caterpillars*
Marlyne Gonzalez, Jacobus de Roode‡†, Nadya D. Muchoney‡†, Ehsan Sanaei‡†

34 **2:00** *Assessment of Post-Drought Recovery of Aquatic Macroinvertebrates in Dogwood Run, Dillsburg, Pennsylvania*
Yi-Hsun Lee, Jeff Erikson†

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35 **1:00** *Synthesis of Rhodanine Indolinones and their Inhibition of Human AANAT*
Jase Adomanis, Anne Reeve†, Jesse Kleingardner†

36 **1:20** *Developing an Assay for Novel Metal-Substituted Heme Proteins*
Mary Alunni, Jesse Kleingardner†

37 **1:40** *Using Enzyme Activity Assays and NMR for Analysis of Stilbenes as PTP1B Inhibitors*
Abigail Barnes, Anne Reeve†, Jesse Kleingardner†

38 **2:00** *Expression and Purification of HCCS and Apocytochrome c for Developing and Optimizing Metal-Specificity Assays*
Ben Humpert, Jesse Kleingardner†

39 **2:20** *Adaptation of Organic Teaching Labs to Emphasize Green Chemistry*
Zoe White, Anne Reeve†, Roseann Sachs†

40 **2:40** *Enzyme Activity Assay of Ferrochelatase Variants that Insert Divalent Metal Ions to Protoporphyrin IX*
Phuong Thy Le, Jesse Kleingardner†

Cell & Molecular Biology

Jordan 161; 1:00 – 3:00

41 **1:00** *Determining the Efficacy of Delayed Proglumide Treatment of Tumor Fibrosis in Murine Panc02 Pancreatic Cancer*
Sadie Miedel, John Harms†

42 **1:20** *Comparison of Ethanol and Acetaldehyde Exposure on Developing Zebrafish*
Mohrael Besaly, Jennifer Ness-Myers†

43 **1:40** *Effects of Nickel and Zinc on Arabidopsis thaliana Growth*
Brad Turner, Michael Shin†

44 **2:00** *Immune Signaling in Co-Cultures of Gut Bacteria and Human Macrophages*
Naomi Kirkwood

45 **2:20** *Examining Tumor Fibrosis in Lung Metastases of Pancreatic Cancer*
Elizabeth Blymire, John Harms†

46 **2:40** *CRISPR-mediated Knockout of MAST3 in THP-1 Cells*
Ava Turnow, Isis Rivera-Walsh†

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48 *An Eye-Triggered Alarm for Late-Stage ALS Patients* 2
Jasmine Sakore, **Wyatt Smucker**, Aaron Eaby, Alexander Hoskins, Will Keane, Jeron Zimmerman, Philip Graybill†, Dereck Plante†

49 *Improving Handpump Technology for Reliable Water Access* 3
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50 *Solar Controller for Senegalese Farmers* 4
Owen Anderson, **Dakota Thompson**, Gibson Armstrong, Chris Esslinger, Jonathan Saikia, Marc Sauder, Randall Fish†

51 *Development of a Reliable, Low-Cost Wind Turbine Monitoring System* 5
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54 *Developing a Ugandan Agricultural Crimper for Sustainable Farming* 8
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59 *A Motion-Activated Functional Electrical Stimulator for Gait Assistance* — 89
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61 *Accessible Transfemoral Prosthetics: Designing Durable Knee Sockets for Developing Countries* — 91
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62 *Scaling and Validating a Prosthetic Knee for Global Pediatric Use* — 92
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69 *Stronger Together: Family-Inclusive Weight Management Programs and Pediatric BMI*
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71 *Simulation of Active Shooter Events Enhances Hospital Preparedness*
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Norah Xenides, **Jamie Ogburn**, **EliAnna Bermudez**, **Kayley Garcell**, **Kaylee Vertz**, **Phoebe Lim**, Owen Smith†

73 *Mobile Health Interventions: Caring for Latino People Living with HIV*
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74 *Improving Nursing Students' End-of-Life Care Confidence and Attitudes Using Simulation*
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75 *The Impact of Doulas as Continuous Labor Support (CLS) on Cesarean Sections*
Laura Caldwell, **Maya Ehst**, **Caroline Gizinski**, **Aubrey Haldeman**, **Ariana Hamilton**, **Bridget Kline**, Laura Lebo†

Natural Sciences

Oakes Museum & Jordan Science Center; 3:00 – 4:00

33 *Evaluating the Effects of Antibiotic Treatment on Microbial Load in Second Instar Monarch Caterpillars*
Marlyne Gonzalez, Jacobus de Roode[‡†], Nadya D. Muchoney[‡†], Ehsan Sanaei[‡†]

35 *Synthesis of Rhodanine Indolinones and their Inhibition of Human AANAT*
Jase Adomanis, Anne Reeve[†], Jesse Kleingardner[†]

37 *Using Enzyme Activity Assays and NMR for Analysis of Stilbenes as PTP1B Inhibitors*
Abigail Barnes, Anne Reeve[†], Jesse Kleingardner[†]

39 *Adaptation of Organic Teaching Labs to Emphasize Green Chemistry*
Zoe White, Anne Reeve[†], Roseann Sachs[†]

40 *Enzyme Activity Assay of Ferrochelatase Variants that Insert Divalent Metal Ions to Protoporphyrin IX*
Phuong Thy Le, Jesse Kleingardner[†]

41 *Determining the Efficacy of Delayed Proglumide Treatment of Tumor Fibrosis in Murine Panc02 Pancreatic Cancer*
Sadie Miedel, John Harms[†]

42 *Comparison of Ethanol and Acetaldehyde Exposure on Developing Zebrafish*
Mohrael Besaly, Jennifer Ness-Myers[†]

45 *Examining Tumor Fibrosis in Lung Metastases of Pancreatic Cancer*
Elizabeth Blymire, John Harms[†]

46 *CRISPR-mediated Knockout of MAST3 in THP-1 Cells*
Ava Turnow, Isis Rivera-Walsh[†]

76 *Comparison of Vertical Jump Devices*
Jacey Thomas, **Seth Rajnic**, **Brad Brown**, **Haley Womer**, H. Scott Kieffer[†]

77 *Assessing the Validity of a Portable Metabolic Cart to Estimate Resting Metabolic Rate*
Nada Samwell, Jacob Davenport, Ezra Zook, Anna Ruffaner, H. Scott Kieffer[†]

78 *The Effects of Stretching on Vertical Jump*
Elizabeth Chorba, Mack Marzan, Kaleb Kabakjian, Evelyn Spencer, Ted Lechthaler, H. Scott Kieffer[†]

79 *Kinetic Analysis of Stilbenes as PTP1B Inhibitors*
Allison Focht, Anne Reeve[†]

80 *Controlling the Kinetics of Silver Nanoparticle Growth on Graphene Oxide*
Shelby Wendling, Seth Burkert†

81 *Ecotoxicology Study of Trindle Spring Run, Mechanicsburg PA*
Peyton Sopirak, Jeff Erikson†

82 *Berberine Efficacy Against MRSA*
Macy White, David Foster†

83 *Characterization and Impact of Chemical Hypoxia on Oligodendrocyte Myelination of Danio rerio (Zebrafish)*
Hope Adedokun, Jennifer Ness-Myers†

84 *Investigating Effects of Chemical Hypoxia on Myelination in Danio rerio*
Elise Kersten, Jennifer Ness-Myers†

85 *Determining the Sensitivity of Western Blot Analysis for Detecting Changes in Collagen Production*
Ethan Brightbill, John Harms†

86 *Insights into the Regulation & Expression of the MAST3 Kinase Gene During Inflammation*
Kacie Watkins, Isis Rivera-Walsh†

87 *The Effect of Blood Flow Restriction Training on Quadriceps Strength and Hypertrophy After ACL Reconstruction: A Critically Appraised Topic*
Bella Hofecker, **Malia Ellis**, Matthew Lewis†

88 *How Does Footwear Designed Around Male Anatomy Impact Injury, Performance, and Overall Comfort of Female Athletes?: A Critically Appraised Topic*
Samantha Mynio, **Nathalia Cordero**, Matthew Lewis†

Oral Presentations (Late Afternoon)

Engineering III

Alexander Auditorium (Frey 110); 4:00 – 5:20

89 **4:00** *A Motion-Activated Functional Electrical Stimulator for Gait Assistance* — 59
Ester Moyo, **Nathaniel Zarate**, Zachary Denlinger, Jacob LaRoche, Ava Miller[§], Thomas Nyemscek, Noah Richert, Andrew Vigil, Ryan Farris[†]

90 **4:20** *A Modular Stance Control Orthosis for Gait Rehabilitation* — 60
Kaitlyn Lutz[§], **Sarah Gilbert**, **Alyssa Mazak**, Josiah Carnwath, Ed Cielecki, Colton Haseltine, Ryan Farris[†]

91 **4:40** *Accessible Transfemoral Prosthetics: Designing Durable Knee Sockets for Developing Countries* — 61
Chaelee Crane[§], **Daniel King**, Trinity Harvey, Adeline Kagarise, Abi Le, Taylor Wahlers, Philip Tan[†]

92 **5:00** *Adapting and Validating a Prosthetic Knee for Global Pediatric Patients* — 62
Kayra DeVries, **Gavin Kinch**, **Levi Zook**, Victoria Burgos[§], Hannah Ferkett, Joseph Hecker, Michael Nace, Dylan Porter, Owen Reinford, Matthew Rush, Philip Tan[†]

Engineering IV

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93 **4:00** *Bridging Isolation: Girder Bridge Design in Alaska* — 63
Emma Rice[§], **Walker Penchansky**, **Luke Redcay**, Levi Beamer, Luke Brenneman, Micah Cotton, Jonathan Miller, Matthew Porcelli, Mason Preston, Ellie Teigland, Lillian Wertz, Noah Zikan, Douglas Stumpp[†]

94 **4:20** *Ministry Headquarters Site Development in Kaduna, Nigeria* — 64
Candace Bell, **Joseph Fan**, **Elizabeth Yoho[§]**, Thomas Keefer, Evan Merrill, Christopher Rivera, Michelle Lockwood[†]

95 **4:40** *Clean Accessible Water Solutions: TCZ* — 65
Samuel Dykes, **Caiden Heller[§]**, Abi Cooney, Nate Frueh, Christian Homnack, Ray Knepper[‡†], Michelle Lockwood[†]

96 **5:00** *Development of an Affordable Digital Auditory Masking Device for Speech Fluency Assistance* — 66
Benjamin Pinto[§], **Sean Baxter**, Jeremiah Clark, Ruth LeuamChampassak, Tyler Mansberry, June Miller, Bob Hentz[‡†], Benjamin Weaver[†]

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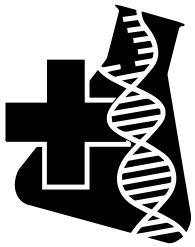

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A graduate of Messiah University, Dr. Hess received his Ph.D. in Animal Physiology from Michigan State University in 1970. Returning to Messiah, he taught courses in Physiology, Cell Biology, Electron Microscopy, and Natural Sciences Capstone for nearly forty years, served as department chair, and retired in 2009 as Interim Dean of the School of Health and Natural Sciences. Throughout his distinguished career, Dr. Hess strove to build a strong program for undergraduate research in biology and in chemistry. His work opened the door to others, an enduring legacy evidenced by this Symposium.

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Jessica Cordell

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See Collaboratory Project Managers (p. 22) for faculty from the **Department of Engineering**.

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Index of Authors

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and corresponding presentation number(s).

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