



THE 17TH ANNUAL

CELEBRATION OF
UNDERGRADUATE
RESEARCH AND
CREATIVE
PERFORMANCE

APRIL 13, 2018 | 2:30 - 5:00 P.M.

HUNDREDS OF PROJECTS PRESENTED BY STUDENTS
FROM EACH ACADEMIC DIVISION OF THE COLLEGE



Hope COLLEGE

@CURCP



hope.edu/celebration



Welcome

April 13, 2018

Dear Friends,

We are pleased to welcome students, guests, and community members to the 17th annual Celebration of Undergraduate Research and Creative Performance at Hope College. This event highlights scholarly accomplishments by talented Hope students working collaboratively with exceptional faculty mentors.

Each project at this event describes original and creative scholarship arising from research that Hope students and faculty have pursued together. Beyond the development of new knowledge, these projects are among the most transformative learning experiences in a student's academic career. The interaction with caring and dedicated faculty mentors results in expanded awareness and opportunities for student post-graduate plans and career aspirations.

This year's Celebration includes 247 presentations by 382 students from 28 different departments and programs. Research occurs both during the academic year and summer, spans the four academic divisions, and includes independent study and course-based research. Hope students regularly receive national recognition for their research accomplishments with NSF Graduate Research Fellowships, Fulbright Scholarships, Goldwater Scholarships, and professional society awards.

Hope College is nationally recognized for the extent and quality of its undergraduate research program. The Council on Undergraduate Research presented Hope College with a 2017 campus-wide Award for Undergraduate Research Accomplishments (AURA) for Hope's exceptional undergraduate research, scholarship, and creative activity programs. Only nine colleges and universities nationwide have received this recognition, and Hope is the only institution in Michigan to have earned the award.

Thank you for your participation in and support of this Celebration. To learn more about research experiences at Hope College, visit the website: hope.edu/research.

Sincerely,

William F. Polik

Associate Dean for Research and Scholarship

Acknowledgements

Cover artwork by Claire Reenders, '19

William F. Polik and Laura R. McMullen, Celebration Co-directors; Deborah DuMez and Leo Herzog, Computing and Information Technology; Kylie Howland, Michelle VanDenend and staff, Creative Dining Services; Heather Roden and staff, Events and Conferences Office; Daphne Fairbanks and Sonja Glover, Media Center and TechLab; Laura Clarke, Michael Culver, and staff, Physical Plant; Rachel Melvin and Kristi Rosendahl, Print and Mail Services; Rebecca Robrahn, Paul Willard, Abigail Brummel and staff from Public Affairs and Marketing

Hope College Wins National Award for Undergraduate Research Accomplishments

The Council on Undergraduate Research awarded Hope with its 2017 campus-wide Award for Undergraduate Research Accomplishments (AURA). The award recognizes exceptional undergraduate research, scholarship, and creative activity programs.

Only nine colleges and universities national wide, three per year, have received the recognition since the award program began in 2015. Hope is the only institution in Michigan to have earned the award. Go Hope!

ELITE COMPANY

Hope received a **Campus-Wide Award for Undergraduate Research Accomplishments** from the Council on Undergraduate Research

9
colleges and universities nationwide

3
per year

HOPE
The only institution in Michigan to earn the award

since the annual recognition program began in 2015

CELEBRATION OF UNDERGRADUATE RESEARCH AND CREATIVE PERFORMANCE

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Listing of projects by department or program. See back cover for location by project number.

Art and Art History

Mentors: Professor Sara Alsum-Wassenaar and Dr. Heidi Kraus

- | | | |
|---|---|---|
| 1 | Carolyn Ellis | Spontaneous Emotional Searching: A Contemporary Analysis of Humanistic Action |
| 2 | Jared Vite, Sarah Sanders, Emma Schipper, Kelly Ocock | Motion Design Reel |

Biochemistry & Molecular Biology

Mentors: Drs. Maria Burnatowska-Hledin, Leah Chase, Kristin Dittenhafer-Reed, Jeffrey Johnson, and Virginia McDonough

- | | | |
|-----|---|--|
| 181 | Riley Draper | Mutations in MON2, Which Encodes a Protein Implicated in Vesicular Transport, Affects Response to Exogenous Fatty Acids in Yeast |
| 187 | Alyssa Goodwin, Anne Sangliana | Effects of Compounds Synthesized in Organic Chemistry on the Proliferation in T47D Cells |
| 184 | Joel Karsten | Effects of VACM-1/Cul5 Gene Knockout on Cellular Proliferation Using CRISPR-Cas9 Approach |
| 186 | John Larson | Development of a Rapid Screening Assay to Detect Trafficking-Defective Mutants of System x_c^- |
| 182 | Kyle Ross, Alex Wyeth | Altered Metabolism and Mitochondrial Lipid Content Drive the Evasion of Apoptosis |
| 183 | Mackenna Senti, Alicia Bostwick, Morgan Cinader | Mechanisms of Regulation of Mitochondrial DNA Stability and Transcription |
| 185 | Philip Versluis | Activation of Akt Increases Cell Surface Expression of System X_c^- |

Biology

Mentors: Drs. Aaron Best, Thomas Bultman, Matthew DeJongh, Brent Krueger, Jianhua Li, K. Greg Murray, Michael Pikaart, Elizabeth Sanford, Joseph Stuke, Peter Vollbrecht, and Kathy Winnett-Murray; also Sarah Brokus, Karen D. Calhoun (U of M), Frank Moen, and Randy Wade

- | | | |
|-----|---|--|
| 37 | Chris Belica | Environmental Factors Affecting Bacterial Community Composition in Hypereutrophic Macatawa Watershed |
| 208 | Ismael Byers | Utilizing Community Voice to Guide the Design and Implementation of Institutional Responsiveness to the Flint Water Crisis |
| 206 | Lydia Doughty, Adriana Mirabelli, Sarah Olen, Julia Wilson, Zachery Wylie, Amelia Waalkes, Anastasia Perecki, Hannah DeVore | Genomic Analysis of the Novel Mycobacteriophage Thyatira |
| 41 | Monica Elliott, Emily Gregory | Wildlife Use Patterns in a Constructed Wetland |
| 207 | Ty Hergenreder | Relating <i>Acer</i> Morphology, Phylogeny, and Historical Climatology |
| 36 | Jade Laughlin, Tena Baar, Sydney Les, Lexi Schoonover | Global Survey of Water Quality Using Point-of-Use Water Filters |

204	Kaitlyn Lein, Kimberly Paquette, Timbree Pederson, Matthew Switalski, Carter Smiley, Emma Oonk, Darby Baird, Brooke Van Wyk, Lilly Hemesath, Abigail Meder	Genomic Analysis of the Novel Mycobacteriophage Bromden
209	Chelsea Miskelley	Comparison of Executive Function in Selectively Bred Obesity-Prone and Obesity Resistant Sprague-Dawley Rats through Behavioral Analysis
43	Abbygayle Parshall, Cassandra Harders	Genomic and Physiological Characteristics of Novel <i>Escherichia</i> Strains Isolated from Freshwater Sources
39	Jacob Peecher, Adam Slater, Shannon Smith, Megan Oostindie	Development of a qPCR Assay to Determine <i>In Situ</i> Replication of <i>Escherichia coli</i> in Freshwater Environments
38	John Peterson, Megan Oostindie, Megan Grimes	Comparing Metabolic Strategies of Environmentally-Isolated <i>Escherichia Coli</i> Strains
42	Eleda Plouch, Abigail Jeavons, Mallory Luke, Abbygayle Parshall, Jacob Spry, Daniel Wade	Monitoring Nutrient Levels and Sediment in Macatawa Watershed
188	Anne Sangliana	Mutualism between Fly and Fungus Depends upon Fungal Reproductive Modes
40	Matthew Schuiling	Isolation and Identification of Fungistatic Compounds from <i>Phytolacca americana</i> and <i>Phytolacca rivinoides</i>
205	Geordan Stukey, Bethany VanHouten, Adam Krahn	Arrested Development – Impact of Temperature on the Isolation Frequency and Lytic Cycle Growth of Cluster K Mycobacteriophages

Center for Leadership Development

Mentors: Matt Gira, Mary Ellen Kettelhut

35	David Wang, Timothy Doorenbos	Honey Batcher
21	Stephen Wilbur, Jordan Hooker, Holden Dippel	ParkShark: Using Carbon-based Painted Inductive Loops to Track Parking Space Occupancy

Chemistry

Mentors: Drs. Mary Elizabeth Anderson, Aaron Best, Maria Burnatowska-Hledin, Kenneth Brown, Leah Chase, Amanda Eckermann, Jason Gillmore, Jeffrey Johnson, Brent Krueger, Aaron Putzke, William Polik, Elizabeth Sanford, Justin Shorb and Matthew Smith; also Amber J. Prins

61	Landon Brower	Examining Deposition Method and Gas Storage Capabilities of HKUST-1 Metal-Organic Frameworks
92	Jimmy Cerone	Student Learning in Online Textbooks
152	Carmen Chamberlain	Synthesis and Characterization of Hydrophobic Ruthenium Arene Complexes
122	Daniel Clark	Developing Monovalent Ion Parameters for the Optimal Point Charge (OPC) Water Model
154	Brandon Derstine	Ethyne-Substituted Longer Wavelength Azo Dyes for Photomechanical Applications
155	Addison Duda	Sonogashira Routes to Phenylethylenes for Photomechanical Polymeric Systems

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88	Patrick Fisher	Diaminoacenaphthylene
125	Kevin Franz, Shannon Degnan	Investigating the Role of xCT in Neuroregeneration
148	Amanda Gibson, Mackenzie Schmidt, Philip Versluis, Dylan Sabo	Regulation of System xc-: Effects of N-terminal and C-terminal mutations on xCT cell surface expression
156	Sean Gitter, Emily Hofmeyer	Halogenated BF ₂ -Azo Dyes for Incorporation in Photomechanical Systems
89	Sydney Gross	The Synthesis of a Highly Fluorinated EDOT Monomer for the Preparation of Hydrophobic PEDOT Coatings
64	Grace C. Ahlgrim, Ethan M. Heyboer	Synthesis of Ortho-Substituted Benzamides through Nickel Mediated Cross-Coupling
65	Jacob Jansen, Katherine Reed, Gregory Campbell	Heterocycle-Directed Decarbonylation of Diaryl Ketones
63	Rebecca Johnson, Meghan Campbell, Erik Schoonover	Development of Rhodium-Catalyzed Carbon-Carbon Single Bond Activation via in situ Generated Imine Directing Groups
60	Grace Kunkel	Tetrahedrite Nanoparticles: Solution-Phase Synthesis and Thermoelectric Characterization
150	Karissa Libson	Leaching of Strontium Doped Hydroxyapatite Nanoparticles (nHAPs)
90	Derrick Obiri - Yeboah, Matthew Ammerman	The Preparation and Electropolymerization of an EDOT-Substituted Iron Porphyrin for Glucose Sensing
59	Andrew Ochs	Tetrahedrite Nanoparticles: A Thermoelectric Pathway toward Alternative Energy Applications
91	Alexander Osterbaan	Raman Spectroscopy for Undergraduate Laboratories
151	John Peterson, Kathleen Muloma	Synthesis and Characterization of Cobalt Schiff Base Complexes with Bioactive Ligands
153	Nicholas Rozema, Carmen Chamberlain	(arene)RuCl ₂ (L) Complexes as Structural Disruptors for Amyloid Beta (1-40)
123	Isaac Rusch	The Preparation of Ferrocene Functionalized Electrochemical Films for Sensor Applications
121	Zachary Snoek, Anna Prins	The Next Generation of High Performance Computing Using Containerization
149	Skylar Sundquist	Regulation of Cellular Proliferation by VACM-1/CUL5 is Dependent on its Posttranslational Modification by NEDD8
94	Peter Timperman	PyScan: Interfacing with Laboratory Instruments Using Python
62	Ashley Trojniak	Thin Film Synthesis and Characterization of Copper-Paddlewheel Surface-Anchored Metal Organic Frameworks
93	Yong Chul Yoon	Validation of Theoretical IR Spectroscopic Methods for Protein Structure Determination

Communication

Mentors: Drs. Marissa Doshi, Choonghee Han, Lauren Hearit, and Professor Rob Pocock

- | | | |
|-----|--------------------------------|--|
| 109 | Kelly Arnold | Digital Constructions of Millennial Womanhood |
| 163 | Rachel Gillespie | Measuring Changes in Intrinsic Religiosity among College Students |
| 165 | Peter Rak | Growing Creativity and Shrinking Traditions: An Exploration on the Internet's Impact on Gamelan in Bali, Indonesia |
| 164 | Monica Ruser | College Students and Religious Identification: Perceptions and Participation in College Religious Life |
| 110 | Mendon Thomas, Courtney Kuiper | Gift of Life Michigan Research and Proposal |

Computer Science

Mentors: Drs. Charles Cusack, Ryan McFall, and Mike Jipping

- | | | |
|-----|---------------------------------|---|
| 119 | Melissa Bazany, Cordell Engbers | Design and Development of the Hope College Student Assessment of Learning and Teaching System |
| 120 | Grace Du Mez, Michael Kiley | Pallist: Find Nearby Friends |
| 118 | Jori Gelbaugh, Amber Carnahan | Developing a Google Chrome Extension to Improve Online Readability |
| 117 | Mark Powers | Graph Pebbling: Doppelgangers and Lemke Graphs |

Dance

Mentor: Professor Linda Graham

- | | | |
|----|---------------|---------------|
| 10 | Raven Bouvier | How We Create |
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Economics and Business

Mentors: Drs. Sarah Estelle, Steven McMullen, and Todd Steen

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|-----|-------------------|--|
| 244 | Fernando Bahena | Does Church Attendance Decrease Crime? |
| 239 | Brian Brown | The Effects of Protective Tariffs on Employment and Wages: An Analysis of U.S. Tariffs on Chinese-Produced Tires |
| 240 | Benjamin DeRitter | Does Immigration Affect Academic Achievement in U.S. Schools? |
| 178 | Keenan Donk | The Lasting Impact of Adolescent Mental Health on Educational Attainment of Adults |
| 218 | Darren Ford | The Effect of Economic Downturns on Marriage |
| 243 | Brandon Fuller | The Convergence of Sphere Sovereignty, Local Knowledge, and Subsidiarity |
| 247 | John Geshay | The Impact of Income and Employment on Volunteering |
| 174 | James Glagola | Raising the Standards: The Impact of Common Core Education on Intermediate Student Mathematical Achievement |
| 214 | Robert Heyboer | The Effect of Location on Income Inequality |

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175	Emma Nyhof	The Impact of Participation in Multiple Means-Tested Welfare Programs on Labor Supply
241	Jacob Pardonnet	Putting Crime in Time-Out: Analyzing the Relationship between Parental Involvement in Their Child's Education and Property Crime
176	Alyssa Pinkham	Is Poverty More Likely to Fall on Deaf Ears? The Effects of Being Deaf/Hard-of-Hearing on Poverty in the United States
242	Caroline Ritter	Do Teenagers Make Riskier Sexual Decisions When They Are Protected by the Hepatitis B Vaccination?
217	Adam Rolain	Legalization of Recreational Marijuana and its Effect on Labor Productivity
215	Daniel Rush	Does Parental Involvement During Childhood Affect Substance Use
246	Samuel Schuster	Does Divorce Impact High School Students' GPAs?
248	Kurtis Slenk	Does Attention Deficit Hyperactivity Disorder Affect Prosperous Living? A Look at ADHD's Impact on Income, Employment, and Schooling
177	Anna Van Deelen	A Painful Problem: How is Educational Attainment Related to Opioid Overdose Rates?
219	Joey Williams	The Effects of a Mobile Population on Green Space
245	Fiona Ye	What Produces Summer Olympic Medals? An Assessment of the Economic and Demographic Factors Determining a Country's Medal Count
216	Camryn Zeller	Will Universal Basic Income Discourage Investments in Higher Education?

Education

Mentors: Drs. Carrie Dummer, Jane Finn, Vicki-Lynn Holmes, Libbey Horton, Stephen C. Scogin, and Deborah Van Duinen

103	Shelby Bowers, Montserrat Dorantes	Project Based Learning: The Teachers' Perspective
101	Anna Davis	Impact of Supported Residency on the Independent Living Skills of Adults with Disabilities
49	Madeline Day	Friendship House Increases Independent Living Skills
53	Kylie DeKryger	Assessing the Impact on Learning of Summer Science Camps
50	Reganne Diener, Dara Madai Luna Medina	Friendship House Helps People with Cognitive Disabilities Improve their Life Skills
99	Carly Hampton	Friendship House Research
111	Emily Krueger	A Journey of Improvement In Word Recognition, Oral Reading, and Reading Comprehension: Does First Language Make a Difference?
102	Chris Kruger, Abby Couwenhoven	STREAM School and Standardized Testing: A Comparison of State and District-Level Assessments in Traditional versus Experiential Learning Environments

51	Jessica McAlpine	Importance of Community for Improvement in Independent Living Skills for Individuals with Intellectual Disabilities
52	Amanda Miller	Improvement in Independent Living Skills for a Resident with a Disability
104	Katie Rietberg, Michelle Austin	21st Century Skill Development in a Project-Based Learning Program
100	Madison Schaefer, Colin Baron, Cassidy Henshaw	They are ALL Our Students: Inclusion in Education
112	Allison Utting	Lessons from the Past: Teaching Empathy through Historical Fiction
98	Sarah Zurawski, Grace Commire	What Really Works? FBA and Classroom Management for Students with Disabilities

Engineering

Mentors: Drs. Jason Gillmore, Eric L. Mann, Courtney Peckens, Katharine Polasek, Matthew Smith, and Professor Susan Ipri Brown

157	Marcus Brinks, Britta Johnson, Michelle Plaver	Development of Model Elastomeric Photomechanical Systems and their Characterization
116	Emma Jones, Regan Jekkals	Engineering the Future Academies
114	Anthony Nguyen, Brooklyn Tobias	Characterizing Cortical Activation from Physical and Artificial Somatosensory Stimulation
115	Anne O'Donnell	Bio-Inspired Control of Civil Infrastructure
113	Jessica Reichenbach	Modeling of Different Stimulations of the Median Nerve
159	Taylor Rink	Development of Wireless Sensing Unit for Environmental Noise Monitoring
158	Alyssa VanZanten, Brian Simonich	Investigating the Kinetics of Polymerization Required for Bulk-Mediated Alignment of Liquid Crystal Elastomers

English

Mentor: Dr. Marla Lunderberg

11	Hannah Winegar	What Women Want: Portrayals of Women in Medieval Literature
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Geological and Environmental Sciences

Mentors: Drs. Brian Bodenbender, Aaron Best, Edward Hansen, Paul Pearson, Jonathan Peterson, Michael Pikaart, Alyssa Shiel (Oregon State), and Brian Yurk; also Professor Suzanne DeVries-Zimmerman and Charlotte Möller (Lund University)

48	Erin Brophy	Partial Melting of Amphibolites in the Eastern Segment of the Sveconorwegian Orogen, Southern Sweden
47	Kathleen Fast, Kaitlyn Caltrider	Gegenwalle Ridges: An Ecohydrological Chronosequence in Morfa Dyffryn, Wales, United Kingdom
108	Ian Gorgenson	Dune Distribution along the Laurentian Great Lakes: The Effects of Wind and Waves
107	Max Huffman	Using Drone Acquired Remote Sensing to Map Sensitivity to Sand Mobility in Coastal Dunes

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105	Brooke Mattson	Identifying Sources of Heavy Metals in Moss along a Mining Haul Road in NW Alaska Using Pb Isotopes and Concentrations of In and Bi
166	McKenzie Stock	Estimating the Size of Very-fine Particles in Natural Water Suspensions via a Laboratory Settling Experiment
106	Cleveland Tarp, Jonas Peterson, Owen Donahoe	Progress Update on Global Survey of Suspended Load in Rural Drinking Water Sources Using Onsite Water Filter Kits

History

Mentors: Dr. Jonathan Hagood, Dr. Jeanne Petit, Geoffrey Reynolds

173	Natalie Fulk, Aine O'Connor, Avery Lowe	"We All Must Do Our Utmost:" Holland, Michigan in World War I
220	Joey Williams	"The Will to Win": How the Fraternal Society Built Hope College Athletics

Kinesiology

Mentors: Drs. Kirk Brumels, Kevin Cole, Maureen Dunn, Kyle Morrison, Brian Rider, and Leigh Sears; and Professors Tonia Gruppen, Timothy Koberna, Katharine Rose, and Stein Slette

202	Keagan Belyk, Madalyn Riedlinger, Jakob Zanski, Justin Fairfield, Mason Rosado	The Effects of Foam Rolling and Static Stretching on Range of Motion and Jump Performance
192	Summer Besteman, Evan Augustine	The Effect of Compression Stockings on Psychophysiological Responses in an Insufficiently Active Cohort
197	Thomas Blackport	Prevalence and Rehabilitation of Chronic Lateral Ankle Instability
191	Grace Ditzenberger, Summer Besteman	Examining the Validity of a Commercially Available Wrist-Worn Heart Rate Monitor
136	Sam Eshuis	The Correlation between Balance and Performance in Collegiate Swimmers
194	Bryanna Howard	Prognosis, Treatment, Recovery, and Future for a Collegiate Male with a Spinal Cord Injury: A Case Study
200	Sydney Jones, Bethany Lee	Testing the Validity of the Apple Health Application through Assessment of Step Count
135	Megan Powell, Matthew Karlovich, Nathan Weeldreyer	The Effect of Sodium Phosphate on Peak Power Output in Male Cyclists
196	Laura Ramaker	Bilateral Pars Interarticularis Fracture Repair at L3 in a Male Collegiate Lacrosse Player: A Case Study
201	Kyle Reason, Jonny Sheesley, Jay Nieuwenhuis, Trevor Van Loo, Nick Czmer	Acute Effects of Wearing the Elevation Training Mask at Different Settings on Time to Fatigue, Rating of Perceived Exertion, Peak Blood Lactate and Heart Rate During a Cycle Ergometer Submax Test
193	Erika Rimelspach, Laure Bouret, Summer Besteman, Marissa Seymour, Clarisa Chavez	The Effect of Acute Post-Exercise Sauna Bathing on Aerobic Performance in Untrained College Females
203	Madison Roskuszka	Posterior Cruciate Ligament and Posterolateral Corner Reconstruction in a Collegiate Football Player: A Case Study
199	Sierra Mutschler, Patrick Patton, Katie Singer, Kyle Weck	The Effects of Implementing a Plyometric Box Jump Program on Lower Body Power in Collegiate Athletes

138	Sarah Spencer, Grant Wunderlich, Laura Ramaker, Mackenzie Andreolli	Feasibility Using the A360 (370) to Monitor a Women's Soccer Season
140	Taylor Grill, Nadine Kosten, Nia Stringfellow, Rachel Satkiewicz, Mary Clare Theis	The Chronic Effects of Moderate Intensity Yoga Training versus Moderate Intensity Aerobic Exercise on Self-Esteem in College-Aged Females
133	Lauren Syverson	The Effect of SmartCellUSA Mat on Absorbing Impact Forces Using Various Weighted Objects
134	Lauren Syverson	Acute Rhabdomyolysis in a Collegiate College Football Athlete
139	Rachael Webb, Alison Rich, Hayden Smith, Sarah Spencer, Mallory Beswick	Effect of Acute Ingestion of a Cup of Coffee on 5-Km Running Performance in Collegiate Cross-Country Athletes
198	Griffin Weigl	Recurrent Anterior Cruciate Ligament Tears in a Male Collegiate Football Player
137	Kayla Williams, Molly Ireland, Mackenzie Andreolli	The Comparison of Roller Massagers and Foam Rollers on Hamstring Flexibility in Female Collegiate Basketball Players
195	Grant Wunderlich, Ryan Hanson, Stephen Hanson, Dillon Johnson	The Effect of Kinesiotape on Grip Strength, Muscular Fatigue, and Blood Lactate Levels in Hope College Athletes

Mathematics

Mentors: Drs. Edward Hansen, Yew-Meng Koh, K. Greg Murray, Mark Pearson, Paul Pearson, Darin Stephenson, and Brian Yurk; Professor Suzanne DeVries-Zimmerman

58	Keri Hadrill	Identifying Sand and Vegetation in Aerial Photos of Sand Dunes via Machine Learning
57	Russell Houpt, Sarah Seckler	Name That Bird: Using Neural Networks to Classify Recorded Bird Songs
97	Noah Kochanski	Forecasting Disease Incidence
96	Benjamin Pederson	A Model of Reproductive Success for Neotropical Pioneer Plants
95	Reagan Spindler	Model Choice and Future Prediction Accuracy in the Time Series for Disease Incidence

Mellon Scholars Program

Mentors: Drs. Virginia Beard, Susanna Childress, Curtis Gruenler, Anne Heath, Marsely Kehoe, Kendra Parker, Julia Randel

33	Jonathan Bading	Raising Lazarus: Reconstructing the Divine Office of a Medieval Saint
13	Alejandra Gómez Limón	Human Rights Violations of Detained Family Units
34	Anna Jones	MultiGenre Creative Writing Project
26	Nina Kay	The Second Classroom: A New Lesson Plan on Masculinity in Children's Media
30	Ellen Messner	Songs That Speak to Us
27	Sarah Herrera, Aine O'Connor, Mitch Van Acker	She's Taking Over: #SophiatheRobot and Doomsday Humor

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- 31 Gianna Ramirez American Womanhood: How Historical Context and Toni Morrison Inform Representation of Black and White Womanhood in *The Help* and Its Film Adaptation
- 28 Krisia Rosa, Emily Wolfe, Michael Bernard The Civil War and Racism
- 29 Emma Wangstrom, Rebecca Stanton, Holle Wade The Effects of Calvin VanderWerf's Presidency
- 32 Madeleine Zimmerman, Cherish Joe, Carolyn Wetzel Media Outlets and Black Lives Matter on Twitter

Modern and Classical Languages

Mentor: Berta Carrasco

- 160 Alondra Monrroy The Interest of Spanish Young People in the Spanish Civil War (1936-1939) and the Franco Regime (1939-1975)

Music

Mentor: Professor Drew Elliot

- 56 James Fixx Sound Synthesis Methods: A Historical, Technical, and Musical Study

Neuroscience

Mentors: Drs. Christopher Barney, Leah Chase, Andrew Gall, Gerald Griffin, and Peter Vollbrecht

- 179 Garrett Fogo Behavioral Effects Following Ablation of Retinal Ganglion Cells in Diurnal Grass Rats
- 180 Ryann Felton, Garrett Fogo, Sarah Plowman, Nicholas Rozema, Tymi Staub Prepubescent Behaviors and Circadian Rhythmicity in an Animal Model for Bipolar Disorder
- 210 Jager Haan Impact of Obesity and Diet: Obesity Development Leads to Selective Manifestation of Anxiety-like Behaviors in Obesity-Prone Rat Populations
- 211 Jada Royer, Anna Lunderberg, Ryann Felton, Julia Berlin, Samantha VanHoven, Mercedes Rede, Sarah Zieschang Establishing the Predictive Validity of a Novel Animal Model for Bipolar Disorder
- 212 Jada Royer, Anna Lunderberg, Ryann Felton Establishing the Validity of a Novel Animal Model for Bipolar Disorder through Neurochemical Analysis
- 213 Isaiah Hough, Emily Kain, Aubrey LaVoie, Nicholai Shaw Evaluating the Impact of a Latent Infection of Herpes Simplex Virus Type I on Behavior in Two Different Strains of Mice (*Mus musculus*)

Nursing

Mentors: Dr. Vicki Voskuil, Dr. Barbara Vincensi, and Megan Koops Fisher

- 45 Jessica Lockwood A Descriptive Study on Barriers to the Use of an Online Early Childhood Education Tool for Caregivers
- 46 Heather Ponstein Parental Use of an Online Interactive Tool to Increase Children's Kindergarten Readiness
- 44 Jorgie Watson Exploring the Physical Activity Behavior of Adolescent Girls: A Mixed Methods Study

Phelps Scholars

Mentors: Drs. Llana Chavis and Chuck Green; Professors Amy Otis-DeGrau, Kristen Gray and Yolanda Vega

20	Jamie Breyfogle	The Protection of Our Youngest
18	Taylor Calloway	Where Did the Middle Go?: The Disappearance of the Middle Class
14	Samuel Cervantes-Esparza	Poverty, Race, and Education: the Intersectionality of a Minority Student
15	Nolan Krause	Is HIPAA Beneficial to Patients?
16	Kaelyn Poirier	Where Are You Wearing?: A Global Perspective
19	Jana Sahyouni	Could Depression and Loss of Dignity Correlate with Requesting Euthanasia and Physician-Assisted Suicide? A Look at the Research from the United States, Canada, and the Netherlands
22	Andrea Shumaker	The Invisible Connection: Mental Health and Sexual Assault
17	Anna Vostrizansky	No Home? Hazardous!: Homelessness and Children's Emotional Health

Physics

Mentors: Drs. Paul DeYoung, Peter Gonthier, Jennifer Hampton, and Stephen Remillard

74	Josiah Brouwer	Code Parallelization Using OpenMP to Offload to GPUs
76	Michael Dennis	Developing the Spin Dependent Compton Scattering Cross-Section in the Strong Magnetic Fields of Magnetars
75	Calvin Gentry	Calculation of Total Cyclotron Widths
71	Jason Gombas	Determining the β -decay Strength Function for ^{103}Nb and ^{104}Nb to Improve R-process Calculations
83	Scott D. Joffre	Comparing Electrochemical Calculations and Particle Induced X-Ray Emission Measurements of Prussian Blue Analogue Deposits
78	Zachary Kellner	Analyzing the Composition of CuInO and TiO_2 Semiconductor Films Using Rutherford Backscattering Spectrometry
70	Briana Linton	A Novel Technique of Fluorine Detection in Soil by means of PIGE Analysis
80	Alexander Medema	Automated Characterization of Fluxon Electrodynamics in a Superconducting Microwave Device
77	Alec Nelson	MeV Ion Beam Channeling in Strontium Titanate Crystals by Rutherford Backscattering (RBS)
72	Cole Persch	Neutron Radioactivity in ^{26}O
82	Amanda Rensmo	Comparison of Charge Storage Properties of Prussian Blue Analogues Containing Copper and Cobalt
73	Caleb Sword	First Observation of Three-Neutron Sequential Emission from ^{25}O
79	Anna Wormmeester	Two-Dimensional Mapping of Non-Linear Emission from Superconducting Devices

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81	William Zywicki	The Influence of Collisions in the Nonlinear Emissions of a Microplasma
Political Science		
Mentors: Drs. Virginia Beard and Joel Toppen		
226	Brooklin Alexander	Public Opinion on Security in Post 9/11 World
168	Anna Benitez	International Security and Human Rights
172	Colin Bennett	Economic Impacts of the Arab Spring
221	Kiley Corcoran	Foreign Aid and African Political and Economic Development
238	Kelly Fuhs	Indigenous Women and Economic Position
224	Michael Girman	Does the Digital Divide Exist and How is It Affecting Africa?
231	Lucy Gruber	Foreign Aid and the Impact on Foreign Development and Politics
225	Taylor Hitchingham	The Digital Divide
229	Jubilee Hosanna-Praise Jackson	The Changed Face of Social Movements
223	Katie Lund	Does the Resource Curse Exist in Sierra Leone?
230	Ridge Mannikko	Lingering Prejudice in Legislation
171	Collin Martin	Kurds and the Syrian Civil War
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3	Nathan Gingrich	Stage Managing <i>SHILOH</i> , A Devised Play
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4	Makeya Royer	Stage Managing <i>The Glass Menagerie</i> by Tennessee Williams
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An abstract book and a sampling of posters from this event can be viewed on Hope's Digital Commons Repository on the Van Wylen Library website (digitalcommons.hope.edu) beginning in May. The abstract book will also be available as a .pdf on the Celebration website (celebration.hope.edu) for a limited time.

Celebration of Undergraduate Research and Creative Performance

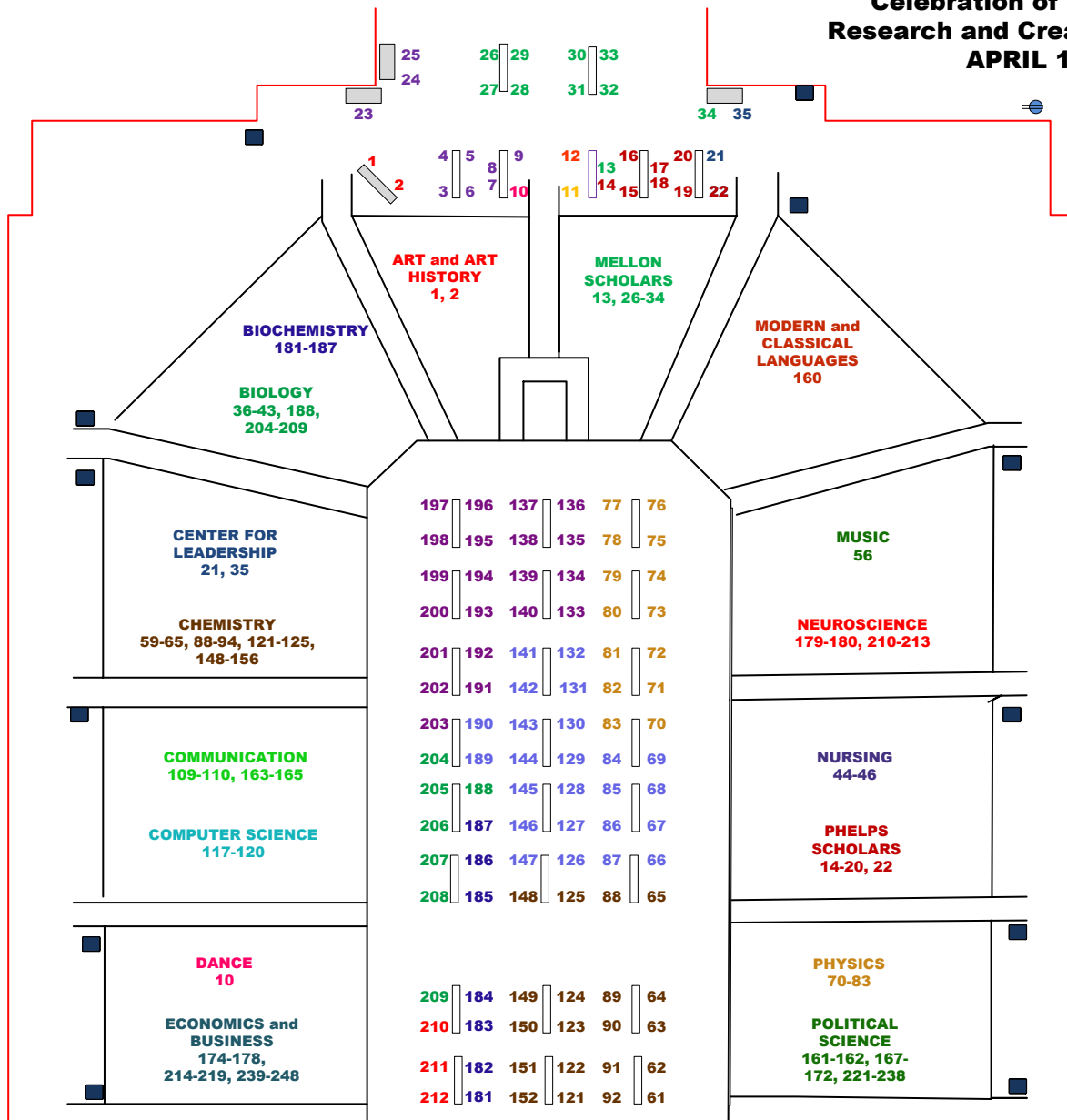
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