



2024 Sustainability Research Projects

In Holland, we believe that in order to become a vibrant, world-class community we must look at all aspects of our community. This includes the economic, social and environmental impacts we all have. The [City of Holland Sustainability Committee](#) created a seven-pillar framework with “lenses” to help us evaluate and make more sustainable choices.

Framework Categories

SMART ENERGY | ECONOMIC DEVELOPMENT | TRANSPORTATION | COMMUNITY & NEIGHBORHOOD
QUALITY OF LIFE | COMMUNITY KNOWLEDGE | ENVIRONMENTAL ACTION & AWARENESS

This framework incorporates a triple bottom line evaluation and the [Hope College Sustainability Institute](#) has used this model as a way to formally recognize the 2024 Sustainability Research Projects at this year’s [Celebration of Undergraduate Research and Creative Activity](#). Projects recognized by this sustainability framework will have a **Green Ribbon** pinned in the upper corner of their research poster.

The [Global Water Research Institute](#) is also giving additional recognition to a number of projects in the Environmental Action and Awareness Category and these projects will be given a **Blue Ribbon** as they connect with with the mission of the GWRI “enabling water-centered research that can transform the health and well-being of local, regional, and global communities.”

SMART ENERGY | Our way of living requires a stream of energy to operate personal and infrastructure devices. We know that energy is produced with scarce resources and the byproducts impact our environment. We need to use both conservation and efficiency measures to manage the resources we have to provide access to reliable and cost effective energy.

Surface Halide Vacancies Influence the Phase Transition in CsPbI3	Dr. Jeffrey Christians, Engineering	Samuel Smith
Mechanistically Studying the Degradation of Cesium Lead Iodide Perovskite Phases due to Temperature and Humidity	Dr. Jeffrey Christians, Engineering	Rory Campagna
Investigation of Superconducting Properties in YBCO using Proton Irradiation	Dr. Kyuil Cho, Physics	Joseph Fogt, Hope Weeda, Trevor Harrison, Nolan Miles
Turbulence and Zonal-Flow Impact in the Madison Symmetric Torus in Quasi-Single Helicity	Dr. Zachary Williams, Physics	Nicholas Kaipainen

ECONOMIC DEVELOPMENT | The business community is the driving engine within the area. While it is dependent on community resources and structure for support, it generates capital essential to growth and development.

Digital Divide in the Democratic Republic of the Congo	Dr. Virginia Beard, Political Science	Kevin Miller
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COMMUNITY & NEIGHBORHOOD | The fiber of our lives can be traced to the places we live and the individuals we interact with on a daily basis. The places we live support the development of our personalities and perspectives on life. Communities at all scales have a vital role to play. Encouraging vital and effective communities is an important element.

“Flirting or Hurting?”: Perceptions of Flirtatious Textings’ Appropriateness	Dr. Austin Beattie, Communication	Alana Policastro, Kate Gaynor, Anika Verbeek, Olivia Budzisz
He Said, She Said: The Role of Gender and Task-Oriented Communication	Dr. Austin Beattie, Communication	Bridget Hodgkin, Lauren Schiller
Does it Pay to Play? A Dyadic Study Exploring Familial Investment in Organized Youth Sport	Dr. Olufemi Oluyedun, Kinesiology	Kayla Wolma
Like Parent, Like Partner? The Influence of Parent Traits on Partner Choice	Dr. Carrie Bredow, Psychology	Jennifer Almquist, Neva Brown
Gratitude and grudges towards others: Impacts on emotion-regulation and the parasympathetic nervous system	Dr. Charlotte van-Oyen Witvliet, Psychology	Nhi Hoang, Charis Snyder, Kendahl Miller, Parker Friend, Grace Sarafa, Alexander Mathew, Jacob Bergstrom, Wyatt Collier, Jessica Estabrook, Joseph Gillengerten, Tyler Kennedy, Ana Wong
How do just beliefs develop? A systematic review of the research	Dr. Kendra Thomas, Psychology	Allison Prindle, Alexa Burgees, Laniah Dennis, Nhi Hoang, Jae’la Leavy, Erin Moran, Katherine Yakes
Do we see our parents as they see themselves? Parent characteristics as predictors of partner preferences.	Dr. Carrie Bredow, Psychology	Abby Mains, Madison Wilson
The influence of family structure and disruption on the use of parents as a template for partner preferences	Dr. Carrie Bredow, Psychology	Grace Kozlowski, Kersten Dekker
Change Agency and Empathy	Dr. Sonja Trent-Brown, Psychology	Kaniya Houston
“Every tribe and language and people and nation”: Faith and Diversity in Context	Dr. Sonja Trent-Brown, Psychology	Kaniya Houston
What makes a host unique? A prototype analysis	Dr. Benjamin Meagher, Psychology	Tyler Kennedy, Tasia Parsons, Lauren Zago
Adult Dysphagia: Interprofessional Support Groups and Holistic Approaches	Dr. Emily Helder, Psychology	Natalie Bekmetjev, Abigail Mosher



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Semantic knowledge for religious concepts in undergraduate students	Dr. Lindsey Root Luna, Psychology	Matthew Czmer, Isabella Bozzi, Ashley Trainor
The Home-Concept: A Descriptive Analysis of Schemas for the Home	Dr. Benjamin Meagher, Psychology	Tasia Parsons, Tyler Kennedy
Beyond Ethnicity: Perceptions of Racial Identity Among Latina/o/x Students at an HWCU	Dr. Rodrigo Serrao, Sociology	Sebastian Lema

QUALITY OF LIFE | Ultimately, it is the feelings and state of mind of individuals in the collective that make up a community's quality of life. The community through governmental, religious, business and social organization, makes decisions and supports actions that contribute to the community's well being.

Effects of Delayed HCA Exposure on a Rat Model of Bipolar Disorder	Dr. Leah Chase-Waller, Biology, Chemistry and Neuroscience	Eden Comer, Natalie Olander
Quality of Health, Physical Activity, and Exercise in Former College Athletes	Dr. Paula Ferrara, Kinesiology	Ryan Endres, Christian Clark
Post-Sport: A Systematic Review		
Former College Athletes' Experiences of Post-Sport Exercise: How Institutions Can Do Better	Dr. Paula Ferrara, Kinesiology	Samantha Vermeesch
A Comprehensive Musical Model for Stroke Recovery	Dr. David Keep, Music	Jane Ellen Altevogt
Demographic, Cultural, Religious, and Health Characteristics of South Asian American Adults who Disaffiliate from Religion	Dr. Alyssa Cheadle, Psychology	Brooke Seymour, Madison Zeitunian, Anna Bosinger, Dezaraya Fields
Impression Management and Mental Health In Athletes and Performers	Dr. Mary Inman, Psychology	Brendyn Mroz, Erin Moran
Prevention/Promotion Focus and Impression Motivation as Predictors of Mental Health in Performers	Dr. Mary Inman, Psychology	Taryn Meyer
Longitudinal Effects of Meaning-Making Expressive Writing on Mental Health	Dr. Daryl Van Tongeren, Psychology	Chloe Swanson
Humbly Facing the Facts of Life: Humility and Existential Concerns	Dr. Daryl Van Tongeren, Psychology	Carmen Casper, Chloe Swanson
Pessimism and virtuous hope: Can they coexist?	Dr. Kendra Thomas, Psychology	Allie Prindle, Alexa Burgess, Katherine Yakes



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Foster Parent Experiences of Stress During the COVID-19 Pandemic	Dr. Liz Sharda, Social Work	Rebekah Yurschak
Walking in the Light: Benefits of Natural Light Exposure for College Students	Dr. Andrew Gall, Psychology	John Barce, Megan Barta, Julia Brown, Christian Clark, Susan Davies, Olivia Hill, Grace Kozlowski, Kendahl Miller, Ashley Trainor, Abby Vonk, Violet Wasilevich
Circadian Rhythms, Light Responsiveness, and Behavioral Impacts in a Rotenone-Induced Parkinsonian Rodent Model	Dr. Andrew Gall, Psychology	Riley G. Checkley, Ethan De Koker, Megan E. Hugunin, Melanie G. Reagan, Juan M. O'Hara, Olivia J. Andry, Cameron Houck
Religious scrupulosity: Etiology, meaning-making, and spiritual well-being among participants with significant experiences with the Christian, Islamic, or Jewish faiths	Dr. Kate Finley, Philosophy	Erin Moran
Live from New York, It's Sexism Female Politicians Often Face	Dr. Sarah Kornfield, Women's & Gender Studies	Riley Gruppen
Hair Texture and It's Influence	Dr. Sarah Kornfield, Women's & Gender Studies	Isabella Rodriguez
Sexual Submission, Fantasy, & Docility: What if "Sexual Liberation" is a Patriarchal Trap?	Dr. Sarah Kornfield, Women's & Gender Studies	Kersten Dekker
Sickly Saints: Religion as a Source of Hope through the Stages of Grief	Dr. Tatevik Gyulamiryan, World Languages and Cultures	Erin Matheny

COMMUNITY KNOWLEDGE | The collective knowledge of the community is an incredible resource. The ability to tap into this wisdom is essential for continued growth. In both formal and informal channels, the community's knowledge and energy must be channeled to where it is needed.

ExploreHope Summer Camps: Amazing Animal Abilities	Dr. Kelly Ronald, Biology	Hannah Sturgeon, Alyssa Archer, Ashley Lauraine
Art vs.The Artist: Can It Be Separated?	Dr. Austin Beattie, Communication	Simon Awad, Timothy Ramos, Antonio Popp, Ja'Kaurie Kirkland



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Comparative Analysis of British & American School	Dr. Laura Pardo, Education	Max Ralston
Identity Development Among Pre-Health Students During the COVID-19 Pandemic	Dr. Paul Pearson, Mathematics & Statistics	Anya Kapitula
Memorable messages regarding adoption and religion: Perspectives of adult adoptees	Dr. Emily Helder, Psychology	Kendall Maes, Katherine Martin
The Effect of Different Timing Schedules on Learning in Individuals With and Without ADHD	Dr. Lauren Slone, Psychology	Chloe Swanson, Carmen Casper, Ethan De Koker, Lauren Tocco, Emily McCloskey, Isabelle VanAntwerpen
The effect of visual dominance on word learning in infants and adults	Dr. Lauren Slone, Psychology	Lauren Tocco, Abby Vonk, Grace Sarafa, Calista Burke, Chloe Swanson
College student well-being: testing associations among happiness, gratitude, anxiety, depression, and cardiac vagal tone	Dr. Charlotte vanOyen-Witvliet, Psychology	Ana Wong, Jessica Estabrook, Joseph Gillengerten, Wyatt Collier, Tyler Kennedy, Jacob Bergstrom, Nhi Hoang, Parker Friend, Alexander Mathew, Kendahl Miller, Grace Sarafa, Charis Snyder

ENVIRONMENTAL ACTION & AWARENESS | The natural and built environments interact with one another over time with intended and unintended consequences. Educating the public on environmental protection and integrating these ideas into our city planning can change negative outcomes of the past and improve our future state.

The Genetic Viewpoint of Environmental Sex Determination in Plants: RNA Extraction of Striped Maples	Dr. Jennifer Blake-Mahmud, Biology	Janaa Ward
Does increased genetic material affect the stress response in related organisms?	Dr. Jennifer Blake-Mahmud, Biology	Steven Awad, Madeline Kenney
Happy Chlamy; The Effects of pH on Sexual Vs. Asexual Reproduction	Dr. Jennifer Blake-Mahmud, Biology	Amanda Darner, Sam Haakenson, Alyssa Fusco, Madison Smith
Social Sex Determination: What Are Its Limits?	Dr. Jennifer Blake-Mahmud, Biology	Molly Prom, Kayleigh Harrell, Hannah Dehaan, Mackenzie Dole



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Environment and sexual expression: Hormone-induced sex change in sexually plastic trees	Dr. Jennifer Blake-Mahmud, Biology	Colin Kalkman, Samantha Weaver, Michael LaPorte, Arsh Mir, Jillian Hickok
Investigating Auditory and Visual Seasonality in House Finches	Dr. Kelly Ronald, Biology	Ashley Lauraine, Hannah Peterson, Jordan Winters
Implications of Iron Oxide Nanoparticle Exposure on the Auditory Physiology and Iron Bioaccumulation in House Sparrows (<i>Passer domesticus</i>)	Dr. Kelly Ronald, Biology	Shae Johnston, Peyton Hallemann
Are there sex-based differences in stored nutrients in a sex-changing organism?	Dr. Jennifer Blake-Mahmud, Biology	Jaclyn Decker, Owen Harries
Impacts of Urbanization on Stress Levels and Auditory-Visual Processing in House Sparrows (<i>Passer domesticus</i>)	Dr. Kelly Ronald, Biology	Natalie Leake, Emma Yonker
The behavioral impacts of iron oxide nanoparticle exposure on the house sparrow (<i>Passer domesticus</i>).	Dr. Kelly Ronald, Biology	John Wenderski, Brooke Fox
Computational Tools for Analyzing Global Warming Potentials of Various Greenhouse Gases	Dr. William F. Polik, Chemistry	Caleb Brzezinski
Effects of acute hypoxic exposure on the olfactory system of adult zebrafish	Dr. Erika Calvo-Ochoa, Biology and Neuroscience	Skylar DeWitt
Development of a Consistent Proton Induced Gamma Emission Liquid 19F Standard	Prof. Andrew Bunnell and Dr. Paul DeYoung, Physics	Jordan Craft, Ryan Mccreeedy, Naomi Whitfield, Loïc Rutabana
PIGE Count Rate Sensitivity to Air Gap	Prof. Andrew Bunnell and Dr. Paul DeYoung, Physics	Megan Haeussler, Evelyn Martin, Zachary Doctor
The Local is Global: The Science of Coffee Roasting and Brewing	Dr. Thomas Bultman, Biology	Elliana Boer
The Local is Global: Voices of Leaders in Coffee Justice	Dr. Regan Postma-Montaño, English	Megan Kamper
Stream-borne Floating Mismanaged Waste in Holland, Michigan: Focus on Foam <i>*Receiving a Blue Ribbon from the Global Water Research Institute.</i>	Dr. Brian Bodenbender, Environmental Science	Sam Haakenson, Reina Duron



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Phighting Phosphorus: The Effects of Sedimentary Phosphorus on the Macatawa Watershed <i>*Receiving a Blue Ribbon from the Global Water Research Institute.</i>	Dr. Michael Phiben, Geological and Environmental science	Elizabeth Kelley, Rachel Fusik, Jake Lyon
No “Butts” About it: The Heavy Metal Impact of Cigarette Litter <i>*Receiving a Blue Ribbon from the Global Water Research Institute.</i>	Dr. Michael Philben, Environmental Science	Faith Huff, Connor Monson, Spencer Whittington
Development of a liquid chromatography method for the quantification of carbohydrates in peat soils <i>*Receiving a Blue Ribbon from the Global Water Research Institute.</i>	Dr. Michael Philben, Geology and Environmental Science, Chemistry	Christopher Klaver, Parker Diaz
Potential non-carbonate buffering in an interdunal wetland/slack along Lake Michigan <i>*Receiving a Blue Ribbon from the Global Water Research Institute.</i>	Prof. Suzanne DeVries-Zimmerman, Department of Geological and Environmental Sciences	Faith Huff
Temperature sensitivity of nitrogen mineralization in peat from bogs across a Michigan transect <i>*Receiving a Blue Ribbon from the Global Water Research Institute.</i>	Dr. Michael Philben, Geology and Environmental Science, Chemistry	Madison Smith

TRANSPORTATION | The movement of people, goods, and services within the area is an evolving system. We interact with other regional, national and international elements to create a total network.

Molecular Functionality and Nanoparticle Influence on Surface Tribopolymerization	Dr. Meagan Elinski, Chemistry	Ashton Wolford
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We believe the Christian faith calls us to care for all of God’s creation and ensure preservation for generations to come. It is through our daily actions that we can make a big impact and create a better world for every individual, as one created and loved by God.

Called to be global citizens, we will engage the world constructively through our teaching, research, and community service in order to shape Hope College into a model of sustainability and be a force for good in the world.

Congratulations and thank you to all of the students and faculty for their hard work this year!

hope.edu/sustainability