



## 2021 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 approach and the [Sustainability Institute](#) has used this model as a way to formally recognize the 2020 Sustainability Research Projects at this year’s Hope College [Celebration of Undergraduate Research and Creative Activity](#).

**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.

Kameron Wilcox, Forest Rulison	Dr. Jennifer Hampton, Physics	Exploring Techniques of Synthesizing Prussian Blue Analogues
Josephine Surel, Elizabeth Cutlip	Dr. Jeffrey Christians, Engineering	Exploring Halide Perovskite Structural Tunability to Design Materials for Dynamic Photovoltaic Windows
Zachery Wylie, Peter Ruffolo	Dr. Jeffrey Christians, Engineering	Vapor Induced Phase Transition of Cesium Lead Halide Perovskite Thin Films for Novel Use in Solar Cells

**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.

Camryn Zeller	Dr. Sarah Estelle, Economics	How Do State Housing Benefits Influence Veteran Interstate Migration?
Victoria Spring	Dr. Sarah Estelle, Economics	The Effects of Hours Worked on Time Spent Preparing Food
Drew Schmitz	Dr. Sarah Estelle, Economics	The Effects of Welfare Participation on Religious Engagement
Nathan Thomas	Dr. Sarah Estelle, Economics	The Effect of Business Size on the Gender Wage Gap
Brooke Kale	Dr. Joel Toppen, Political Science	Free Trade in the World of Global Hegemons



## 2021 Sustainability Research Projects

**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.

Ellie Jankowski	Dr. Sarah Kornfield, Communication	The Beauty in Being a Boy
Anna Hagner, Paulina Kozan, Eliese Moelker, Abigail Przekop, Avery Slancik, Jason Veldman, Nina Cuthrell	Dr. Lindsey Root Luna, Psychology/Neuroscience and Dr. Alyssa Cheadle, Psychology	What Predicts Compliance with COVID-19 Guidelines? Evaluating the Relative Roles of Self-Regulation, Working Memory, and Heart Rate Variability
Andrea Koh	Dr. Charlotte vanOyen-Witvliet, Psychology	The Role of Accountability in Civic Life
Ashley Hayden, Katrina Beltz	Dr. Charlotte vanOyen-Witvliet, Psychology and Dr. Gerald Griffin, Psychology	Investigating the Genetic Underpinnings of Empathy and Relational Accountability
Anna Hagner, Ashley Hayden, Katrina Beltz	Dr. Charlotte vanOyen-Witvliet, Psychology and Dr. Lindsey Root Luna, Psychology	Accountability Mindsets about Supervisor Feedback: Linguistic Analyses of Thoughts and Feelings
Claire Buck	Dr. Curtis Gruenler, English	Plague and Pandemic in Science and Story
Emily Dodge, Alexx Irwin	Dr. Carrie Bredow, Psychology	Like Father, Like Partner? The Influence of Parental Traits on Implicit and Explicit Mate Preferences
Cameron Geddes	Dr. Sarah Estelle, Economics	How Does Terrorist Activity Affect a Country's Tourism Receipts?
Chapin Thiel	Dr. Sarah Estelle, Economics	The Effect of Parent's Religiosity on Their Child's Future Religiosity
Jazmin Serrano	Dr. Deborah Sturtevant, Social Work	Immigrant and Refugee Youth: Stories Shared by Professionals

**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.

Elizabeth Bassett	Dr. Sarah Kornfield, Communications	Racism Exists and America Isn't Looking
Valeria Lee	Dr. Annie Dandavati, Political Science/Women and Gender Studies	When a Woman Was Presidenta
Ruth Holloway	Dr. David Ryden, Political Science	Examining Shifts in Public Support For LGBTQ Individuals, 1990-2015
Taryn Bushong	Professor Tonia Gruppen, Kinesiology	TBI with Persistent Cognitive, Visual, and Emotional Challenges of a 24 Year Old College Graduate



## 2021 Sustainability Research Projects

Ashley Hayden, Lindsey Medenblik, Haley Balkema, Linnea Johnson, Ryon Hinga, Jimmy Tran, Nina Cuthrell	Dr. Lindsey Root Luna, Psychology and Dr. Alyssa Cheadle, Psychology	Evaluating the Relationship between Religiousness and Health Outcomes: Investigating Heart Rate Variability and Self-Regulation as Possible Mediators
Hannah Meade	Dr. Jack Mulder, Philosophy	On Natural Evil, Free-will, and Embodiment
Emma Passaglia	Dr. Kate Finley, Philosophy	The Intersection of Mental Health and Christianity
Jacob Kelley	Dr. Jared Ortiz, Religion	Drawn Into Charity by Charity
Andrew Levering	Dr. Jared Ortiz, Religion	Spousal Consolation: Unveiling Conscience in Augustine's City of God
Eliese Moelker, Mikaela Stephan, Nathan Koorndyk, Elizabeth Ngun Cer Sung, Alexander Mathew	Dr. Phillip Rivera, Biology	Optimizing Protein Precipitation Methods and Quantifying Immune Proteins in Human Nail Samples
Paulina Kozan, Erick Alvarado, Mikayla Zobeck, Vanessa Sauer	Dr. Phillip Rivera, Biology	Sex-differences in Ethanol Addiction Observed in Mice with a Novel Self-administered Behavioral Paradigm
Gonzalo Moya	Dr. Kristin Dittenhafer-Reed, Chemistry and Dr. Philip Rivera, Biology	The Role of Circulating Mitochondrial DNA in the Inflammatory Response in Neurological Disorders
Taylor Richmond	Dr. Daryl Van Tongeren, Psychology	Examining First Responders' Mental Health
Yuki Kojima, Alissa Sweeney, Taylor Richmond, Carolyn Priebe, Matthew Severino	Dr. Daryl Van Tongeren, Psychology	A Virtue of Success: Exploring the Role of Humility in Leadership
Matthew Severino	Dr. Daryl Van Tongeren, Psychology	College Life and Religious Change
Carolyn Priebe, Taylor Richmond, Matthew Severino, Alissa Sweeney, Yuki Kojima	Dr. Daryl Van Tongeren, Psychology	The Effect of Religious Priming on Attitudes Toward Immigrants
Anna Kate Peterson	Dr. Sarah Estelle, Economics	The Effects of the Hospital Readmissions Reduction Program on Non-Targeted Interventions
Houston Patton, Michael Pineda, Dylan Sherman, Carlos Flores, Ka'niya Houston, Joe Wilkins	Dr. Jordan VanHemert, Music	Exploration of Black American Music
Daniel Tague	Dr. Sarah Southard, Music	Fleeing Oppression: A History of Self-Imposed Exile in Music



## 2021 Sustainability Research Projects

Maria Egloff	Dr. Vicki Voskuil, Nursing and Dr. Emilie Dykstra Goris, Nursing	Development of the “Be Physical” Intervention Protocol for the INSPIRE Randomized Control Trial
Isabel Santos, Delaney Groves	Dr. Lindsey Root Luna, Psychology	Filled and Unfulfilled Hope: The Effect of Imagery on Self-Regulatory Resources and Emotion
Amy Osterbaan	Dr. Alyssa Cheadle, Psychology and Dr. Daryl Van Tongeren, Psychology	Does Religious Deidentification Predict Risky Health Behaviors and Poor Mental Health?
Kimberly Paquette	Dr. Alyssa Cheadle, Psychology	The Effects of Religiousness and Spirituality on COVID-19 Health Behavior Compliance
Sabrina Blank, Tim Boyce, Karsten Galyon, Sacia Gilbertson, Haley Katenin, Emily Lambert, Meredith Lepper, Lindsey Medenblik, Julia Wilson	Dr. Andrew Gall, Psychology and Dr. Charlotte vanOyen-Witvliet, Psychology	Forgive to Rest: Implications of Rumination and Compassionate Reappraisal for Improving Sleep Quality and Quantity
Corine LaFrenier, Andrea Rocco, Elijah Maxwell	Dr. Sonja Trent-brown, Psychology	A Holistic Approach to Physical Activity and Indicators of Overall Health: A Retrospective and Prospective Study
Mikenna K Davidson Natalie A. Ramsay	Dr. Sonja Trent-Brown, Psychology	College Students’ Screen Time in the Midst of a Pandemic
Natalie Rosenquist	Dr. Sarah Estelle, Economics	How Does an Individual's Underlying Medical Conditions Affect Flu Vaccine Take-up?

**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.

Hailey Schumann	Dr. Sarah Kornfield, Communications	Voices of Humanity: <i>Rough Translation</i> ’s “El Hilo: Walking to Venezuela” and Reframing Refugee Crises
Joshua Getz	Dr. Sarah Estelle, Economics	The Implications of Post-Secondary Vocational Training for Employment Stability
Bekah Segrist	Dr. Sarah Estelle, Economics	Is Foreign Aid Improving the Provision of Education? The Effect of Official Development Assistance on the Quantity and Quality of Teachers in Developing Countries
Arinze Nwike	Dr. Sarah Estelle, Economics	The Effects of Early Childhood Education on Crime
Adolfo Magarin, Michael Bonagura	Dr. Laura Pardo, Education Department	What Alternative Schools Get Right: Lessons from The Field
Sofia Byrum	Dr. Sophia D’Agostino, Education	Naturalistic Developmental Behavioral Intervention: Perceptions of Michigan Preschool Teachers Serving Children with Disabilities



## 2021 Sustainability Research Projects

Kate Pikaart, Nick Gersonde	Susan Ipri Brown, Explore Hope	Virtual Reality STEM, Real Life Careers
Grace Zwiers	Dr. William Polik, Chemistry and Prof. Clayton Piehl, Chemistry	Before the Next Pandemic: Developing a Framework for Assessing Online Labs to Maximize Student Experience
Yiwei Jiang	Dr. Sarah Estelle, Economics	Do Higher Ranked Colleges Reduce the Risk of Overeducation?
Rachel Dohm	Dr. Vicki Voskuil, Nursing and Dr. Emilie Dykstra Goris, Nursing	Designing a Theory-Based Physical and Educational Intervention to Promote Strength in Adolescent Girls

**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.

Morgan Sherrard, Lindsay Martin	Dr. Kelly Ronald, Biology	Changes in Chromatic and Achromatic Contrast of Avian Plumage in Forests with Different Levels of Deer Browsing
Lukas Bruxvoort, Victoria King	Dr. Jianhua Li, Biology	Genetic Changes of Lignification Genes between Trees and Shrubs
Liam Diephuis	Dr. Natalia Gonzalez-Pech, Chemistry	Design of New Nanomaterials for Arsenic Remediation
S. Charles Davenport, Lindsey Boltz, Liam Diephuis, Luke George, Tristan Porter, Anna Molloy	Dr. Natalia Gonzalez-Pech, Chemistry	Synthesis of Titanium Dioxide Nanoparticles for Solar Disinfection from Aqueous Solutions
Anna Molloy, Lindsey Boltz, Charles Davenport, Liam Diephuis, Luke George, Tristan Porter	Dr. Natalia Gonzalez-Pech, Chemistry	The Development of Multifunctional Nanoparticle Collectors for Water Filtration Processes
Luke George, Anna Molloy, Lindsey Boltz, Liam Diephuis	Dr. Natalia Gonzalez-Pech, Chemistry	Synthesis and Implementation of Copper Nanomaterials into Iron Oxide Nanoclusters for CO <sub>2</sub> Remediation
Alexis Koehl, Christian Lundy	Dr. Michael Philben, Chemistry, Geology, Environmental Science	Effects of Differences in Cell Wall Biochemistry on the Microbial Decomposition of Sphagnum (Peat Moss)
Ashish Duvvuru, Eli Kane, Ashley Wrobel	Dr. Jonathan Peterson, Geology and Environmental Science, Interim Dean for Natural and Applied Sciences	Analysis of Heavy Metals in <i>Ictalurus punctatus</i> (channel catfish) and <i>Perca flavescens</i> (yellow perch) in Lake Macatawa, Holland, Michigan



## 2021 Sustainability Research Projects

Amelia Waalkes Hanson, Alexis Koehl, Christian Lundy, Lauren Bryan	Prof. Suzanne DeVries-Zimmerman, Geology and Environmental Science and Dr. Michael Philben, Chemistry, Geology, Environmental Science	Seasonal Geochemistry of an Interdunal Wetlands at Saugatuck Harbor Natural Area, Michigan
Alexander Bauer	Dr. Brent Krueger, Chemistry and Dr. Aaron Best, Biology	Understanding Water Quality in the Lake Macatawa Watershed using Machine Learning
McKenna Bartley, Hannah Meade	Dr. Sonja Trent-Brown, Psychology	College Students' Attitudes toward the Outdoors: Trends during the Pandemic
Nicholas Weigle	Dr. Elizabeth M. Sanford, Chemistry and Dr. K. Greg Murray, Biology	Pioneer Plant Seeds Contain Antifungal Compounds

**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.

Clay Purvis	Dr. Sarah Estelle, Economics	The Environmental Effects of Not Having a Tailpipe: A New Look at the Determinants of Vehicle Miles Traveled with Special Attention to Electric Vehicles
Jacob Moore	Dr. Sarah Estelle, Economics	The Effects of Fuel Taxes on the Annual Sales of Passenger Vehicles

*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](https://hope.edu/sustainability)  
[hope.edu/academics/celebration-undergraduate-research/](https://hope.edu/academics/celebration-undergraduate-research/)