



HUMAN ENVIRONMENT REGIONAL OBSERVATORY

Summer Research Experience for Undergraduates [REU] at Clark University



ABOUT THE HERO PROGRAM (HUMAN ENVIRONMENT REGIONAL OBSERVATORY)

The Human-Environment Regional Observatory [HERO] program is a unique undergraduate/graduate/faculty experience that engages in research on human-environment relationships in Massachusetts. HERO Fellows conduct hands-on research under the mentorship of Clark University faculty. The research conducted by HERO Fellows often leads to scholarly publications, presentations at academic conferences across the USA, and awards and honors. This eight-week curriculum is sponsored by the Clark University O'Connor Fund.

**SUMMER 2019 PROGRAM
MAY 20TH - JULY 12TH**

A NOTE FROM THE HERO DIRECTORS

Dr. John Rogan (HERO Director) and Dr. Deborah Martin (HERO Associate Director) welcome you to the 20th anniversary year of the establishment of the Human Environment Regional Observatory (HERO) program at Clark University

HERO TURNS 20

"We are delighted to celebrate HERO's twentieth year with a new group of six exceptional students. HERO began in 1999 through the initiative of Clark Geography faculty members David Angel (now president of Clark University) and Billie Lee Turner II (now at Arizona State University).

Over the past twenty years, HERO has welcomed more than one hundred and thirty students to work on challenging human-environment research projects. This year marks our third installment of the HERO Newsletter to communicate our achievements and research goals to our sponsors,

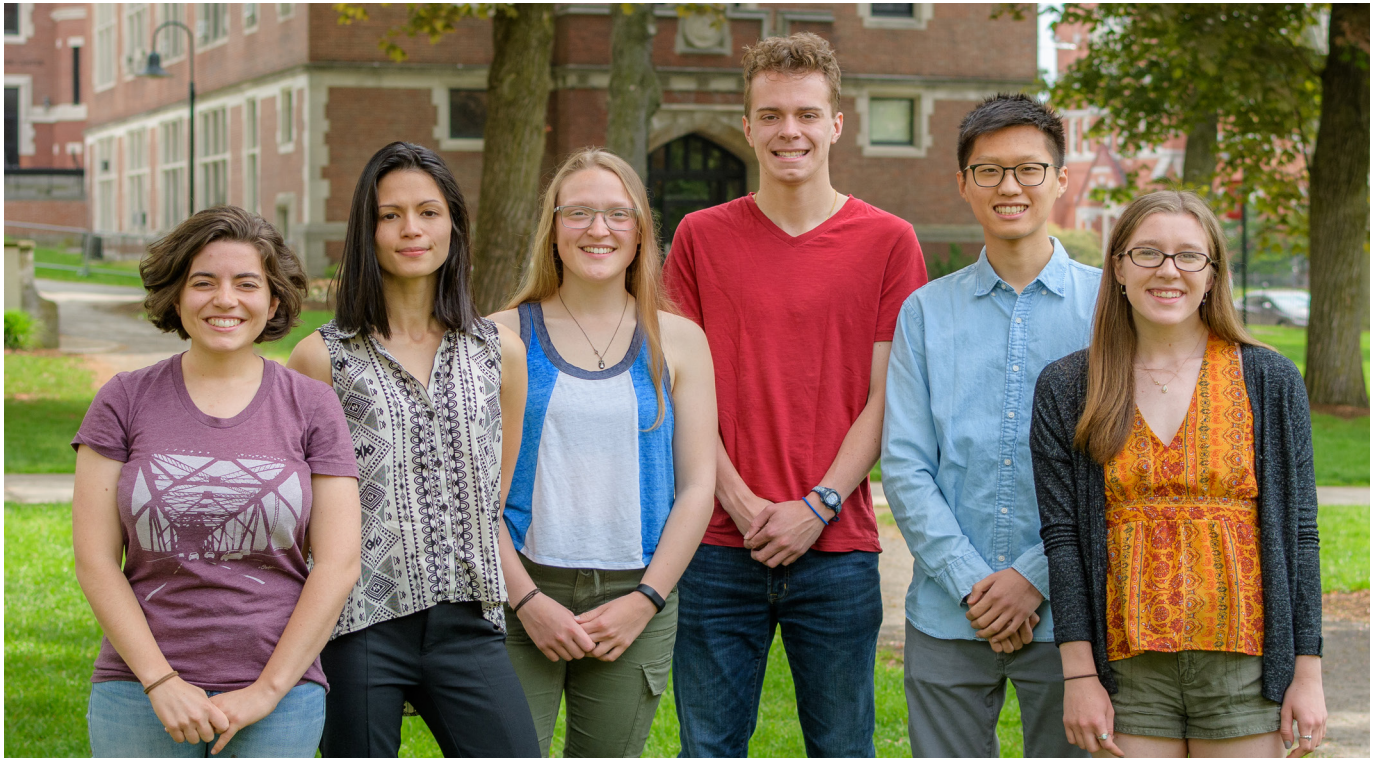
collaborators, and alumni.

The theme of HERO 2019-2020 is, again, *Greening the Gateway Cities*, where we will extend our previous analysis of juvenile tree health and stewardship to two new Massachusetts Gateway Cities: Leominster and Pittsfield. We look forward to sharing our research findings with you all in the coming months."

Sincerely,
Deborah Martin
& John Rogan
(Graduate School of Geography)

Photo (above): HERO fellows working at the Hadwen Arboretum on a new collaborative effort (see p. 6)

HERO 2019-20



HERO 2019-20 COHORT

HERO 2019-20 cohort includes six undergraduate students, who will spend the summer and following academic year working with Professor John Rogan, Professor Deb Martin, and Graduate RAs Marc Healy and Nick Geron.

Above Photo (L-R): Sadie Murray, Cynthia Sellers, Juliette Gale, Benjamin Ryan, Novak Chen, Shannon Reault.



NOVAK CHEN

Majors: Geography & Mathematics

Haoyu (Novak) Chen is a sophomore who will graduate in 2021, and double major in Mathematics and Geography. Novak is an international student who spent the first 17 years of his life in China. Novak has studied in three different high schools, including both Chinese and American high schools, and both public and private high schools. From these study-abroad experiences, he was able to explore the variant culture experiences and learned the importance of stepping out of his comfort zone. With that and the interest of Geography, Novak chose Clark University as his undergraduate home. "When I saw HERO program's opportunity, what interested me the most is this unique research opportunity involving urban forestry which is led by a mentor. I am really excited to use this opportunity to learn from my peers, Dr. Rogan, and Dr. Martin."



JULIETTE GALE

Major: Geography & Global Environmental Studies

Juliette Gale is a junior and Geography and Global Environmental studies major with specializations in Earth System Science and Political Ecology. Her research interests focus on human environmental interactions within urban space, particularly in the Worcester area. Outside of academics, Juliette is on the Clark Women's Rowing team and enjoys spending her free time outside, camping and hiking. "I chose the HERO program because of my current interest in the social implications of the spatial distribution of urban forests. This summer, I'm looking forward to learning from my peers, having the opportunity to speak with organizations throughout Massachusetts, and gaining valuable fieldwork experience through HERO."

WHY BE A HERO?

HERO Fellows analyze the causes and consequences of global environmental changes at local scales in faculty led research projects. Each student is paired with a Clark faculty mentor and other researchers on the HERO team. HERO students will learn how to use various research methods such as GIS, remote sensing, geostatistical modeling, interviews and focus groups.

The HERO Program offers:

- Unique hands on research experience working with graduate students and faculty
- Opportunities for publications, presentations, honors, and awards
- Stipend for 8 weeks of research, plus academic credit for the year following the summer
- Funding for attendance to present research at Association of American Geographers (AAG) annual scholarly meetings



SADIE MURRAY

Majors: Geography & Biology

Sadie Murray is a junior double majoring in biology and geography who is interested in studying how climate change impacts the way people are relating to their environment. She loves being outside, trees and talking to people. During the HERO program this summer, she is looking forward to studying urban forestry and getting some practical experience with field research! Outside of HERO she is most looking forward to seeing Massachusetts when it's not winter, reading, and cooking her own food.



SHANNON RESULT

Major: Environmental Science: Earth System Science

Shannon Result is a junior environmental science major on the earth system science track who is also minoring in geography. Shannon will be graduating next May (2020), and plans to pursue a master's degree in GIS science through the accelerated 5th year program at Clark. Aside from academics, Shannon is a member of the women's rowing team, and enjoys outdoor activities such as trail running, hiking, and nordic skiing. "I chose to participate in the HERO fellowship because it presents a unique opportunity to conduct environmental research within our everyday surroundings. Urban forestry is becoming an increasingly relevant field as urbanization continues to spread, and I am very thankful for the opportunity to contribute to such important work through the HERO program. I am looking forward to working with a group of dedicated students who share my interests, and learning from our research mentors who have done such impressive work with HERO in the past. I feel very fortunate to have this opportunity, and can't wait to get outside and start working!"



BENJAMIN RYAN

Major: Geography

Benjamin (Ben) Ryan is a sophomore geography major, graduating in 2021. "I wanted to be a part of the HERO program because it provides a great way to get started in research and apply skills from class in a real-world setting. I'm excited to be able to conduct GIS analysis and learn more about the role of green spaces in cities and urban forestry, and work with a group of staff and students that are passionate about the field."



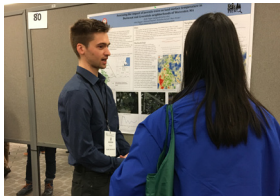
CYNTHIA SELLERS

Major: Environmental Science: Earth System Science

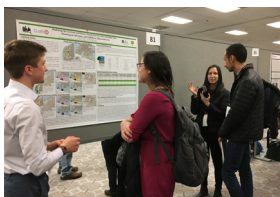
Cynthia (Cindy) Sellers is a senior Environmental Science major on the Earth System Science track. "I was really excited to find a research program like HERO that provided the opportunity to explore the dynamics of urban development within local communities. It's truly a unique experience to be able to develop long-term data and challenge my interests through independent research. I'm looking forward to working with this awesome team and to further developing my skills through field research and geospatial analysis."

AAG CONFERENCES

HERO students have the opportunity to present their research at the American Association of Geographers (AAG) annual meetings



Above: Andrew Pagan presenting research at AAG 2019 in Washington, DC



Above: Rowan Moody presenting his research at AAG: "Modelling the Current and Future Ecosystem Services of Urban Tree Planting in Chicopee & Fall River, Massachusetts"

LOCAL PARTNERS

HERO often collaborates with the Worcester Tree Initiative, USDA/DCR, and other local government agencies



Above: HERO students learning about trees planted through "Greening the Gateway Cities".



HERO 2018-19

2018-19 HERO Cohort (L-R): (front) Elizabeth Lohr '19, Yeannet Ruiz '19, Rowan Moody '20, Laura Cohen '19. (back) Marc Healy, Rachel Corcoran-Adams '20, Andrew Pagan '19, and Nick Geron.

In 2018, HERO focused on Greening the Gateway Cities, with extended previous analysis of juvenile tree health and stewardship in Chicopee and Fall River, MA. This cohort continued their research throughout 2018-19 and presented at the AAG Annual Meeting in Washington, DC.

RESEARCH PRESENTED @ AAG

- Laura Cohen: Networking a Common Space: How Tree Planting Actors Work Together to Green the Gateway Cities of Fall River & Chicopee, Massachusetts

- Elizabeth Lohr: Creating a matrix to assess pest vulnerability in Massachusetts Gateway City tree plantings
- Rowan Moody: Modelling the Current and Future Ecosystem Services of Urban Tree Planting in Chicopee & Fall River, Massachusetts
- Andrew Pagan: Assessing the impact of established juvenile trees on land surface temperature in Burncoat and Greendale neighborhoods in Worcester, MA
- Yeannet Ruiz: Comparing the vigor and mortality of juvenile residential trees in three Massachusetts 'Gateway Cities'

To learn more about the AAG Annual Meetings, visit annualmeeting.aag.org



STAKEHOLDER SUMMIT

Annual HERO Summer Research Presentation

On July 12 2018, [HERO] students presented their results to a roomful of stakeholders from the state Department of Conservation and Recreation (DCR), U.S. Department of Agriculture, Worcester Tree Initiative, and community members. Their data will be added to that of the 2017-18 HERO cohort, which focused on trees in the Gateway Cities of Holyoke, Chelsea, and Revere. Over 19 years, HERO Fellows have researched the interaction between humans and the environment, from residential

lawn care to the area's recovery from Asian longhorned beetle damage, and contributed data subsequently used by local, state, and federal officials. "You've been doing this many years now, and it's great to see the changes over time, Mat Cahill, an urban forester for DCR's Greening the Gateway Cities, told the student presenters. "This is usable information that we can take back to this program. Your work is valuable, and we appreciate what you do. [Click here for the full article \(ClarkNow\)](#)

To view past and upcoming Stakeholder Summit presentations, visit clarku.edu/departments/HERO

NOTES FROM HERO ALUMNI

We have had many wonderful HERO cohorts in the past -- here are a few words from our outgoing HERO cohort who just wrapped up the program in May 2019!

RACHEL CORCORAN-ADAMS, IDSC '20

"HERO really shaped the way I view my academic career here at Clark. After HERO, I became more invested in Geography and my public speaking skills improved significantly. I also established relationships with esteemed faculty that will help me when I pursue a GIS accelerated degree, as well as with local organizations such as the DCR and the USDA. Beginning the work on my thesis a year ahead of my peers allowed for me to get a head start on a topic I am really passionate about. This upcoming year, I will be working at Clark Labs as a Remote Sensing Research Assistant and will be continuing my work on my honors thesis."

ELIZABETH LOHR, BIOL & GEOG '19

"My favorite part of participating in the HERO program was becoming involved in urban forestry in a hands-on way. Learning about human-environment interactions and applying the work I did over the summer to my own research project was rewarding both academically and personally. I also gained so much from working with our faculty and Graduate advisors, who were incredibly helpful and encouraging. Experiencing hands-on research wouldn't have been as much fun without my cohort, who I have gotten to know very well over the past year and I now consider great friends.

This summer I am working as an administrative coordinator at an environmental education camp run by the Tyler Arboretum, in my home state of Pennsylvania. In the upcoming year I am completing one more semester and will graduate in December, after which I hope to pursue a career in urban forestry and/or sustainability."

ROWAN MOODY, GEOG '20

"Being a part of HERO has been one of my favorite experiences in my undergraduate career. What I have enjoyed most about HERO this year has been the balance of between comprehensive group work (summer data collection, analysis, presenting to the DCR), and the high level of independence and creativity allowed within our individual research projects. The extensive field work of tree surveying and long hours in the lab for analysis throughout this year, as well as our travels to the AAG annual conference in Washington D.C. have resulted in so many stories and fond memories with the five other HERO fellows. HERO has really helped prepare me for a further career in Geography and GIS as I complete my undergraduate education and apply for Clark's M.S. Accelerated Degree Program in GIS. Starting this summer, I will be joining Clark Labs (Worcester, MA) as a research assistant to map mangrove degradation and aquaculture development in coastal regions of Myanmar and surrounding countries. I will be continuing my HERO research into my Honors thesis on urban forest ecosystem services in Chicopee and Fall River, MA."

ANDREW PAGAN, GEOG '19

"The HERO program was extremely useful for sharpening my public speaking, time management, and collaborative skills. It was a great opportunity to work with state and non-profit organizations on real-world issues. I was also able to write an undergraduate thesis that will be sent to the Department of Conservation and Recreation to provide further information on the effects of their urban greening initiatives. Lastly, the friendships I have made with fellow HERO students and faculty are equally as valuable to me as the research experience."

YEANNET RUIZ, GEOG '19

"I'm thankful for my HERO experience and the skills that I have been able to acquire. Through [HERO], we received the support and mentorship of Professors Martin and Rogan. It was an incredible experience to be able to collect data which was then used for our research projects. There is a lot of autonomy when it comes to working on our year-long research project in which it helps to inform agencies about our findings. It has been a valuable experience; I was able to present at the AAG conference and have become interested in pursuing an academic career. [After graduation,] I will be returning to Houston, Texas to work as a GIS technician with the City of Houston."

GRADUATE HEROS

MEET OUR GRADUATE RESEARCH ASSISTANTS

This year we have two Geography doctoral students who will work closely with our 2019-20 HERO fellows:



MARC HEALY, HERO RA

B.A. Geography, University of Utah, USA. Research Interests: Urban Forestry Dynamics and Legacies, Urban Heat Island, Applied GIS and Remote Sensing, Sustainable, Proactive Urban Tree Management Policies. Marc is entering his fourth year in the Ph.D. program in Geography and has been an RA for HERO since 2017.



NICK GERON, HERO RA

M.S. Ed Education, Lehigh College CUNY, NY, USA B.A. Environmental Policy and Analysis and French Literature, Boston University, USA. Research Interests: Use of GIS and Remote Sensing for monitoring land use change and natural resources due to climate change, Urban Ecology and Citizen Science, engaging local communities in Environmental Justice issues. Nick is entering his third year in the Ph.D. program in Geography and this is his third summer as an RA for HERO.

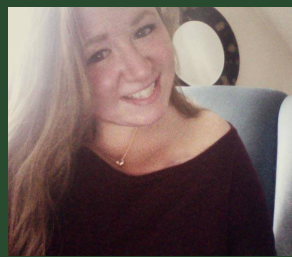
HERO FACULTY & STAFF



John Rogan, Ph.D.
Professor of Geography
HERO Director/Co PI



Deborah Martin, Ph.D.
Director, Graduate School of
Geography
Assoc. Director of HERO/Co PI



Rachel Levitt
Program Administrator
Graduate School of Geography
HERO Administrative Assistant



Pamela Dunkle
Operations and Budget anager
George Perkins Marsh Institute
HERO Budget Manager



Photo: Congressman Jim McGovern speaks to the group at the Hadwen Arboretum

HERO ALUMNI (CONTINUED)



Nicholas Malizia (BA '05, MA '06) shares a bit about his current position at Indigo Agriculture, and discusses how HERO helped him to set his career goals after graduation. Nicholas participated in the HERO program beginning in 2005.

"I'm currently the Director of Data Science for the GeolInnovation team at [Indigo Agriculture](#), a Boston-based startup that aims to improve grower profitability, environmental sustainability, and consumer health through the use of natural microbiology and digital technologies. As part of the GeolInnovation team, spatial data are at the forefront of everything we do – from analyzing optical and radar-based satellite imagery to optimizing the placement of our biological technologies based on environmental conditions.

Studying geography at Clark, and specifically my time as a HERO Fellow, were critical in helping prepare me for my career. Working closely with professors like John Rogan, Gil Pontius and Billie Turner as part of the HERO program opened my eyes to the possibilities of what I could do with my degree in Geography. Through HERO and my associated research I became involved in the academic discussion around topics that I was studying in class, making the topics even more engaging. And, Gil taught me how to program in Visual Basic. The programming languages have changed over the years, but I've written a lot of code since leaving

Clark. More than anything, the HERO program opened my eyes to the fact that I was never going to be satisfied with a job where I was not 100% engaged and challenged. That realization inspired me to pursue my PhD and, ultimately, to leave academia for industry to pursue topics in the private sector that I'm passionate about."

RESEARCH AT THE HADWEN ARBORETUM

On Friday, May 31st, the Worcester Tree Initiative led classes of local grade school children on an interpretive tour through Clark's Hadwen Arboretum. Congressman Jim McGovern joined the group to discuss the importance of green space and public parks within Worcester (pictured above). The HERO program has recently begun a long term program of trail maintenance and invasive plant removal in the arboretum. The maintenance program is supported by Clark's Facilities Department, and the USDA/DCR.

STAKEHOLDER SUMMIT

Join us for this year's HERO Stakeholder Summit on [Thursday, July 11th 2019!](#) At the close of each summer, the HERO cohort presents their findings to members of local collaborating organizations such as the Worcester Tree Initiative, USDA/DCR, and other members of the local community. This event is open to the public and often includes Clark University faculty, staff, graduate students, HERO alumni, and more. For more information, email RLvitt@clarku.edu for details about this year's event. Stay tuned for details!



HERO @ CLARK UNIVERSITY

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Newsletter Editor: Rachel Levitt
(HERO Administrative Assistant and
Program Administrator in the Graduate
School of Geography)