

Tree Assessment Characteristics: Vigor



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 Clark University O'Connor Fund.

Summer 2018 Program:
May 21st - July 13th

NOTE FROM THE HERO DIRECTORS

Welcome to the 19th year of the Human Environment Regional Observatory (HERO) program at Clark University!

The HERO program has been chiefly supported over the 19 years by an endowment from the late John O'Connor ('78). This year marks our second installment of the HERO Newsletter to communicate our achievements and research goals to our sponsors, collaborators, and alumni. The theme of HERO 2018-2019 is Greening the Gateway Cities where will extend our previous analysis of juvenile tree health and stewardship from Worcester to two Massachusetts Gateway Cities: Chicopee and Fall River. This tree inventory and stakeholder assessment builds on last year's research conducted in Chelsea, Revere and Holyoke in collaboration

with the Department of Conservation and Recreation. We are joined this year by six Clark undergraduate students from a variety of departments and programs.

We look forward to another challenging year of research in the Gateway Cities.

Sincerely,
Deborah Martin
& John Rogan

Graduate School
of Geography

Header Photo from Worcester Telegram & Gazette, T&G Staff/Christine Peterson [[Click here for a link to the article](#)]

HERO 2018-19



HERO 2018-19 COHORT

HERO 2018-19 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) Back Row: Laura Cohen, Andy Pagan, John Rogan, Rachel Corcoran-Adams, Marc Healy Front Row: Rowan Moody, Elizabeth Lohr, Yeannet Ruiz, Deb Martin, Nick Geron

WHY BE A HERO?

HERO Fellows analyze the causes and consequences of global environmental changes at local scales in faculty led research projects. Each Fellow is paired with a Clark faculty mentor and other researchers on the HERO team. Fellows 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
- Funding for attendance to present research at Association of American Geographers (AAG) annual scholarly meetings



ELIZABETH LOHR

Major: Biology & Geography

"I want to be a part of the HERO program because it's a great opportunity to gain experience and learn valuable skills, while still doing meaningful work. I am looking forward to doing field work and collaborating with a dynamic group of students and faculty."



ROWAN MOODY

Major: Geography | Minor: Biology

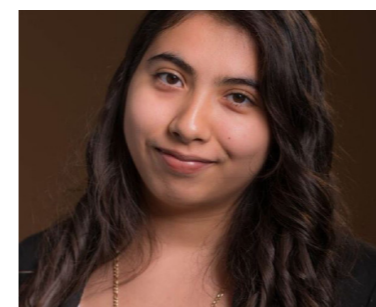
"I applied to HERO for the opportunity to gain hands-on experience collecting data in the field and conducting GIS analysis in the field of urban ecology. I'm excited to be to develop new skills and delve into our research topic. Additionally, I'm looking forward to meeting my fellow student-researchers, as well as working with them throughout the summer and into the following year."



ANDY PAGAN

Major: Geography | Minor: Environmental Science

"I wanted to take part in the HERO program because it provides students an opportunity to apply a wide range of skills in a research project that has real-world outcomes. I'm most excited to conduct field work, perform geospatial analysis, and make a new group of interesting friends."



YEANNET RUIZ

Major: Geography (specialization in GIS & Earth System Science)

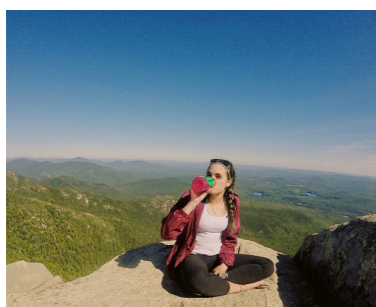
"I look forward to being out in the field this summer through the HERO program and am excited to learn about different tree species. As an undergraduate, being able to do in-depth research is a rare and unique opportunity. I'm thankful to be part of this year HERO's cohort."



LAURA COHEN

Major: Geography & Sociology

"I want to work in the HERO program to gain valuable research experience while at the same time work on the fascinating issues surrounding the greening of cities, especially gateway ones like Worcester. I most look forward to the opportunity to implement the tools I have learned through classes about research methods in a hands on setting. I also look forward to working with my fellow students the program and the esteemed faculty."



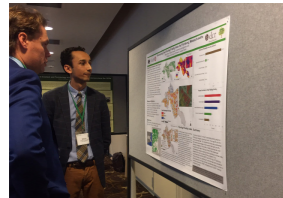
RACHEL CORCORAN-ADAMS

Major: International Development (focus on Geoinformatic Data Analysis, Urban Development) | Minor: Computer Science

"I want to work in the HERO program because its interdisciplinary approach to data collection allows for an in-depth research experience not many undergraduates get to have. I am excited to put my skills in remote sensing to use and conduct field work that leads to urban ecology policy reform, not to mention it will be my first summer living in Worcester!"

AAG ANNUAL MEETINGS

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



Above: Miles Weule Chandler presenting research at AAG 2018 in New Orleans, LA



Above: Eli Baldwin presenting research at AAG: "Strategies for Juvenile Tree Stewardship on Multi-family Residential Properties in Chelsea and Holyoke, Massachusetts"

LOCAL PARTNERS

HERO collaborates with the Worcester Tree Initiative, USDA, and local government agencies



Above: 2017-18 HERO students watching DCR tree planting in Chelsea, MA. May 2017



HERO 2017-18

HERO 2017-18 includes Eli Baldwin, Meyru Bhanti, Hannah Corney, Joe Mogel, Gemma Wilkens, and Miles Weule Chandler. Also pictured: Benjamin Breger and Sonny Kramer (UMass Amherst) who collaborated with us over the summer.

In 2017, HERO focused on Greening the Gateway Cities, with extended previous analysis of juvenile tree health and stewardship from Worcester to three Massachusetts Gateway Cities: Chelsea, Revere and Holyoke. This cohort continued their research throughout 2017-18 and presented at the AAG Annual Meeting in New Orleans, LA.

Research Areas:

- Eli Baldwin: Strategies for Juvenile Tree Stewardship on Multi-family Residential Properties in Chelsea and Holyoke

Massachusetts

- Meyru Bhanti: Does the distribution of juvenile tree planting impact local air temperature? A calibrated microclimate simulation in Holyoke Massachusetts
- Hannah Corney: The Impact of Juvenile and Mature Trees on Air Temperature-Fluxes: Employing ENVI-met in the city of Chelsea, Massachusetts
- Joe Mogel: Assessment of Factors Influencing Juvenile Street Tree Health in Mass Gateway Cities
- Gemma Wilkens: A Hedonic Measure of the Effect of Tree Canopy Cover on Real Home Price
- Miles Weule Chandler: Developing a Planting Priority Index for the Greening the Gateway Cities Program in Fitchburg, Massachusetts

AFFILIATED RESEARCH

GRADUATE RESEARCHERS

Meet our HERO Graduate Research Assistants

This year we have two Geography doctoral students/candidates who will work closely with our undergraduate HERO fellows



Marc Healy B.A. Geography, University of Utah, USA. Research Interests: Remote Sensing, Land Use/Cover Change, LiDAR, GIS. Marc is entering his third year in the Ph.D. program in Geography and was a RA for HERO during the previous summer and following academic year (2017-18)



Nick Geron M.S. Ed Education, Leham 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 second year in the Ph.D. program in Geography and this is his first summer as a RA for HERO, which he will continue into the following academic year (2018-19).



ELM PARK ECOSYSTEM BENEFITS

HERO RA and second-year PhD student Nick Geron shares a bit about his experience researching the ecosystem benefits for Elm Park in Worcester, MA this past semester

"I conducted an analysis of the ecosystem benefits for Elm Park for Landscape Ecology with GISDE student Dan Lassila. We worked with the Worcester Tree Initiative (WTI) who had been notified by residents of street tree removal without any replanting. The Elm Park neighborhood has a much denser population than Worcester on average with lower median income and less educational attainment. The demographics of Elm Park residents

are a mix of college students from WPI and Becker College with non-white immigrant populations. The current neighborhood tree canopy cover according to i-Tree Landscape is 9%, much lower than more suburban Worcester neighborhoods but consistent with highly urban downtowns in Massachusetts. The purpose of the street tree analysis was to map the distribution of ecosystem services from street trees in relation to current canopy cover to find identify potential gaps for tree planting in the spring and fall of 2018. The results of our analysis found that while there were large ecosystem benefits from street trees in Elm Park, the benefits were concentrated on select trees and dependent on very old, large trees. We calculated the ecosystem services in Elm park using i-Tree. i-Tree was created by the US Forest Service to help cities manage their urban forests. First, we took a street tree census in which we collected DBH, leaf and bark health, sidewalk damage, tree species, and land use. These metrics were input into i-Tree streets as well as i-Tree design (a predictive model using the same set of parameters). Total benefits in Elm Park were 31,652, the majority of which were energy benefits from reductions in heating and cooling in the winter and summer respectively. We focused our tree planting on two streets, Somerset Street and Home Street. The cost benefit analysis shows how total benefits from new street trees will exceed total costs after 15-20 years."

STAKEHOLDER SUMMIT

Annual HERO Research Presentation



The [HERO] students measured and assessed the condition of trees planted along city streets and in residents' yards. In Chelsea, they interviewed residents who had received trees. On July 13, they presented their findings to an audience of research partners from the WTI, DCR and U.S. Department of Agriculture (watch a video of the presentation). The DCR will use the students' data to modify their tree planting programs in other gateway cities. In their survey of 1,388 trees in the three cities, students found that 81 percent overall had survived. Cherry plum, eastern redbud,

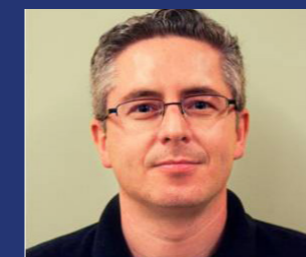
crabapple, white oak and honey locust fared well; black gum, tulip trees, dawn redwood, cherry dogwood and dogwood did not.

The HERO program allows undergraduates to apply what they've learned in the classroom and reviewed in research journals to an initiative that could affect the health of thousands of trees – and people.

Clark ResearchMatters article, written by Meredith King. [Click here for the full article](#)

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

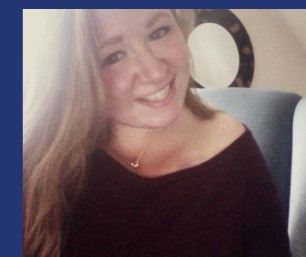
HERO FACULTY & STAFF



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

HERO ALUMNI



THE
UNIVERSITY OF
BRITISH
COLUMBIA



Trevor Jones



Ryan Frazier

HERO ALUMNI AT UNIVERSITY OF BRITISH COLUMBIA

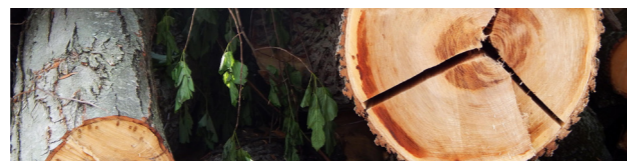
Some exciting news from two HERO alumni: Ryan Frazier (HERO 2004-2005) just accepted a tenure-track faculty position at the University of British Columbia in the Department of Forestry. Ryan will be joining Trevor Jones (HERO 2004-2005) who is also a tenure-track faculty member in the same department at the same university. Congratulations to both! [Click here to read about the Department of Forestry at UBC.](#)

19 YEARS OF HERO ALUMNI

Over the past 19 years, the HERO program has seen numerous cohorts of excellent undergraduate students from Clark and from outside universities and colleges around the country. Since the beginning, the program has hosted approximately 112 students, with this year's cohort bringing

the total to 118! Here are some of the schools our past HERO students have come from for the summer program hosted at Clark:

Appalachian State
Arizona State University
Bard College of Simon's Rock
Barnard College
Bloomsburg University of Pennsylvania
Carthage College
Clark University
College of the Holy Cross
Eastern Illinois University
Grinnell College
Humboldt State University
James Madison
Kenyon College
Metropolitan State College of Denver
Middlebury College
Mississippi State
New Mexico State University
Rensselaer Polytechnic Institute
Southern Connecticut State University
Stanford University
Trinity College (TX)
University of Wisconsin-Platteville
University of California Davis
University of California Santa Cruz
University of California Los Angeles
University of Florida
University of Arizona
University of Chicago
University of Massachusetts Amherst
University of Puerto Rico
University of Texas Austin
University of Vermont
Wellesley College
Wesleyan University
Whittier College (CA)
Worcester Polytechnic Institute



For more information about our HERO alumni, visit us online at clarku.edu/departments/HERO/people/alumni



HERO @ CLARK UNIVERSITY

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