The Impact of Geography on Work-Related Experiential Activities in Engineering and Computer Science

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What is a WREA?

- Work-related experiential activity
    - Internship
    - Cooperative placement
    - Job shadow
- In-Person, Remote, and/or Hybrid
- WREAs a high impact activity, valuable in applying knowledge learned in the classroom, strengthening skills, developing professional networks
    - Positive academic gains (Binder et al., 2015; Knouse et al., 1999; Kuh, 2008; Parker et al., 2016)
    - Student career learning (Dirienzo, 2016; McGee & Spiro, 2000)
    - Increased employability (Callanan & Benzing, 2004; Gault et al., 2010; Knouse et al., 1999; Nunley et al., 2016)
    - Differences exist based on structure (Hora et al., 2017)
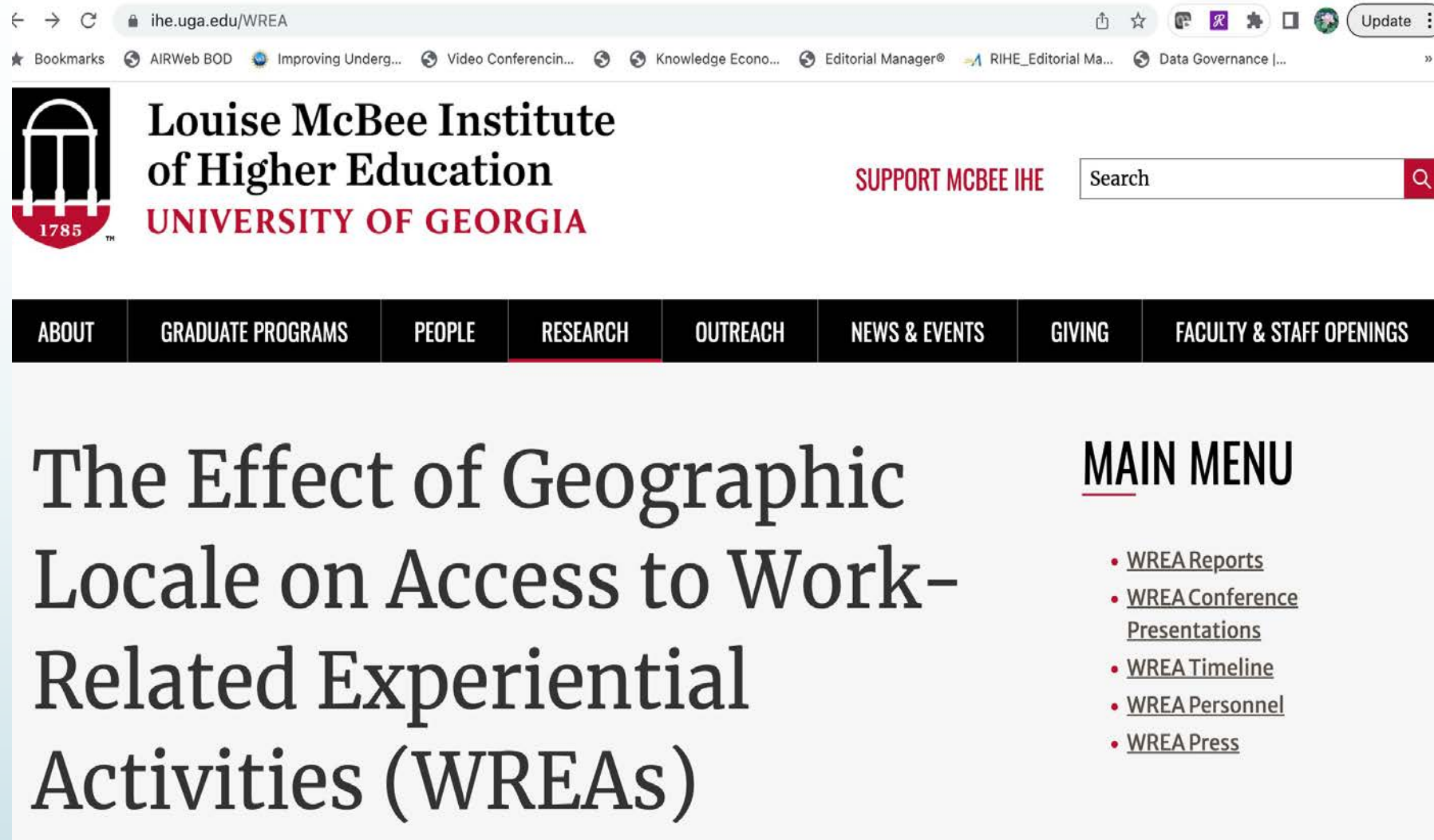
What Prevents WREA Participation?

➥ Many barrier exist to participation (Bathmaker et al., 2013; Dirienzo, 2016; Frenette et al., 2015; Hora et al., 2017, 2019; Hora, Chen, et al., 2020)

➥ Hora et al. (2019) found that many barriers prevent students from participating

  ➥ Financial (e.g., need for pay or transportation)

  ➥ Sociocultural (e.g., cultural screening)

  ➥ Institutional barriers (e.g., course loads or scheduling)

➥ Not much known about role of geography

➥ We hypothesized that physical location significantly impacts access to WREAs

WREA Study

- 3+ year mixed-methods study funded by The NSF to examine the impact of geography on students' access to work-related experiential activities (WREAs)

- Gathered data from:

  - 2,300 students across six institutions spring 2021 and spring 2022 surveys

  - Individual interviews with students (N=48), career planning directors (N=6) and focus groups with company officials (21)

- Majors in engineering and computer science (because many enter FT workforce after bachelor's degree)

- First year data collected during Covid-19 pandemic

- Thankful for research team colleagues who worked with us

- So far, we have xx conference presentations, 6 peer-reviewed journal articles, and numerous unpublished reports

WREA
Work-Related Experiential Activities

https:www.ihe.uga.edu/WREA

Research Methods

Spring Surveys and Survey Data Analysis

- *Career & Employment Planning Survey* administered sp21 & sp22 – 5 institutions
  - 2300 usable responses for 10.4% response rate

- Initial cleaning of data, used only second year responses for those who completed both years

- Descriptive statistics and early comparisons

- Regression models

- Geospatial analyses

Qualitative Data

➥ Semi-structured protocols used; developed unique protocol for each group; conducted over Zoom

➥ Interviews with career center administrators (CCAs) (N = 6)

   ➥ Lasted between 30-60 minutes

   ➥ Conducted by PI and co-PI

➥ Focus groups with employers and recruiters. (N = 21)

   ➥ Hour-long focus groups

   ➥ Companies span the country but frequently more local. Range from public to private and large to small organizations.

   ➥ Led by co-PI and her research assistant

➥ Students (N = 75)

   ➥ 30-75 minutes

   ➥ Juniors or seniors in engineering or computer science

   ➥ Conducted primarily by the co-PI and her research assistant

Data Analysis

- Survey data were cleaned, analyzed
  - Descriptive and advanced statistics as well as maps and other geospatial images created

- Qualitative data were analyzed by the co-PI and her research assistant
- Iteratively developed codes
  - Inductively coded
  - Met to discuss codes
  - Reconcile disagreements
  - Recode with agreed code list and definitions (inter-coder agreement)

Findings (brief)

Survey Results (N=2300)

Characteristic	Percent of valid responses
Participated in a WREA	
Yes	61.4
WREAs completed since entering college	
One	38.4
Two +	61.6
Full-Time Job with WREA Company	25.8
FT Job with Another Company	34.2
Modality of WREA	
Remote	27.3
In-Person	54.6
Both	18.1

Survey Results (cont'd)

- The top three items with the highest scores for <u>benefit from their WREA</u> participation were:

  1. *interacting with others in a professional setting*

  2. *establishing relationships with employers*

  3. *being guided by a mentor*

- Overall, not a lot of significant predictors in the regression analyses

- Older students and first-generation students were more likely to choose in-person WREAs over remote opportunities (similar relationships exist between in-person and hybrid, though the relationship is weaker)

- Students' geographic location played a significant role in access to WREAs
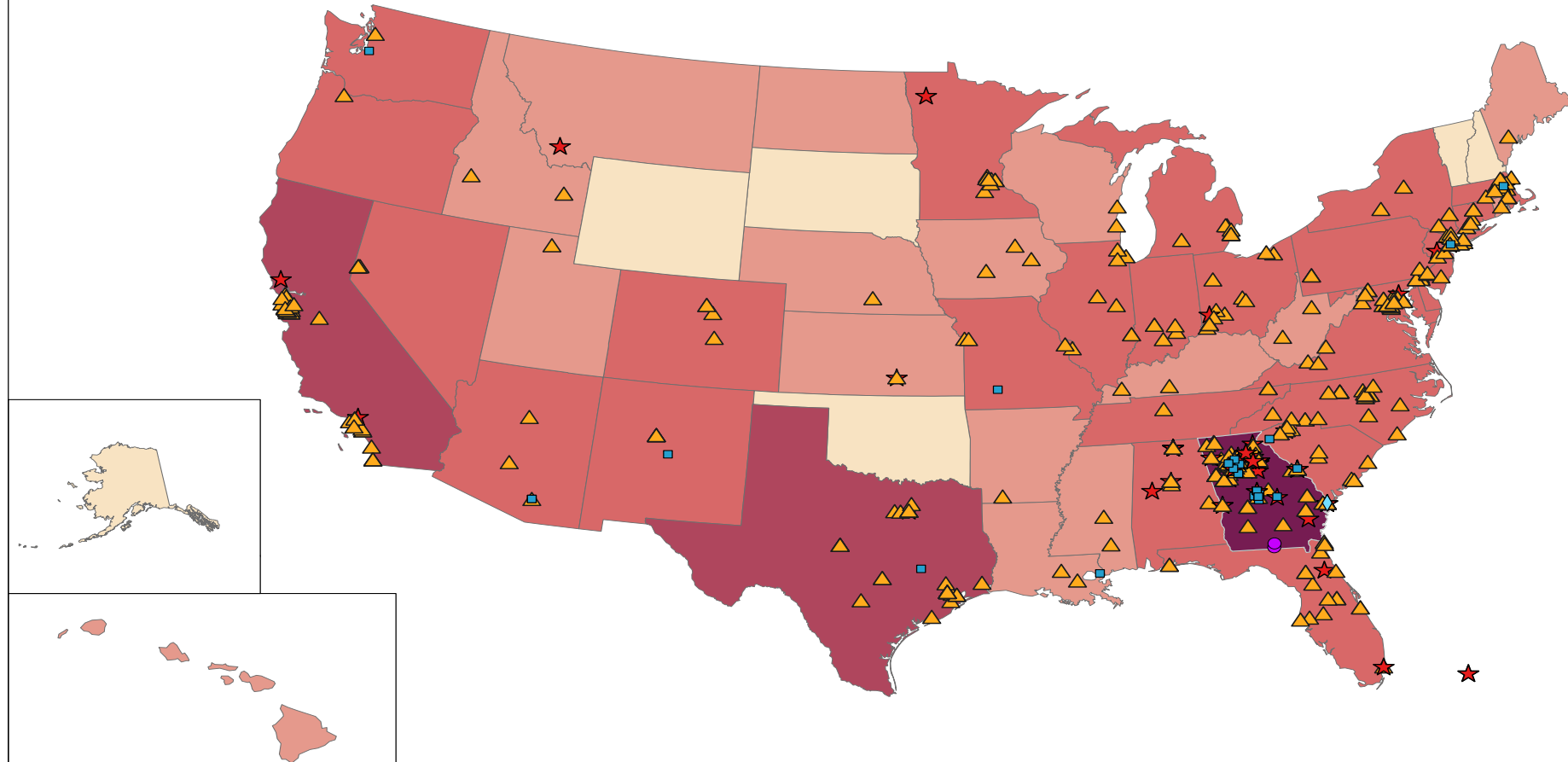
Qualitative Findings

- Generally, interview and focus group findings followed survey results
- Also more nuanced, richer information
  - e.g., Women did not appear to hesitate to look for/take on WREAs
  - Personal preferences matter (location, amenities)
- Students remarked on the challenges of Remote WREAs
  - Isolation/Communication
  - Space (mental and physical)
  - Lack of replicability/quality of experience

- Employers and Career Center Directors Acknowledged that remote is likely here to stay—need to focus on improving remote experiences
- Atlanta is a significant industry and opportunity hub
- Non-metro institutions struggle with lower resources and fewer employers in their area

- ** Disparities in the structure of opportunities for students across institutions were most visible when more elite institutions were compared to less well-resourced institutions across the state.

Geospatial Analyses

➼ Mapped the location of WREA activities (State and beyond)

➼ Examined WREAs located near home and institution of enrollment

➼ Used a variety of data (e.g., census, American Community Survey, Longitudinal Employer-Household Dynamics, and state government offices

➼ to examine if/what amenities and services were wanted

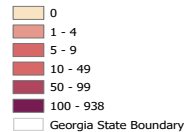➼ To calculate a Work Sustainability Index (WSI)

We thank Prof. Jerry Shannon, primary contributor to the geospatial analyses, developer of geovisualizations

WREAs - USA

Sates with WREAs

Count
- 0
- 1 - 4
- 5 - 9
- 10 - 49
- 50 - 99
- 100 - 938
- Georgia State Boundary

Universities

School Name
- △ Georgia Tech
- ■ Mercer University
- ◇ Savannah State University
- ★ University of Georgia
- ● Valdosta State University

0   135   270   540 Miles
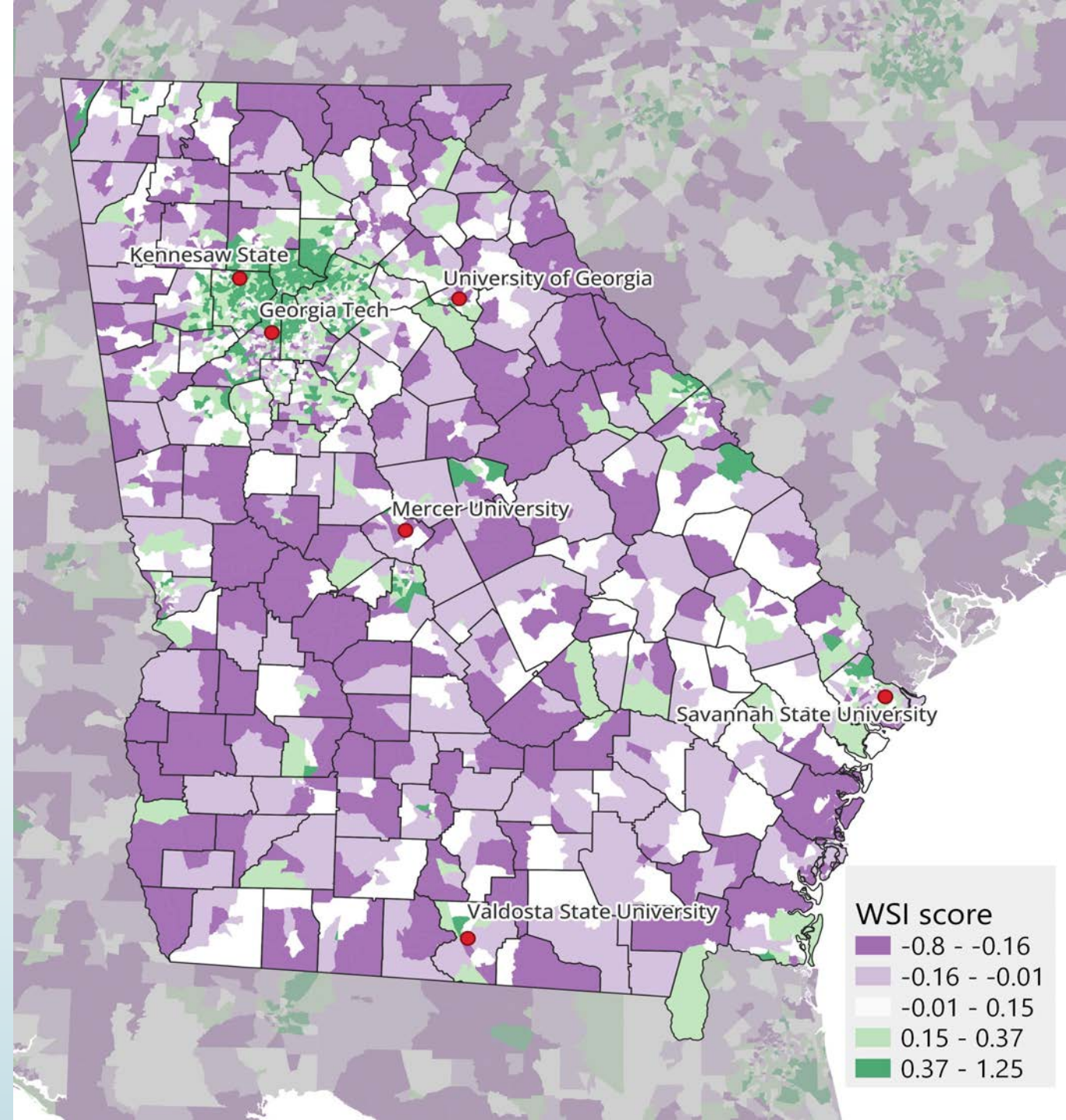
0   130 260   520 Kilometers

N

Work Suitability Index (WSI) Score By County in Georgia

WSI included:

- Amenities per 1k people
- % employed in STEM
- % with BA degree
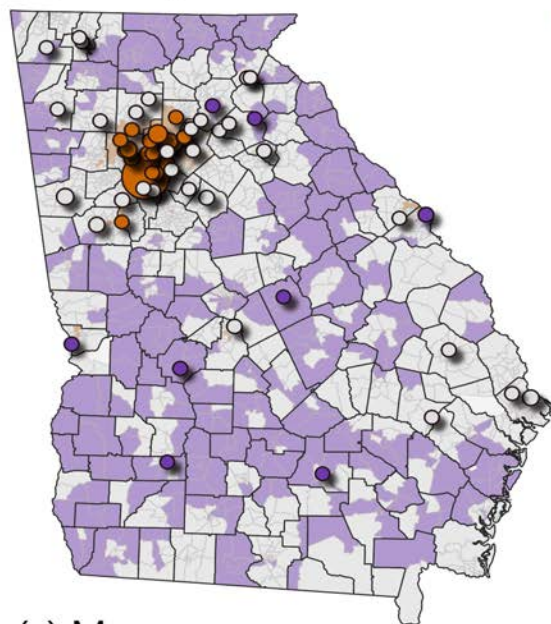- Median age
- % Rent burden

For Georgia Tech, 65% of all WREAs occurred in census tracts identified as WSI hotspots, while only 4% occurred in cold spots.
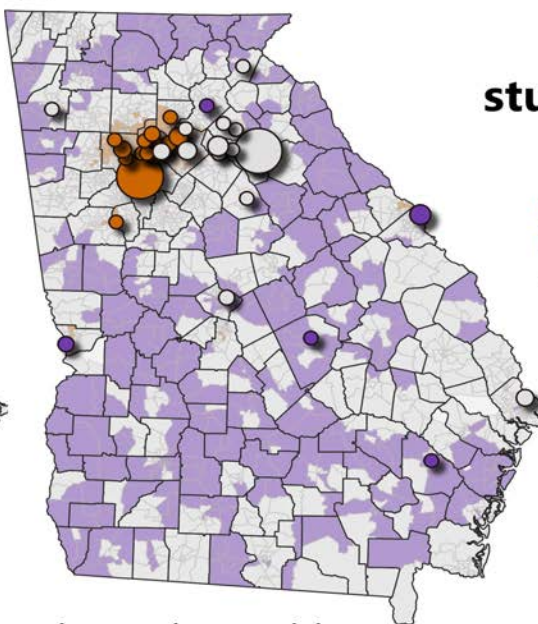
Another 31% of WREAs took place in tracts that were not statistically significant in LISA analysis.

The rate of hot spots was lower for the University of Georgia and Mercer (38% and 16% respectively), with a correspondingly greater amount in tracts that were not significant hot or cold spots (54% and 78%).
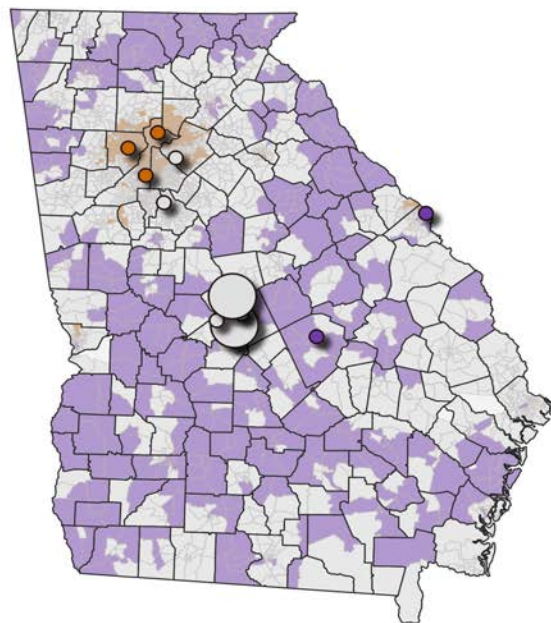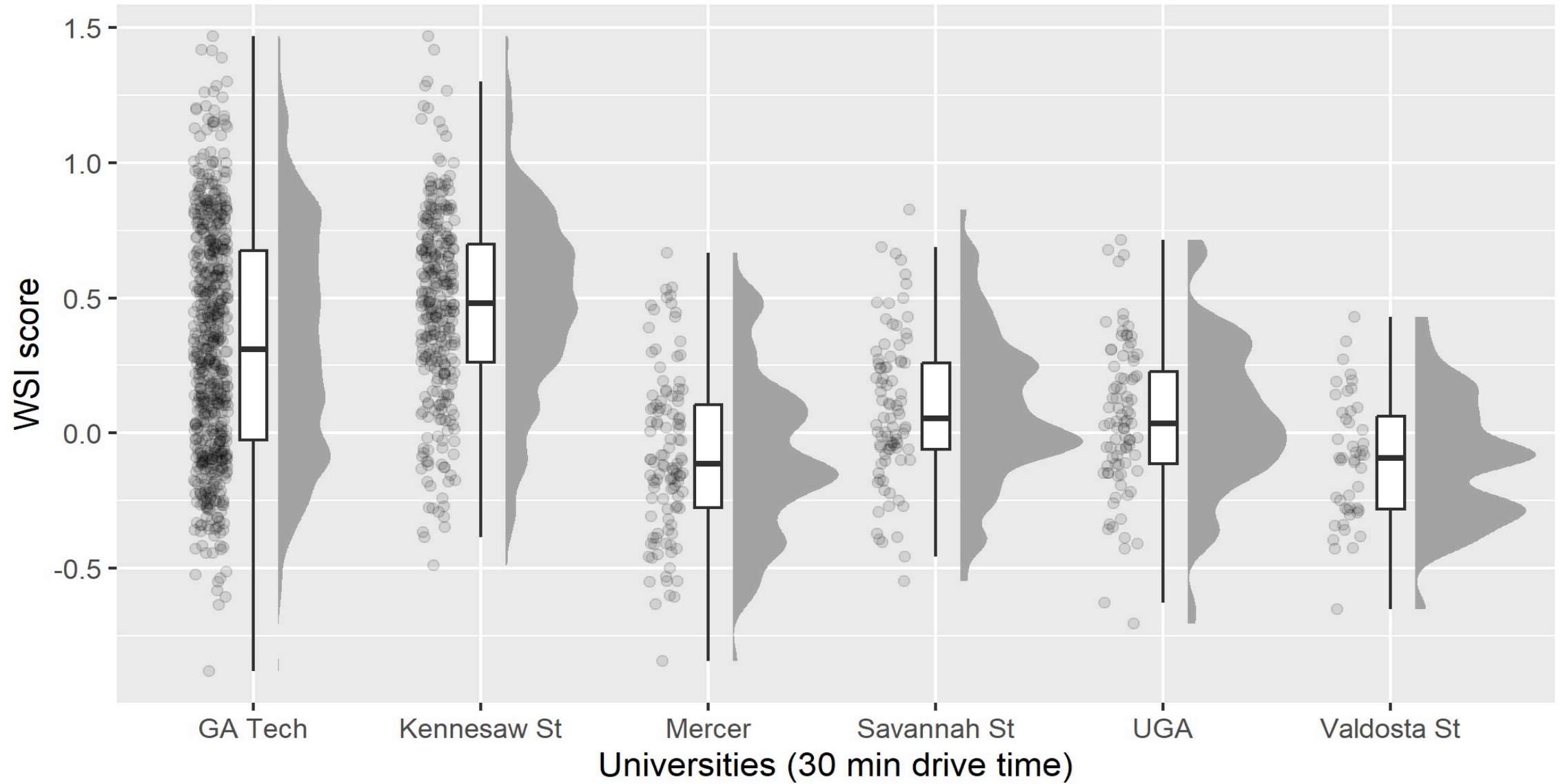

WSI hot/cold spots and student WREAs

LISA classification
High-high (hot)
Low-low (cold)
Not significant

Dot size reflects percentage of WREAs in each city by school.

(a) Georgia Tech
(b) UGA
(c) Mercer
(d) WSI hot/cold spots

WSI scores for tracts near each University

Conclusions

Overall Summary

➡ Students perceived their WREA participation as helpful in preparing them for post-grad employment

➡ Stakeholders agree that remote WREAs will stay

➡ Geography played a significant role in access to WREA opportunities

➡ Covid changed our plans to a degree; weren't able to observe career fairs

➡ Low response rates didn't give us robust information on some questions like impact of WREA on job offers

Implications

- ➡ WREAs are perceived to be valuable by both students and employers – need to collaborate with employers

- ➡ Need increased attention on intentionally in design and selection of modality (especially remote)

- ➡ Geographic location impacts students' access to WREA – rural institution staff must work harder to build bridges, create opportunities

- ➡ Institution officials should continue addressing larger barriers to WREA participation

Institutional Research Focus

- IR/IE practitioners can collaborate with career center and faculty researchers on this or other related topics.

- We relied on IR directors at each institution to provide us with student addresses (following FERPA guidelines)

- Workforce, employment are big topics and IR is often involved in these studies

- Benefit of multiple data sources and stakeholder groups

- Collaborations with academic and student affairs offices

- Asking complex questions and providing complex answer

- Looking at unique needs of your student population

Good Practices For Survey Research in IR

- Understand the literature on survey research, consider relevant theory

- Be knowledgeable about the topic, research design, and analytic methods

- Consider Survey Format

  - Mode of delivery- internet access, accessible across phone & laptop

  - Wording - succinct length of survey, easily understood language

- Collaborate- work with different organizations/offices/etc. to allow access from multiple angles, know other open surveys

- Have a plan and then carry out accurate analysis and reporting

Questions?

Members of WREA Research Team

- Prof. Jerry Shannon, UGA Geography Dept, Geospatial expert
- Prof. Marguerite Madden, Director UGA Geospatial Research Center
- David Tanner, Associate Director, Carl Vinson Institute of Government, UGA
- Doctoral Students
    - Collin Case (GRA, 3 yrs)
    - Matthew Grandstaff (GRA, 3yrs)
    - Amanda Aragon (GRA, 2yrs)
    - Alexa Arndt
    - Bilijana Birac
    - Sarah Burman

Thank you

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