



# 2022 RESEARCH INFRASTRUCTURE WORKSHOP

## CI Training at TACC



# TACC - 2022



LEADERSHIP-CLASS  
COMPUTING FACILITY

**TACC**

TEXAS ADVANCED COMPUTING CENTER



# Successful Staff Training Highlight

- ~4 years ago, we introduced our professional internship program.
- Grew out of challenges in hiring junior developers.
  - Applicant pools were not great.
- Initial intent – lots of people are coming into software development via non-traditional pathways.
  - Lack of traditional credentials made it harder to judge the skill of these candidates.
  - But, undoubtedly, there were talented people out there.
- Created a cohort of positions that were 4 month “internships”
  - Reasonable starter salary
  - Chance for candidates to put real experience on the resume’
  - Chance for us to see if they could grow into our roles without a huge investment.





# Successful Staff Training Highlight

- Starting with the \*very first\* posting, the applicant pool was \*universally better\* than full time junior dev positions.
  - More people thought they would qualify.
  - Coming through a big project at UT-Austin was seen as a great way to advance careers, even for people who wouldn't have thought about it as a “career”.
- We brought in 3-5 interns at a time, to ease the “constant onboarding” load.
- A great success. . . We've ended up keeping almost half in permanent positions (and making offers to 2/3<sup>rd</sup>).
- Starting cohort #5 this fall.

# CODE@TACC



Developed and deployed 6 years ago at TACC



One-week, residential camp for high school students



Incorporate project-based learning approach to introduce computational skills and increased awareness of computing at scale





# IMPACT



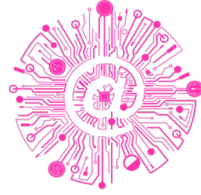
- ▶ For women and/or other underrepresented\* students, our enrollment rates are 5-20x the national average for STEM and computing program enrollment.
- ▶ College enrollment in STEM and computing programs higher for women and/or underrepresented students who participate in Code@TACC (n=140, 2015-2019).
- ▶ Partnerships in Education and Resilience (PEAR) Institute found that girls who participated in Code@TACC reported enjoying science more, being more interested in having a career in science, and being more knowledgeable about how to obtain a science career.

	% STEM	% CS	% Eng.
NCES all students	18%	4%	6%
TACC all students	<b>66%</b>	<b>22%</b>	<b>26%</b>
NCES underrepresented students	14%	3%	4%
TACC underrepresented students	<b>58%</b>	<b>16%</b>	<b>18%</b>
NCES Women	11%	1%	2%
TACC Women	<b>68%</b>	<b>19%</b>	<b>28%</b>

\*Underrepresented includes African American/Black, Hispanic/Latinx, Native & Indigenous



# Code @ TACC 2021-2022



Three camps each summer  
108 participants

Majority underrepresented:  
22% African American/Black  
36% Hispanic/Latinx

61% qualify for free or  
reduced-price lunch

48% girls

29% first-generation college  
aspirants

70% first-time camp  
participants

# Advanced Computing for Social Change

Weeklong event for undergraduate students

Teaches Advanced Computing concepts to create agents of change

Instruction teaches practice first, theory second

Program targets underrepresented students and non-CS majors



# Advanced Computing for Social Change 2021-2022

Sixty-nine participants

Three cohorts

Collaborators: Chaminade, LSAMP, SURA

55% women

32% African American/Black



17% Hispanic/Latinx


10% Native Hawaiian or Pacific Islander

25% Asian

10% White








**TACC**  
XSEDE  
Texas Advanced Computing Center

# The Number of Bacterial Species in Your Body is Influenced by Surfing in the Ocean

by ELLIS NATALIE - Chaminade University of Honolulu



Chaminade University  
data science

### INTRODUCTION

The microbiome, which is a collection of microorganisms found in an environment, is essential for both human and environmental health. Greater diversity, or more species of bacteria, is normally seen as preferable or more healthy.

Surfers devote considerable time outside (and in the ocean) than the normal individual. Therefore, the bacteria on (and in) them may be a valuable predictor of both their health and the health of the oceans they surf in.

### BACKGROUND

Microbes (bacteria, fungi, viruses), which are invisible to the naked eye, account for over 98% of the ocean's biomass and are important for maintaining the marine ecosystem's well-being.

Millions of these microscopic creatures, which are smaller than dust mite excreta and measure less than five microns, are present throughout every liter of saltwater and contain cellular life forms such as phytoplankton (algae) and bacteria. Microbes in the water are arguably the most crucial creatures for keeping our planet healthy and sustainable.

### HYPOTHESIS

The number of bacterial species discovered in the bodies of Pacific surfers is greater than Atlantic surfers.

### METHODS

- The data was obtained from QIITA and the Surfer Biome Project (QIITA ID 11404).
- The R programming language (through Stampede2 supercomputer & personal computer) for quantitative analysis and visualization.

### PRELIMINARY FINDINGS

Number of Bacterial Species / Mean (Standard Deviation):

	Atlantic	Pacific
Body Sites (Fig 1 & 2)	348 [3096]	227 [186]
Female (Fig 3)	332 [310]	230 [153]
Male (Fig 3)	374 [312]	215 [168]
Unspecified sex (Fig 3)	218 [120]	387 [313]
20s Age Category (Fig 4)	380 [314]	220 [177]
30s Age Category (Fig 4)	360 [305]	208 [160]

P-Value  
 Ocean 1.92e-10 \*\*\* (Statistically Significant)  
 Body Site <2e-16 \*\*\* (Statistically Significant)  
 Sex 0.181  
 Age Category 0.184

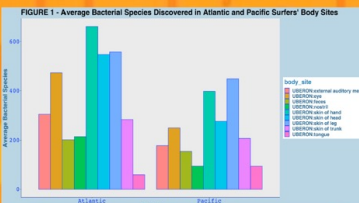
### DISCUSSION

The preliminary data and accompanying graphs show that the number of bacterial species discovered in the bodies of Pacific surfers is lower than Atlantic surfers. The results were obtained through the use of a mean quantitative analysis technique. Despite the fact that the bodies of Atlantic surfers have a greater number of bacterial species than those of Pacific surfers, the differences are not statistically significant (for sex and age categories).


### REFERENCE

[1] The University of Newcastle Australia. Surfing bacteria reveal new insights into the ocean's health. Retrieved 03/21/22 from <https://www.newcastle.edu.au/newsroom/story/surfing-bacteria-reveal-new-insights-into-the-ocean-s-health/>  
 Wickham et al., (2019). Welcome to the tidyverse. *Journal of Open Source Software*, 4(3), 1686. <https://doi.org/10.21105/joss.01686>

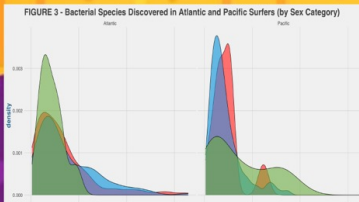
### FIGURE 1 - Average Bacterial Species Discovered in Atlantic and Pacific Surfers' Body Sites



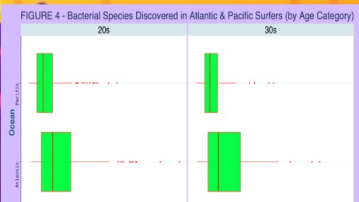
### FIGURE 2 - Average Bacterial Species Found in Atlantic and Pacific Surfers' Body Sites



### FIGURE 3 - Bacterial Species Discovered in Atlantic and Pacific Surfers (by Sex Category)



### FIGURE 4 - Bacterial Species Discovered in Atlantic & Pacific Surfers (by Age Category)



“I expected to learn how to create visualizations in python. I saw this as an opportunity to enter the world of data and computer science, which previously had seemed so far out of reach and unattainable. I believe that achieved my goal of feeling more confident and comfortable with coding. However, I feel that I got more than I bargained for.”





# CI RESEARCH 4 SOCIAL CHANGE REU 2021



**JORDAN WILLIAMS**  
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Computer Science



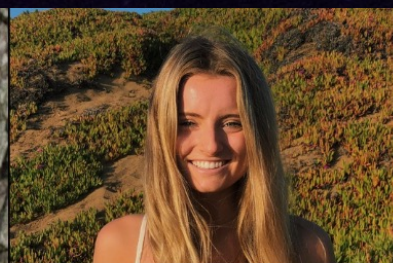
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UT Austin  
Undeclared



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Florida International University  
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**ANTONIO RAMOS**  
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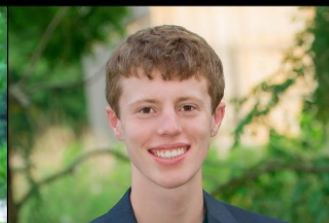
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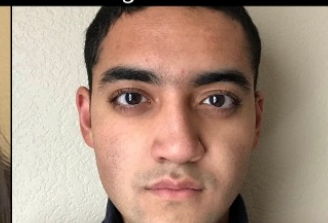
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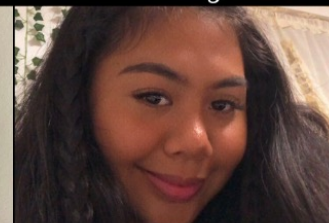
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**MELIA OKIMOTO**  
Chaminade University  
Environmental Science

47% women

67% underrepresented

47% first-generation

67% teaching-intensive institutions



# CI RESEARCH 4 SOCIAL CHANGE REU 2022



60% women

60% underrepresented

20% first-generation

60% teaching-intensive institutions

From left to right: 1. Evan Wilcox, Math, Berea College, 2. Christa Tsao, CS, College of Marin, 3. Brandon Childs, Econ (HIST), UT Austin, 4. Alan Garcia, CS, Austin CC, 5. Ani Savk, Chem Eng, UT Austin, 6. Enehi Ameh, Global Mgmt & Psychology, Earlham College, 7. Vy Diep, CS (Bio), Middlebury College, 8. Frieda Farias, CS (ENG), Columbia, 9. Christine Jones, MIS (ASL), RIT, 10. Brandon Bayquen, CS, City College of San Francisco