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Developing Resilience and Managing Uncertainty During the Pandemic

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Resilience in the Pandemic Era

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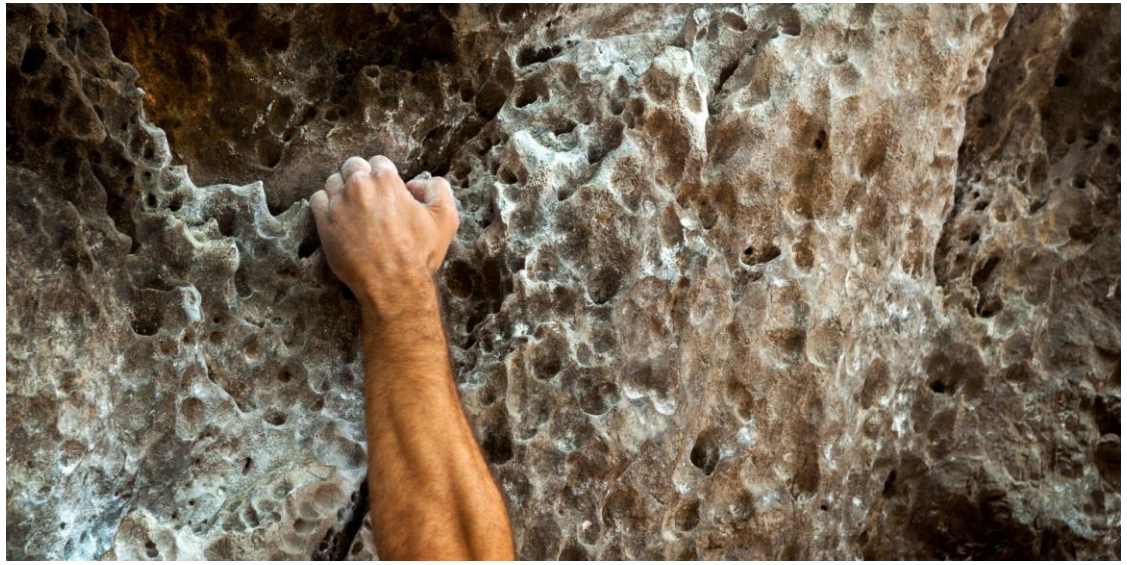
Resilience – Physical Strength



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Resilience – Psychology Quality

- "Resilience is the psychological quality that allows some people to be knocked down by the adversities of life and come back at least as strong as before…. " (Psychology Today).

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Resilience – Communication Process

- Resilience is the "communication process that unfolds in response to a single or series of disruptive events, involves adapting and transforming, and is created through interaction" (Wilson, Buzzanell, et al., 2021).

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Resilience

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Cassie Hayes, Texas Tech U

“No Hitting the Pause Button: Leveraging Advanced Cyberinfrastructure and Developing Organizational Resilience for NSF MFs in the Pandemic Era”

CICompass

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“No Hitting the Pause Button”

Leveraging Advanced CI and Developing Organizational Resilience for NSF MFs in the Pandemic Era

USC Viterbi School of Engineering
Information Sciences Institute
INDIANA UNIVERSITY
UNIVERSITY OF NOTRE DAME
THE UNIVERSITY OF UTAH
TEXAS TECH UNIVERSITY
renci

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Research Team

- Kerk Kee (PI)
- Ewa Deelman (co-PI)
- Cassandra Hayes (Research Assistant)
- Alex Olshansky (Research Assistant)

NSF Award #s: 2042054 AND 2042055

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What were some lessons learned as MFs pivoted from the pandemic?

How can we boost resilience in MFs?

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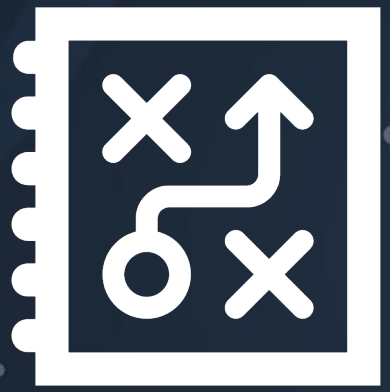
What We Found…

Lessons Learned to Boost MF Resilience



Pandemic Response Strategies

Pandemic-Sensitized Mindset

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Pandemic Response Strategies

#1 Promote Flexible Expectations at Work

- Adapting aims and expectations, such as embracing remote work, can lead to the ability to manage crises more successfully, as well as discovering more efficient systems of operations.

#2 Encourage Information Sharing in the Community and the Ecosystem

- Shared knowledge can offer guidance for risk management practices as well as offering a sense of community with other MFs, research teams, and institutions during a crisis. In addition, to self-organize following a crisis, individuals must know their roles and chain of command.

#3 Create Optimal Alignments across Institutions (including Funders)

- While too many institutional requirements can cause confusion, institutional guidance is essential to MF crisis response, as institutions offer stability, a sense of finality in decisions, normalcy, and, at times, a durable scapegoat for pandemic frustrations.

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Pandemic Response Strategies

#4 Sensitize Team to Risk to Balance Safety and Productivity

- Sensitizing teams to the pandemic can reduce underestimating and/or overestimating the risks associated with the crisis by both workers and management in their response efforts.

#5 Keep Work Going Despite Pandemic Challenges

- Because the practice of doing scientific research gives meaning to involved workers, keeping work going despite challenges aids in team functioning and morale.

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Pandemic-Sensitized Mindset

#6 Know Your Vulnerabilities

- Rather than attempting to pre-emptively identify all vulnerabilities, developing a knowledge base surrounding general areas of vulnerability and strategies for reacting can aid crisis response.

#7 Acknowledge that No Science is an Island

- The pandemic further exposed the reality that scientific research projects are impacted by social, institutional, and political forces—that scientific research cannot be separated from world events.

#8 Look for Socio-Technical (Not Just Technical) Solutions

- Solutions cannot be evaluated solely on a technical level—rather, a human-centered approach needs to be put in place. Technologies may be useful, but tools that are already utilized within teams were more successful than creating or adopting new solutions.

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Pandemic-Sensitized Mindset

#9 Integrate the Personal and Professional

- The crisis displayed that teams must consider the human needs of workers and researchers involved to minimize burnout, as boundaries between professional work environments and personal life blurred.

#10 Cultivate Readiness to Adapt in the New Normal

- Waiting for “the new normal” hindered teams, as participants described situations of inability to adapt to changing circumstances due to hoping instead for a return to a status quo. Given the understanding that crises and pandemics will happen again, working in a relative “pandemic-ready” mode and regard it as the new normal may be preemptively wise.

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Thanks!

Questions or Feedback?

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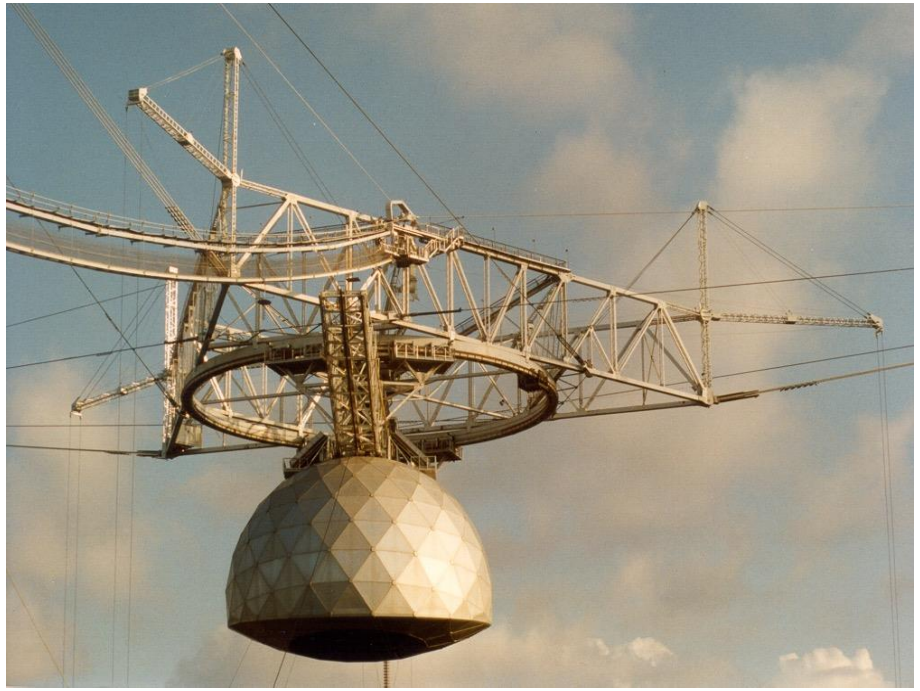
Shafaq Chaudhry, U of Central Florida

“Resilience in Major Facilities”



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Resilience in Major Facilities

Presented by: Shafaq Chaudhry, Ph.D.
University of Central Florida

The Arecibo Observatory in Puerto Rico as pictured in 2019
Photo credit: www.ucf.edu

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Arecibo Observatory (AO)

- NSF facility in the island of PR, completed in 1963.
- In 2018, management led by UCF, Universidad Ana G. Mendez and Yang Enterprises.
- World's most powerful single dish 305-m radio telescope for 53 years.
- Research in atmospheric sciences, planetary sciences, radio astronomy and radar astronomy.

Photo Credit: Shafaq Chaudhry

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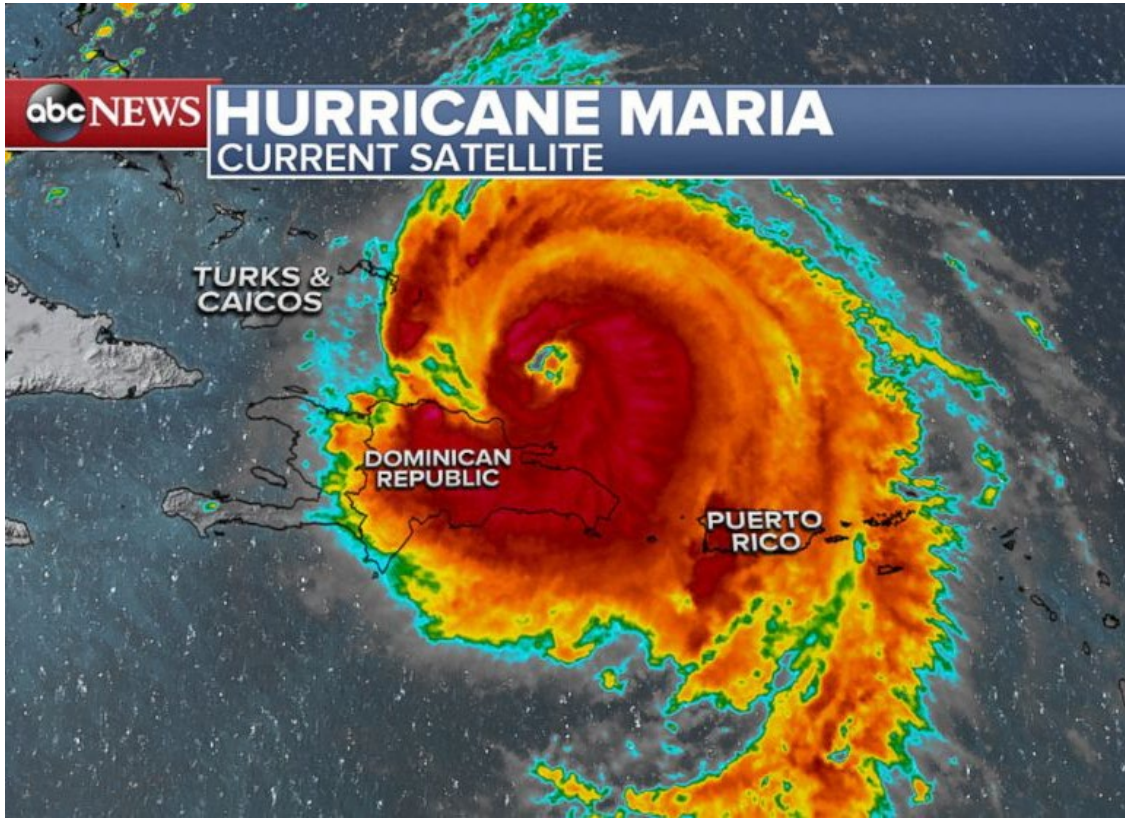
Crisis in 2017 – Hurricanes Irma and Maria

- Hurricane Irma – Cat 5, $700 M in damage
- Hurricane Maria – Cat 4, Sep 20, est. $100 B in damage, est. 2975 deaths
- Flying debris damage
- No power, phone lines disconnected
- Roads blocked
- An antenna fell and tore the dish
- AO resumed within 1 week, powered by generators



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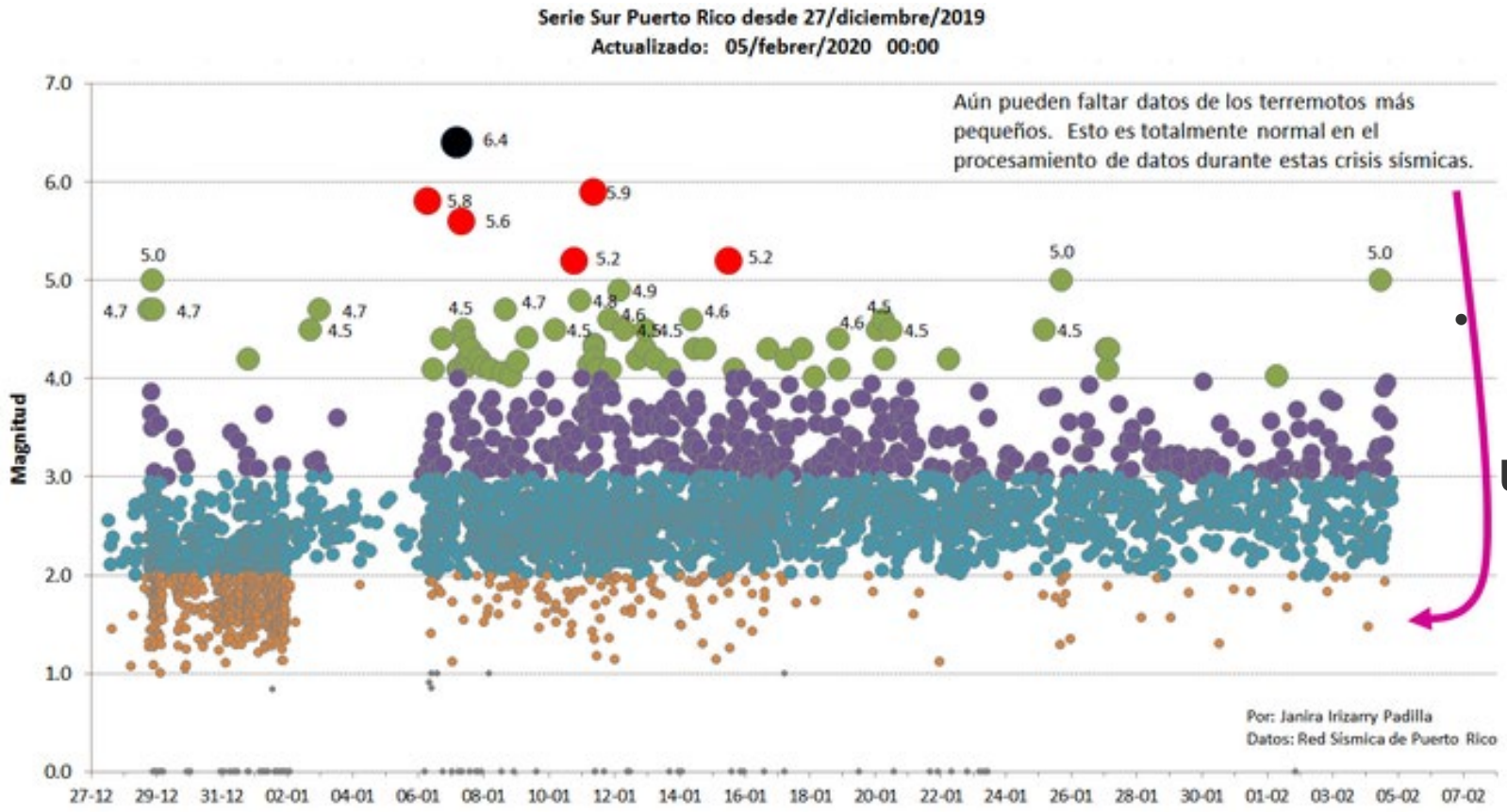
Crisis in 2020 – Swarm of Earthquakes



- Jan 6 – 5.8 magnitude
- Jan 7 – 6.4 magnitude
- Observations put on hold
- No one allowed onsite until the shaking subsided

Photo Credit: https://www.wolthers.com/

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Crisis in 2020 – COVID-19

Government mandated curfew

Staff transitioned to remote work on March 16

Observations halted 9pm-5am Mar16-MAr30

Active radar observations placed on hold

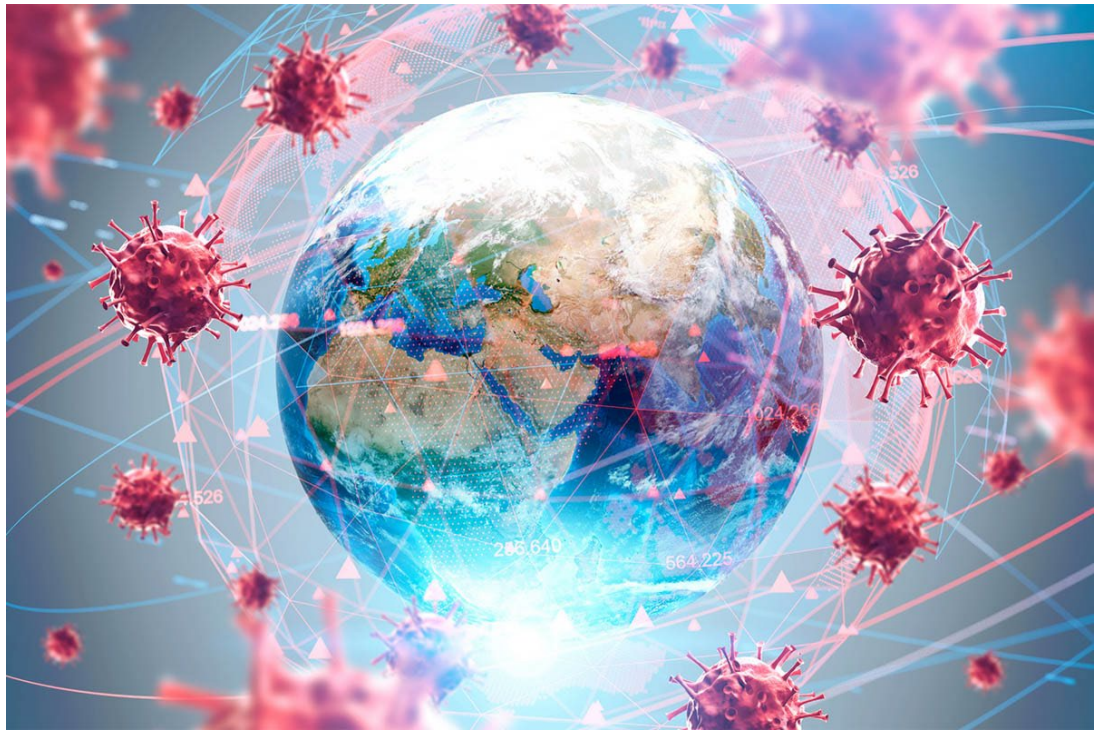

Photo Credit: University of Central Florida

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Crisis in 2020 – Telescope Collapse

Photo Credit: University of Central Florida/AO

- Aug 10 – an auxiliary cable broke
- Nov 6 – main cable broke
- UCF worked on a plan with NSF
- Dec 1 - 900-ton platform fell

Footage of collapse on YouTube: https://www.youtube.com/watch?v=ssHkMWcGat4&t=24s

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Crisis in 2020 – Telescope Collapse

What followed after

- Safety of people
- Assessment of damage – stability of structure
- Environmental assessment
- Find ways to restore operations
- Continue to support scientific community

"Safety of personnel is our number one priority. We already have engineers on site to help assess the damage and determine the stability and safety of the remaining structure."
— Elizabeth Klonoff

UCF's Vice President for Research and Dean of the College of Graduate Studies

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Summary

Challenges

- Geophysical – earthquakes
- Meteorological – hurricanes and tropical storms
- Biological – epidemic

Resilience Plans

- Anticipate risk: Periodic assessments
- Coordination with sponsors
- Safety protocols
- Recovery/restoration plans
- Communication with researchers

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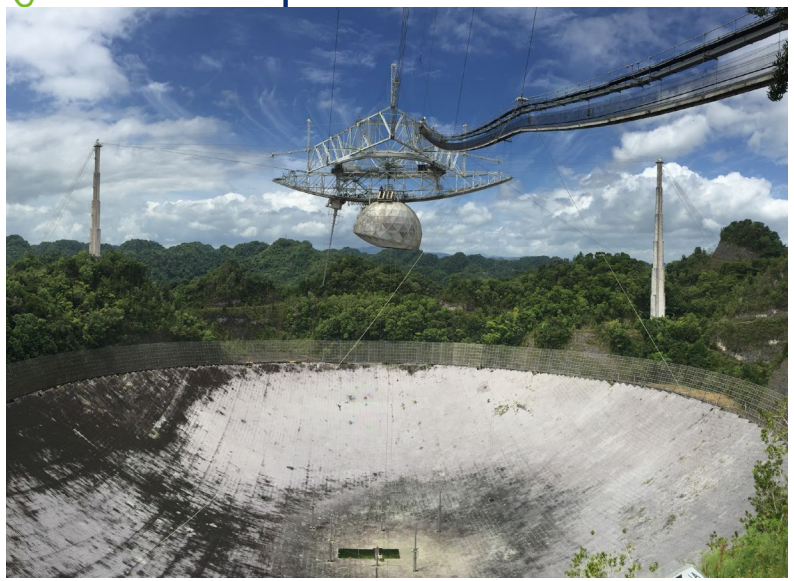

Thank you!

Photo Credit: Shafaq Chaudhry
Disclaimer: Thoughts and opinions expressed in this presentation reflect my own and do not necessarily represent opinions of UCF