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The Impacts on STEM Undergraduate and Graduate Student Experiences of Higher Education's response to COVID-19: Resilience and Innovation in Online Learning and STEM Progression

Sponsor: National Science Foundation

September 22, 2020



The Impacts on STEM Student Experiences of Higher Education's response to COVID-19

Planning Committee:

Tasha Inniss, Spelman College, Chair

Alfred Bryant, Campbell University

Jim Julius, MiraCosta College

Hironai Okahana, Council of Graduate Schools

Juan Ramírez-Lugo, University of Puerto Rico, Rio Pedras

Viji Sathy, University of North Carolina, Chapel Hill

Heather Thiry, University of Colorado, Boulder

NASEM Staff:

Kerry Brenner, BOSE

Maria Lund Dahlberg, BHEW

Matthew Lammers, BOSE

Poll Questions

What is your discipline/field?

Which of these categories describes your institution?

What is your position at your institution/organization?

What is the status of your institution for the Fall 2020 Semester/Quarter?

Impact on Undergraduate and Graduate Students of Higher Education's Response to COVID-19

Panelists:

Craig Ogilvie, Montana State University

Felicia Jefferson, Fort Valley State University

Sherry Pagoto, University of Connecticut

Cassandra Hart, University of California, Davis

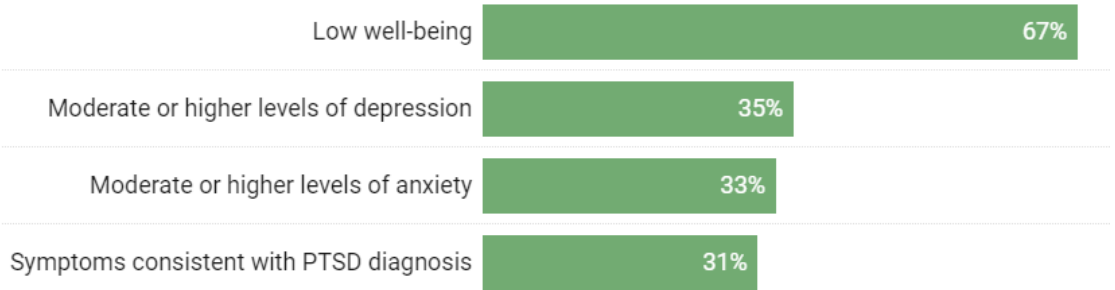
Moderator:

Viji Sathy, University of North Carolina, Chapel Hill

Graduate Student Experiences: Support & Stress During the COVID-19 Pandemic

Craig Ogilvie¹, Colter Ellis¹, Garrett Gowen², Kelly Knight¹, Rosemary Perez³, Sarah Rodriguez⁴, Nina Schweppe¹, Rachel Smith²

- 1. Surveyed graduate students @ 11 universities, June & July, > 4,000 responses
- 2. Mental health at risk



- 1. Only 33% thought institutional policy changes supported their well-being
 - a. 2-to-1 students experienced more support from faculty than upper-level administrators
 - b. Experiences of support were similar for demographic groups; differences being studied
- 2. Educational plans
 - a. 25% expect a delay of 6 months or longer in degree completion
- 3. Career plans
 - a. 25% in STEM fields were pessimistic about pursuing their current career goals
 - b. c.f. 52% humanities students

¹ Montana State University, ² Iowa State University, ³ University of Michigan, ⁴ Texas A&M Commerce

National Academies of Science, Engineering and Medicine



RAPID: Effects of the Move to Online Teaching on the Rural HBCU Community due to the Coronavirus (COVID-19) Pandemic

NSF Award #2028573

Felicia Jefferson, MS, Ph.D.,

Associate Professor

Biology Department, College of Arts & Sciences,

September 22, 2020



RAPID COVID-19

The project at Fort Valley State University seeks to investigate the adaptability and educational outcomes of rural HBCU students, many of whom are members of underserved populations, and faculty who are asked to adopt online course delivery as a result of the COVID-19 pandemic. The effects on student retention and learning, and on faculty turnover will be studied.

The long-term goal of this project is to study the best mechanism of suddenly introducing rural, underserved, and underrepresented populations to online instruction leading to successful academic outcomes. Many students and faculty from rural HBCUs face unique challenges, including the availability of consistent internet access, the availability of tools for online teaching, and readiness for an online teaching environment. The project investigates the impacts of prompt or forced online lecture and laboratory courses on undergraduate chemistry and biology majors. Using Qualtrics, multivariate analysis, and constructivism theory as the theoretical framework, the impacts of adaptability and educational outcomes of rural HBCU students and faculty will be examined. In addition, the project will study the relationship among the instructors who have no knowledge, little knowledge and good knowledge in teaching online courses using multivariate analysis. Pre and post questionnaires will compare the effects of sudden online learning and teaching among the three groups of faculty and students. The project will also provide assistance to faculty for best practices for online teaching, particularly for laboratory courses.

Researchers

Neuroscience, Biology, Engineering, and Sleep (NeuBEs) Laboratory (www.neubefvsu.com)

Faculty

- Dr. Felicia Jefferson, Director

Graduate Students (6)

- Co-Advisor to one Ph.D. and six (6) Master's Students at partnered labs

Undergraduate Students (9)

- Majors/Minors: Biology, Biotechnology, Chemistry, Nuclear Engineering
 1. Zakkyah Brannen-Burton
 2. Amber Davenport
 3. Cassandra Gary-Smith
 4. Tracee Nicole Holmes
 5. Stephanie Johnson
 6. Myron Preston
 7. Jenah Smart
 8. Kebriano Ross
 9. Gabrielle van Genderen

Partnered LABS

- Emory and Atlanta VA Center,
- University of Texas Arlington
- University of Texas Health Science Center

Current Lab Projects: Smart Home tracking for home based elderly patients with Alzheimer's, Effects of Artificial Light at Night (ALAN) on Sleep-Wake Patterns in Rural and Suburban Wildlife, Electromagnetic radiation and bird migratory paths, Neurotoxicological effects of sleep deprivation and cognitive decline, RFID Rat/Pig Model for smart Pills, etc.



A Comparative Analysis of Student Performance in an Online vs. Face-to-Face Environmental Science Course From 2009 to 2016

Jasmine Paul* and Felicia Jefferson

Department of Biology, Fort Valley State University, Fort Valley, GA, United States

A growing number of students are now opting for online classes. They find the traditional classroom modality restrictive, inflexible, and impractical. In this age of technological

Citation: Paul J and Jefferson F (2019) A Comparative Analysis of Student Performance in an Online vs. Face-to-Face Environmental Science Course From 2009 to 2016. *Front. Comput. Sci.* 1:7. doi: 10.3389/fcomp.2019.00007

Dr. Jasmine Paul,
Associate Professor,
Fort Valley State University, Fort Valley, GA 31030

Dr. Paul has significant experience in teaching online lab courses at Fort Valley State University. Dr. Paul also served as research mentor to several undergraduate students in research. Students are challenged to present oral and poster presentations at the Annual Biomedical Research Conferences (ABRCMS) and Annual National Institute of Science/ Beta Kappa Chi Scientific Honor Society each year. Dr. Paul's focus on the research is toward HIV/AIDS and Related Risk Behaviors among African American College Students. Her recent publication is on "A comparative Analysis of Student Performance in an Online vs Face to Face Environmental Science Course from 2009 to 2016" was on Frontiers Computer Science. In the year 2019. (doi.org/10.3389/fcomp).

Dr. Paul also collaborated with Dr. Jefferson to support the research on "The ability of a sleep intervention to increase non-STEM major's interest in STEM fields and their engagement in a STEM course based on sleep quality and/or duration. (ongoing research support). Currently Dr. Paul is working with Dr. Jefferson on the research "Effects of Coronavirus (COVID-19) on the Rural HBCU community with the move to 100% online teaching. NSF-20-052,2020.



Dr. Felicia Jefferson

- Education: *Biotechnology (B.S.) and German Language (B.A.) - (RIT), Molecular Genetics and Biochemistry (M.S.) - (GSU), Neuroscience and Biomedical Science (Ph.D.) - (MSM), Behavioral Neuroscience Research Fellow (Postdoctoral) - (Emory)*
- Appointments: Industry Employment: Bausch & Lomb, Procter & Gamble, Schering-Plough (now Merck), American Management Association, *Positions:* Staff Scientist III, Staff Scientist V, Review Manager, Contributing Editor; Academic: **Fort Valley State University, (Tenured Associate Professor Biology)**

Let us know if you're interested in participating

Contact: jeffersonf@fvsu.edu and paulj@fvsu.edu

- Universities we are working with:

- Bluefield State College
- Chaflin University
- Elizabeth City State University
- Grambling State University
- Kentucky State University
- Louisiana State University
- Mississippi Valley State University
- Morehouse School of Medicine
- Prairie View A&M University
- Rust College
- Selma University
- South Carolina State University
- Southwestern Christian College
- Talladega College
- Tuskegee University
- University of Maryland Eastern Shore
- University of Texas Arlington
- University of Virgin Islands
- Voorhees College
- Wiley College



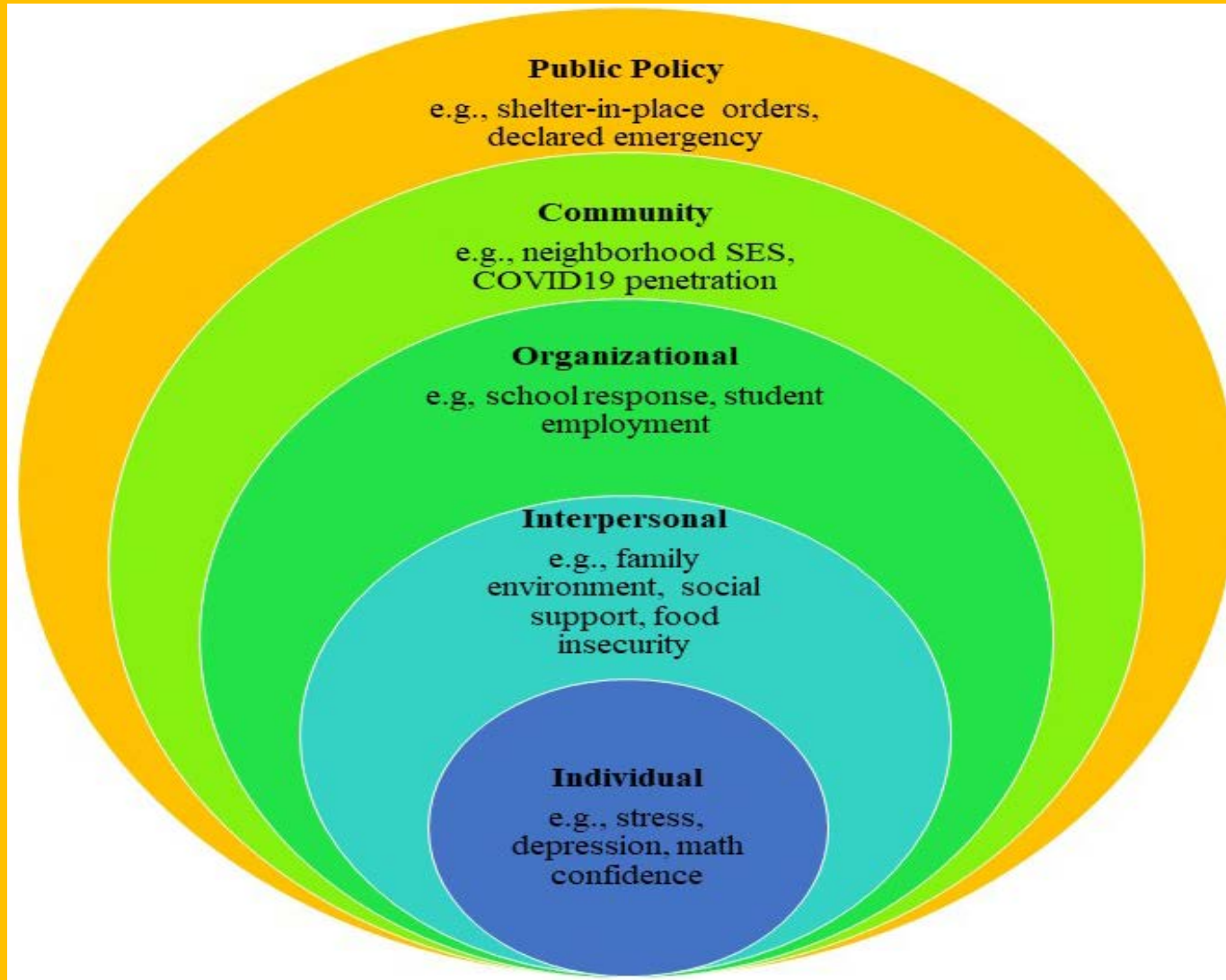
Differential Impacts of the COVID-19 Pandemic on Undergraduate STEM Majors



Sherry Pagoto, PhD, UConn Department of Allied Health Sciences
Nathanial P. Brown, PhD, Penn State Department of Mathematics
Molly Waring, PhD, UConn Department of Allied Health Sciences



A socioecological approach to addressing disproportionate impacts of COVID19 on STEM majors



Challenges Identified

- 1. Certain individual difference factors, home climates, and professor behaviors are not conducive to online learning**
- 2. Students of different backgrounds differ in their preferences for synchronous versus asynchronous learning**
- 3. Strategies used by professors to engage students are received by students differently of different backgrounds**

Research Questions

- 1. How do we measure home educational climate? What tools can universities and professors use to assess this?**
- 2. Which mode of instruction works best for whom? Do student preferences track with performance?**
- 3. Develop and test instructor strategies to enhance engagement in synchronous and asynchronous online learning. Examine effectiveness by student demographic characteristics.**
- 4. Develop and test reentry programs for underrepresented students who take a gap year**

Cassandra Hart

University of California, Davis

Student-Centered Online Learning During COVID-19

Panelists:

Cynthia Brame, Vanderbilt University

Viveka Brown, Spelman College

Mays Imad, Pima Community College

Maxwell Bigman, Stanford University

Tam'ra-Kay Francis, University of Washington

Moderator:

Jim Julius, MiraCosta College

Cynthia Brame, Vanderbilt University

Student-Centered Online Learning: Factors to consider

Community

- ☐ Classroom Culture
- ☐ Growth Mindset (Value of Mistakes)
- ☐ Anti-deficit lens
- ☐ Icebreakers

Support

- ☐ Peer
- ☐ Check-Ins
- ☐ Written Feedback
- ☐ Weekly Checklist

Design

- ☐ Starting with the end
- ☐ Touchpoints
- ☐ Bandwidth (faculty and students)
- ☐ Assessments

Resources:

- ☐ Bandwidth Recovery – Author: Cia Verschelden
- ☐ Limitless Mind – Author: Jo Boaler

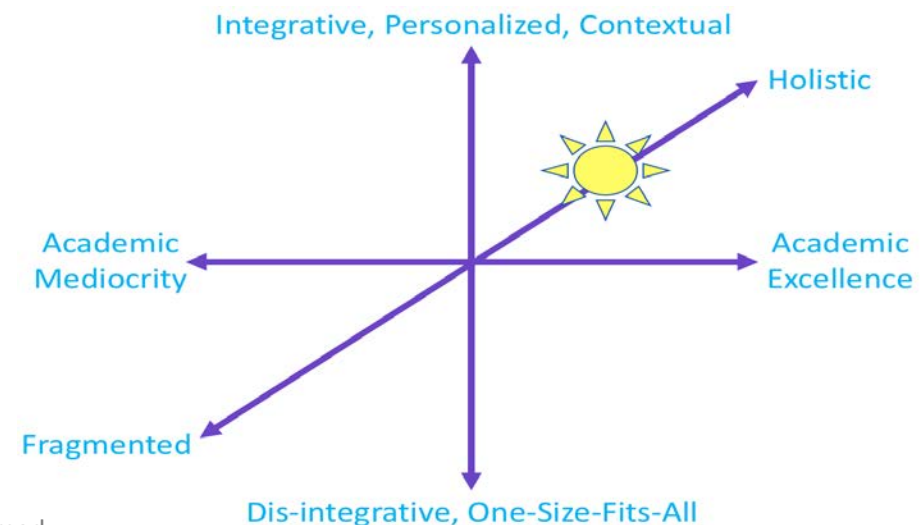
Contact Information: Viveka Brown – vborum@spelman.edu

What does student-centered online learning look like during COVID-19?

Mays Imad, PhD ::: mimad@pima.edu ::: [@Irningsanctuary](https://twitter.com/Irningsanctuary)

Pima Community College – Faculty, Coordinator of Teaching & Learning Center

1. College and university students were struggling with mental health prior to March 2020—the pandemic has acted like an amplifier.
2. Meaningful learning becomes difficult to achieve when basic human needs are not met.
3. Trauma-informed education is intimately connected with equity and restoring justice at the individual and the community levels.



Maxwell Bigman

Stanford University



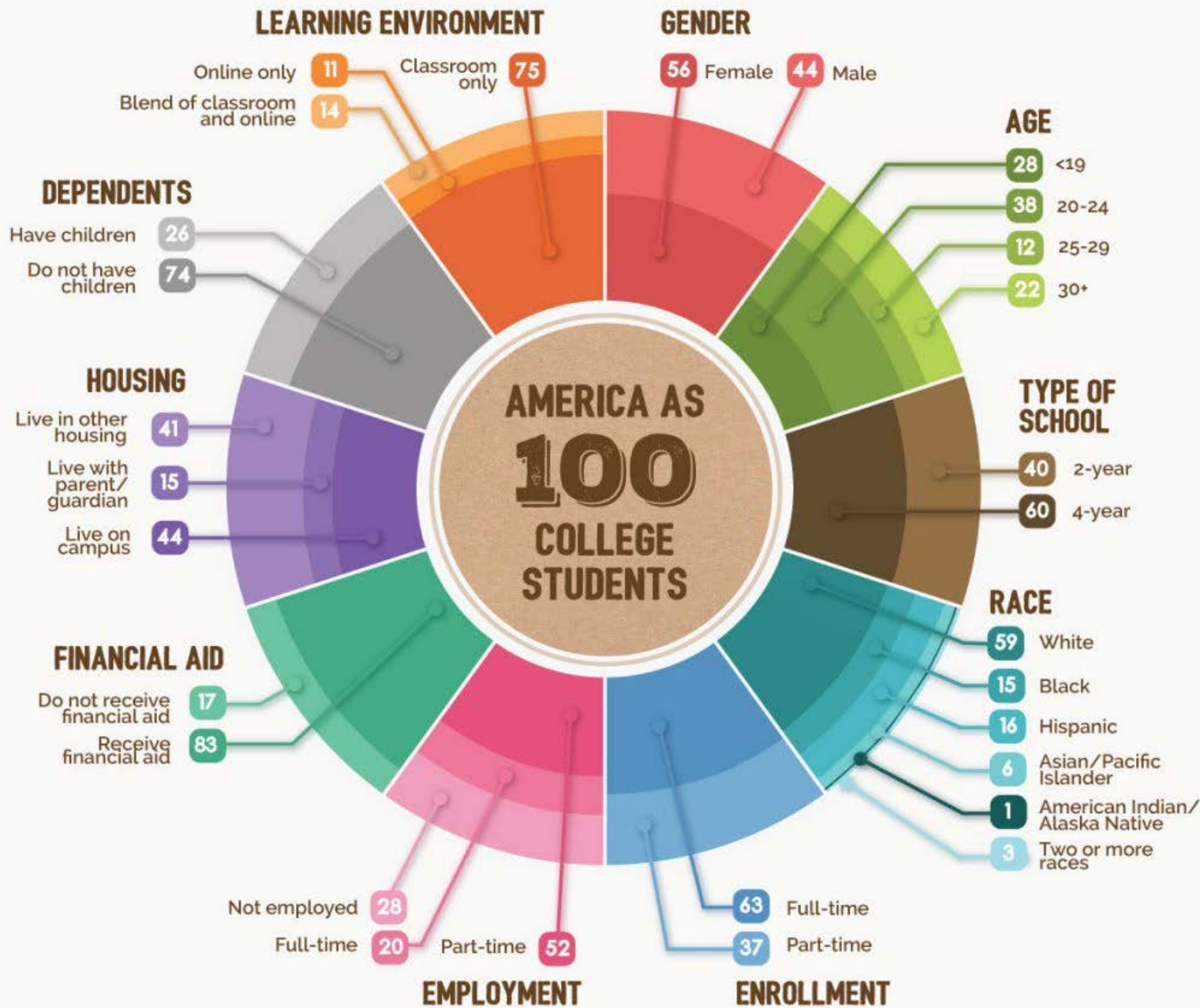
- ❖ How might instructors & students shift from a deficiency mindset to consider what's (uniquely) possible in online learning environments?
 - What does it look like to create learning experiences that go “[beyond being there](#)” in person? How might we create new student-centered course models?
- ❖ How can course designers create opportunities for students to collaborate and meet one another within course structures?
 - Examples: *office hours, virtual study spaces, informal avenues to connect*
- ❖ What might a human-centered approach to course design look like?
 - Take iterative approaches to online course design: experiment, utilize (frequent) feedback and create flexibility for students

Relevant Resources:

[LWMOOCs Paper](#), [Stanford Engineering Magazine Interview](#), [Higher Ed Survey of Covid Reponse](#)

Tam'ra-Kay Francis, PhD

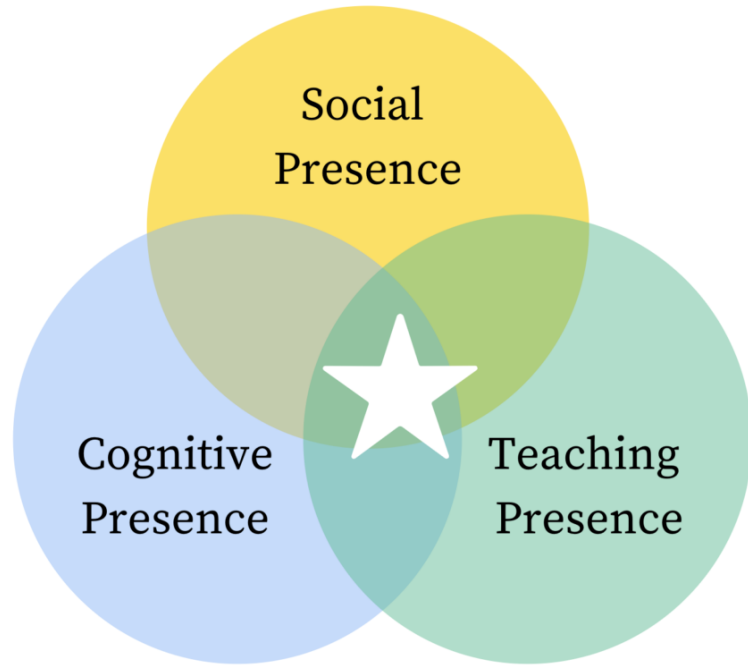
Department of Chemistry
University Washington of Washington



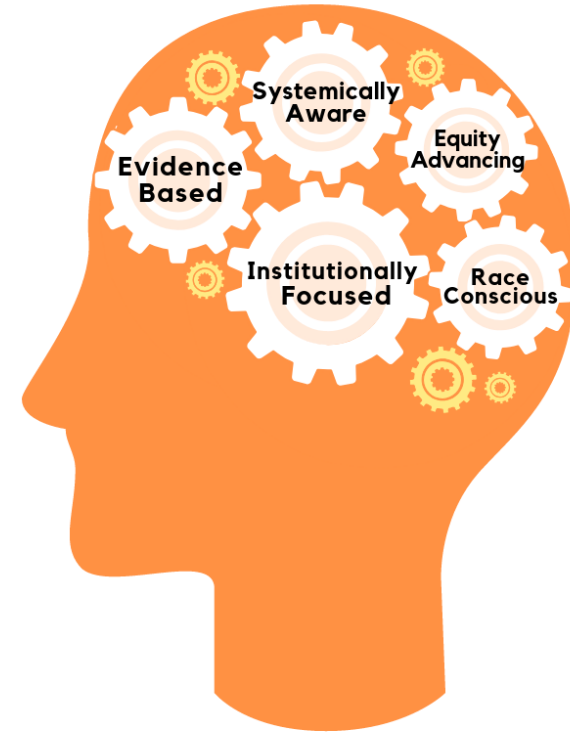
Guiding Question

How do we provide holistic and supportive learning environments for **ALL** our students during a pandemic?

Community of Inquiry



+



- How is the UW STEM community enacting and advancing equity-minded policies, practices and mindsets, in alignment with the University of Washington's Inclusive Excellence-driven initiatives?
- What is an equity-minded indicator of success? How do we know what we are doing well? +

PR²ISM

Pedagogy and Research on Race Identity Social Justice and Meaning



UW Postdoc Diversity Alliance



Website: pr2ism.org

Student Progression in STEM During COVID-19

Panelists:

Erin Shortlidge, Portland State University

Nayda Santiago, University of Puerto Rico, Mayaguez

Eboni Zamani-Gallaher, University of Illinois, Urbana Champaign

Keivan Stassun, Vanderbilt University

Moderator:

Juan Ramírez-Lugo, University of Puerto Rico, Rio Pedras

ERIN E. SHORTLIDGE, PHD

Assistant Professor of Biology

Biology Education Research Group

Portland State University

www.shortlidgegroup.org



NSF S-STEM *Reducing Transfer Shock:
Developing Community, and Collaboration to
Support Urban STEM Transfer Students*





Nayda Santiago, Professor Electrical and Computer Engineering University of Puerto Rico, Mayaguez

Projects

- A Support Ecosystem to Expand Capabilities and Opportunities for STEM Undergraduates Following Hurricane Maria (EECOS)
 - *PI: Monica Alfaro*
 - *Supplement for students suffering after Earthquakes*
 - *26 stem students*
 - *SSTEM*
- Recruiting, Retaining, and Engaging Academically Talented Students from Economically Disadvantaged Groups into a Pathway to Successful Engineering Careers
 - *PI Manuel Jimenez*
 - *Participants: 90 engineering students*
 - *SSTEM*
- Computing Alliance of Hispanic Serving Institutions (CAHSI)
 - Computing Alliance of Hispanic-Serving Institutions--Building a Resilient, Sustainable, and Adaptable CAHSI Ecosystem
 - NSF INCLUDES Alliance: Computing Alliance of Hispanic-Serving Institutions
 - PI Ann Gates
 - Approx 60 institutions
 - INCLUDES, CREST, CNS
- Contact information:
 - Naydag.Santiago@upr.edu
 - <https://www.linkedin.com/in/nayda-g-santiago-a07527140/>



Dr. Eboni M. Zamani-Gallaher, Director
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National Science Foundation Grant Number 1625891

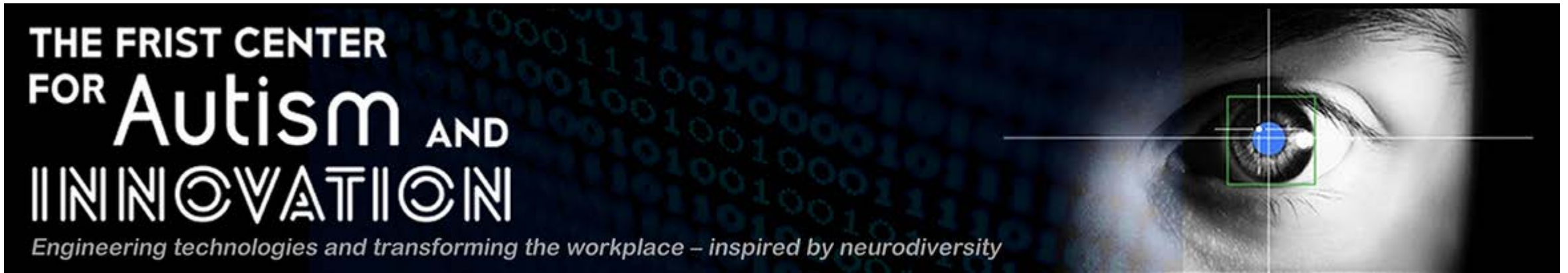


Transitioning Learners to Calculus in
Community Colleges

National Science Foundation Grant Number 1645072

HISPANIC-SERVING COMMUNITY COLLEGES
STEM PIPELINES





Supporting Progress of Neurodiverse Students

Keivan G. Stassun

Stevenson Professor of Physics & Astronomy
Director, Frist Center for Autism & Innovation
Vanderbilt University



Specific supports implemented for Covid

- Regular virtual check-ins with job coach one-on-one:
 - Progress monitoring: Review goals, revisit task checklists, reminders to communicate
 - Executive function: Offer advice on how to handle workloads and when/how to ask for help
 - Mental health: Detect issues early and activate supports quickly
- Social worker / licensed therapist on call
- Virtual hangout to “feel” like co-working space
- Elevate the shared experience – launched a regular webinar series with interns as expert panelists
- Tools for self-paced goal setting and development

Vanderbilt's Frist Center for Autism and Innovation

The Autistics' Roundtable

how the challenges of COVID-19 quarantine
experience of being autistic



presenter
T A McDonald, Ph.D
Faculty Research Instructor
Department of Neurology
family member advocate



moderator
Claire Barnett
self-advocate

wednesday, June 3 from 1-2pm (central)



panelist
**Alex
Lithgow**

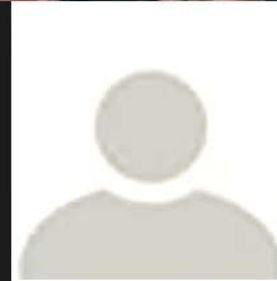


panelist
**Dr. Dave
Caudel**
self-advocate



panelist
**Emery
Hall**
self-advocate

join us at <https://vanderbilt.zoom.us/j/99215636278>



Vanderbilt's Frist Center for Autism and Innovation presents...

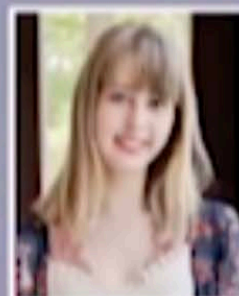
The Autistics' Roundtable Webinar

international perceptions of autism

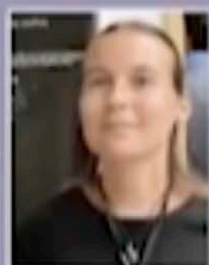


presenter
Thorkil Sonne

Specialisterne, Founder
Denmark



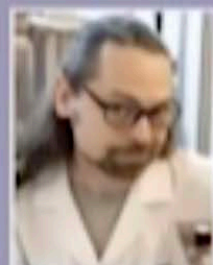
moderator
Claire Barnett
Frist Center Communications Coordinator
self advocate



panelist
Nina Hernitschek
self-advocate
Germany



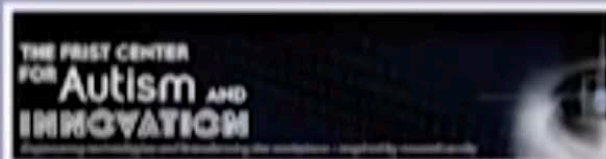
panelist
Yvonne Wu
self-advocate
China



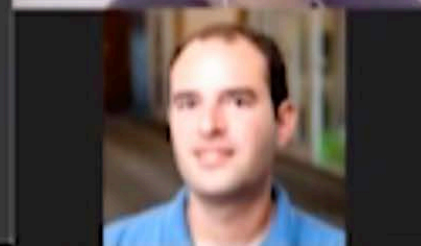
panelist
Dave Caudel
self-advocate
U.S.A.

monday, september 14, 12-1:15pm(central)

join us at <https://vanderbilt.zoom.us/j/98865789335>



VANDERBILT
School of Engineering



THE AUTISTICS'
ROUNDTABLE
WEBINAR:
HOW COVID
QUARRANTINE
MIRRORS THE
ASD EXPERIENCE



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Vanderbilt University



autismandinovation The First Center has launched its YouTube page, and the first ever post is the inaugural installment of our Autistics' Roundtable Webinar! Visit our website or head directly to YouTube to see the full webinar. 📺 🧐 #autism #neurodiversity #covid19 #coronavirus #asd #autistic #webinar #autismspectrum

0...



73 views

JULY 22

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Supporting Teens and Young Adults on the Autism Spectrum: Setting and Pursuing Self-Determined Goals

START COURSE

DETAILS ▾

This toolkit is designed to help people* who support teens and young adults on the autism spectrum set and pursue self-determined goals. For brevity, when we refer to young adults, we are also including teens.

**Teens and adults on the autism spectrum may also find this toolkit helpful. This toolkit may also be beneficial to people who support individuals with a range of disabilities.*

Additional resources can be found in the online version of this toolkit. Register for a free account at triad.vkclearning.org and access the information in the **Caregiver** folder.



Box 6: Goals Other Young Adults Have Set

Daily Living Skills	Clean up bedroom	Do laundry	Cook meals	Learn to drive
Employment	Practice job interview skills	Meet with a counselor to discuss job opportunities	Review job postings	Fill out a job application
Health	Listen to relaxation recordings every day	Drink more water	Eat more vegetables	Exercise more
Independence	Get a driver's license	Live independently	Take the bus to a friend's house	Fly to visit grandparents on the East Coast
Leisure, recreation and hobbies	Read books	Bake desserts for the holidays	Play guitar	Create art
Relationships	Find a girlfriend/boyfriend	Network and meet new people at work	Visit relatives	Plan a fun weekend with friends

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