# Scholars Reception

*Honoring faculty scholarship from 2019-2023*

May 2, 2023

Bergen Community College

# DR. BROCK FISHER

*Vice President of Academic Affairs*

# DR. ERIC M. FRIEDMAN

*President*

# DR. URSULA PARRISH DANIELS

*Professor Emerita*

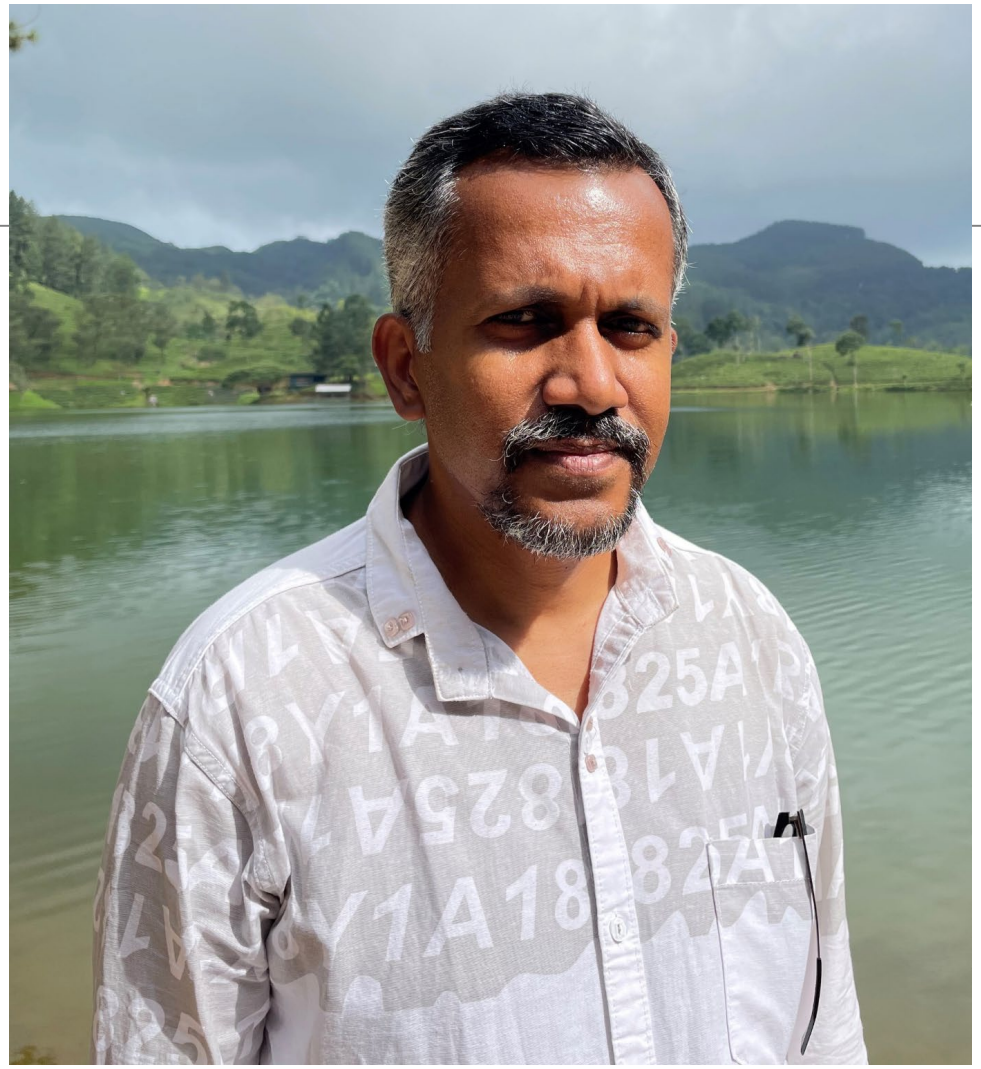
# PROF. SARA MASTELLONE

*Mathematics*

# 13 Ways to Create An Equitable Learning Environment

1. Increase wait time
2. Separate instruction from management
3. Intentionality
4. Class grouping
5. Collaborative Learning
6. Alert students to issues of equity
7. Code yourself
8. Don’t rely on volunteers to answer in class
9. Create strategies to involve all students
10. Individual meetings with some students or groups
11. Teacher geographic mobility
12. Be sure teaching materials and displays in the classroom reflect all types of students in non-stereotypical pursuits
13. Eliminate put-downs of all kinds

Based on the work of Myra and David Sadker (Failing at Fairness) and Thomas L. Good and Jere E. Brophy (Looking in Classrooms)



# DR. NEEL HALDOLAARACHCHIGE

*Physical Sciences*

# RESEARCH HIGHLIGHTS

## FROM 2019 - 2023


## Neel Haldolaarachchige, Ph.D.

### Assistant Professor of Physics, *Department of Physical Sciences*


### Research Students

- 2019-2020: Jean Alvarez, David Gordon, Jaeyoung Hwang, Shogo Nakaza, Michael Giarratana
- 2020-2021: Svetlana Doroshevich, Nami Uchida, John Totaro, Ymer Dinoshi, Alexandra Cortez, Priscilla Fujimura
- 2021-2022: Omar Alhaj, Yeraldine Ohoa

### Collaborators

- Dr. Satya Kushwaha, John Hopkins University
- Dr. K. Hettiarachchilage, City University of New York

# LIST OF PUBLICATIONS FROM 2019 - 2023

## Peer reviewed journal articles

1) First Principles Computation of New Topological B2X2Zn (X = Ir, Rh, Co) Compounds, ***Multidisciplinary Scientific Journal (J) 2023***, 6(1), 152-163; https://doi.org/10.3390/j6010011
2) Comparison of student performance between virtual and in-person modalities of introductory calculus-based physics, ***Physics Education 2022***, 57 (6), 065008, https://doi.org/10.1088/1361-6552/ac840a
3) Remarkable Topological Features of Electronic Band Dispersion of IrGa and RhGa Compounds from First Principles, Journal of ***Undergraduate Research in Physics (JURP), 2022***, 31 (1), https://www.spsnational.org/jurp/2022/
4) Computational Prediction of New Series of Topological Ternary Compounds LaXS (X = Si, Ge, Sn) from First-Principles, ***Multidisciplinary Scientific Journal (J), 2021***, 4 (4), 577-588, https://doi.org/10.3390/j4040042

## Non-peer reviewed journal articles

1) A Set of Virtual Experiments of Fluids, Waves, Thermodynamics, Optics, and Modern Physics for Virtual Teaching of Introductory Physics, ***Arxiv, 2021, Cornel University***, https://doi.org/10.48550/arXiv.2101.00993
2) Introductory E & M Lab Manual for Virtual Teaching, ***Arxiv, 2020, Cornel University,*** https://doi.org/10.48550/arXiv.2012.13278
3) Lab Manual of Introductory Physics-I for Virtual Teaching, ***Arxiv, 2020, Cornel University,*** https://doi.org/10.48550/arXiv.2012.09151

## Internal (BCC use only) publications

1) Lab manual for Calculus-based physics I (PHY280)
2) Lab manual for Calculus-based physics II (PHY290)
3) Lab manual for Calculus-based physics III (PHY291)

## International conference presentations

1) First-principles computational prediction of new topological compound, ***APS March Meeting 2022***, G00. 039 https://ui.adsabs.harvard.edu/abs/2022APS..MARG00039H/abstract
2) Computational prediction of a new topological ternary compound from first-principles, ***APS March Meeting 2021***, H71. 019, https://ui.adsabs.harvard.edu/abs/2021APS..MARH71019H/abstract
3) Computational investigation of new topological candidate showing multiple Dirac crossings near Fermi Energy, ***APS March Meeting 2021***, E56. 005, https://ui.adsabs.harvard.edu/abs/2021APS..MARH71019H/abstract
4) Development of virtual introductory physics class and lab manual for virtual experiments with open educational resources (OER), ***APS March Meeting 2021***, C15. 013, https://ui.adsabs.harvard.edu/abs/2021APS..MARC15013H/abstract
5) The magnetic structure of a strongly correlated rare-earth based intermetallic system Au2PrIn, ***APS March Meeting 2020***, 65, C71, https://meetings.aps.org/Meeting/MAR20/Session/C71.37
6) Investigation of correlation of chemical structure and electronic band structure of Fe-Ga system, ***APS March Meeting 2019***, G70. 009, https://ui.adsabs.harvard.edu/abs/2019APS..MARG70009A/abstract

# DEVELOPMENT OF OPEN EDUCATION RESOURCES

- *Two types of lab manuals were developed,* one for ***virtual teaching*** and one for ***in-person teaching***
- *6 lab manuals were developed for calculus-based physics sequence,* Physics I (PHY280), Physics II (PHY290), Physics III (PHY291)
- *Each lab manual consists of 12 lab experiments and altogether 36 lab experiments.*

- *Virtual lab manual makes online teaching possible for sequence of physics classes.*
- *All lab experiments for virtual teaching new design with OER simulations.*
- *About half of the total in-person lab experiments redesigned*

**In-person lab manuals published internally**

1) Lab manual for Calculus-based physics I (PHY280)
2) Lab manual for Calculus-based physics II (PHY290)
3) Lab manual for Calculus-based physics III (PHY291)

**Virtual lab manuals published externally**

1) Lab manual for virtual teaching of Phsyics I, ***Arxiv, 2021, Cornel University***, https://doi.org/10.48550/arXiv.2101.00993
2) Lab manual for virtual teaching of Physics II, ***Arxiv, 2020, Cornel University,*** https://doi.org/10.48550/arXiv.2012.13278
3) Lab Manual for virtual teaching of Physics III, ***Arxiv, 2020, Cornel University,*** https://doi.org/10.48550/arXiv.2012.09151

# PHYSICS EDUCATION - INVESTIGATION OF STUDENT PERFORMANCE

- Investigated one of the hardest STEM course (*calculus-based physics I*) for any engineering/science majors.
- Historically this class has very high drop out rate and failing rate.

***Research Questions***

- Does *class modality* (virtual or in-person) affect student performance?
- Does the type of *assessment affect* student performance?
- Does student's *background knowledge* of conceptual physics affect student performance?
- Does student's *math level* (completed calculus-I or not) affect student performance?

*We found that,*

- *class modality (in-person or virtual) does not correlate* with student performance
- student can perform well with *shorter continuous mid semester assessments*.
- *very little correlation between students' math background and class performance*

- Results were published in peer-reviewed journal of ***Physics Education 2022***, 57 (6), 065008, https://doi.org/10.1088/1361-6552/ac840a

# COMPUTATIONAL MATERIAL SCIENCE - QUANTUM MATTER SIMULATION

- Searching for *new electronic materials* for next generation electronic applications
- Plan is to find new material and predict its physical properties.
- This needs *solving **quantum** mechanical problem*
- That needs a use of supercomputing cluster
- We used *ACCESS supercomputing cluster* funded by NSF
- We found few interesting new materials with remarkable electronic properties.
- Two materials show *electron motion speed increases by $10^9$* (billion times) relative to electron speed in Silicone wafers *(all electronic circuit today based on silicon wafer)*

- Received ***NSF grant*** *to use the supercomputing cluster* system called ***ACCESS*** (**A**dvanced **C**yberinfrastructure **C**oordination **E**cosystem: **S**ervices & **S**upport).

*This is a long-term project and so far, we published 3 peer reviewed articles.*

- Multidisciplinary Scientific Journal (J) **2023**, 6(1), 152-163 https://doi.org/10.3390/j6010011
- Journal of Undergraduate Research in Physics (JURP), **2022**, 31 (1), https://www.spsnational.org/jurp/2022/
- Multidisciplinary Scientific Journal (J), **2021**, 4 (4), 577-588 https://doi.org/10.3390/j4040042

*Thank you!*

# DR. MELISSA KRIEGER

## *Education*

# *Meditation and Community College Students' Sense of Belonging, Self-Efficacy, and Coping Skills*

Maryville University of St. Louis
Leadership in Higher Education, Ed.D

**Melissa Krieger, Ed.D**
**Associate Professor**
**Education Program**
**May 2, 2023**

# Mixed Methods Action Research Project

Quantitative data collected through a 10 point Likert-scale survey tool (Zajacova et al., 2005)

- Analysis of means and standard deviations

Qualitative data collected through open-ended survey and field notes

- Coded for themes and sub-themes

# Implications

Student-faculty interaction outside of class seemed to be the most influential factor related to students' perception of sense of belonging, self-efficacy and their ability to cope.

…the meditation intervention was the vehicle toward student participants seeking to schedule post-session discussions and meetings.

# Why is student-faculty interaction outside of class so valuable?

- Provides experiences to help new students to see themselves as "college students" (Self-awareness)
- Supports development of the perception that their input matters (mattering)
- Allows for opportunities to discuss and seek college resources (self-efficacy)
- Positive experiences and connection with resources (Interdependence)
- Increased confidence (sense of belonging)

# Student-Faculty Interaction and Student Development

- Interdependence with college representatives supports nonacademic skills development, particularly development of self-efficacy skills (Astin, 1983; Chickering & Reisser, 1993; Flory, 2020; Johnson, 2009; Karp et al., 2008).
- Interactions with faculty and staff outside of class fosters a sense of belonging (Harper & Quaye, 2009; Strayhorn, 2018; Tinto, 1997; 2012)
- While meditation is a proven stress reducer (Ramasubramanian, 2016; Seppälå et al., 2020), the value of the meditation sessions was the springboard to increased interactions between me and student participants.

# References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Johnson, M. (2009). Community college students' perceptions of stress. *Biology of Exercise, 5*(1), 15-27.

Karp, M. M., O'Gara, L., & Hughes, K. L. (2008). *Do support services at community colleges encourage success or reproduce disadvantage? An exploratory study in two community colleges* (CCRC Working Paper No. 10). Community College Research Center. Columbia University. https://ccrc.tc.columbia.edu/publications/do-support-services-encourage-success.html

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Krieger, M.S. (Oct. 2022). *Mindfulness meditation: a new best practice.* Innovations. National Institute of Staff and Organizational Development (NISOD). https://www.nisod.org/tag/mindfulness/

Krieger, M.S. (May 2022). *More than relaxing: The influence of meditation.* NISOD Conference. Austin. https://www.nisod.org/downloads/2022_Program_Web.pdf

Krieger, M.S. (May 2022). *Creating pipelines for future teachers.* American Association of Colleges and Universities (AACU) Annual Convention. New York City

Krieger, M.S. (April 2022). *Pipelines for teacher education candidates.* Hudson County Community College's Social Justice Symposium. https://www.hccc.edu/page/symposium-agenda.html

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Krieger, M.S. (Sept. 2021). *Community college opens doors to a diverse teaching force.* NJEA Review. https://www.njea.org/community-colleges-open-doors-to-a-diverse-teaching-force/

# DR. JOHN FINDURA

*Writing Center Supervisor and English*


# PROF. JOANNA CAMPBELL
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