

Contact Information


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Research Interests

My research program concentrates on the physics of multi-hadron reactions to study the excited hadron spectrum from Quantum Chromodynamics. I employ theoretical tools such as lattice field theory and reaction theory to connect the dynamics of quarks & gluons to resonance phenomena.

Education

- | | |
|--|----------|
| Doctor of Philosophy <i>Major: Physics</i>
Indiana University | May 2019 |
| <ul style="list-style-type: none">• Dissertation – <i>Studies in Multiparticle Scattering Theory</i>  pdf• Advisor – Prof. Adam P. Szczepaniak | |
| Master of Science <i>Major: Physics</i>
Indiana University | May 2017 |
| Bachelor of Science <i>Major: Physics</i>
Purdue University Northwest | May 2013 |
| Bachelor of Science <i>Major: Mechanical Engineering, Minor: Applied Mathematics</i>
Purdue University Northwest | May 2011 |

Employment

Academic Appointments

- | | |
|---|---------------------|
| Assistant Professor
William & Mary – Physics Department | Aug 2023 – present |
| Postdoctoral Scholar
University of California, Berkeley – Physics Department | Feb 2023 – Aug 2023 |
| Adjunct Associate Professor
Old Dominion University – Physics Department | Aug 2022 – Aug 2023 |
| Postdoctoral Fellow
Old Dominion University – Physics Department | Jun 2019 – Feb 2023 |
| Nuclear Engineering Associate (Special Term Appointment)
Argonne National Laboratory – Nuclear Science and Engineering Division | Jan 2013 – Jan 2014 |

Affiliated Positions

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|---|---------------------|
| Associate Staff Scientist
Thomas Jefferson National Accelerator Facility - Theory Division | Aug 2023 – present |
| Affiliated Scientist
Lawrence Berkeley National Laboratory – Nuclear Science Division, Nuclear Theory | Feb 2023 – Jan 2024 |

Teaching & Research Assistantships

Research Associate Indiana University – Department of Physics	Jan 2014 – May 2019
Assistant Instructor Indiana University – Department of Physics	Fall 2017, Fall 2015, Fall 2013
Research Aide Argonne National Laboratory – Nuclear Science and Engineering Division	Aug 2012 – Jan 2013
Intern (Student Research Program) Argonne National Laboratory – Nuclear Science and Engineering Division	May 2012 – Aug 2012
Limited-Term Lecturer Purdue University Northwest – Department of Chemistry and Physics	Jun 2011 – May 2013
Teaching Assistant Purdue University Northwest – Mechanical & Civil Engineering Department	Jan 2010 – Dec 2010
Supplemental Instructor Academic Resource Center, Purdue University Northwest	Aug 2009 – Sep 2011

Affiliations & Associations

US Lattice Quantum Chromodynamics (USQCD) Member	2024 – present
Exotic Hadron Collaboration (ExoHad) Full member	2023 – present
Hadron Spectrum Collaboration (HadSpec) Full member	2019 – present
Joint Physics Analysis Center (JPAC) Affiliated member, former Full member	2013 – present
COMPASS Collaboration Limited Membership	2015 – 2019
American Physical Society Division of Particles and Fields, Division of Nuclear Physics, Topical Group on Hadronic Physics	since 2011

Honors, Prizes, & Awards

The 2021 Jefferson Science Associates Postdoctoral Prize Annual award for postdoctoral researchers with a prize of a \$10,000 grant for research activities.	2021
Konopinski Dissertation Award Dissertation award for Ph.D. students in Physics at Indiana University.	Spring 2019
Outstanding Graduate Student in Research Award Awarded to graduate students in physics for excellence in research.	Spring 2019
The Professor Brian D. Serot Fellowship Fellowship support for Ph.D. students studying theoretical nuclear physics.	Fall 2018
JSA Junior Scientist Travel Award Travel stipends from the Jefferson Science Associates.	2017, 2018, and 2019

Teaching

Courses Taught

William & Mary

- The Standard Model of Particle Physics** | PHYS 772 Spring 2025
Elective course for graduate students in physics on modern particle theory.
Also taught Spring 2024. Student evaluations (out of 5): 5.00.
- Classical Mechanics of Waves and Particles II** | PHYS 303 Fall 2024
Elective course for undergraduate students in physics on classical mechanics.
Student evaluations (out of 5): 4.60.
- General Physics I - Problem Session** | PHYS 101P (4 sections) Fall 2023
Weekly one-hour problem session for introductory calculus-based physics.
Student evaluations (out of 5): 4.30.

Old Dominion University

- University Physics I** | PHYS 226/231/261 Fall 2022
Introductory calculus-based course on mechanics and wave-motion.

Indiana University

- Physics 2 - Discussion** | PHYS 222 Spring 2017
Assistant Instructor for the introductory calculus-based course on electromagnetism and optics.
Also taught Spring 2015.
- General Physics 1 - Laboratory** | PHYS 201 Fall 2013
Assistant Instructor for the introductory algebra-based course on mechanics and wave-motion.

Purdue University Northwest

- Heat, Electricity and Optics - Laboratory** | PHYS 25100 Spring 2013
Teaching Assistant for the introductory calculus-based course on thermodynamics, electricity, and optics.
Also taught Spring 2011, Fall 2011, Fall 2012.
- General Physics I - Laboratory** | PHYS 22000 Spring 2012
Teaching Assistant for the introductory algebra-based course on mechanics and wave-motion.
- Mechanics - Laboratory** | PHYS 15200 Summer 2011
Teaching Assistant for the introductory calculus-based course on mechanics and wave motion.

Graduate Student Supervision

- Nicholas Chambers** Spring 2023 – present
William & Mary Ph.D. candidate researching topics in Lattice QCD.

Undergraduate Student Supervision

- Archana “Archie” Parameswaran** Fall 2024 – present
William & Mary undergraduate student researching topics in three-body scattering.
- Ryan Speegle** Fall 2024 – present
William & Mary undergraduate student researching topics in three-body scattering.
- Aaron Nussbaum** Spring 2023 – present
William & Mary undergraduate student researching topics in three-body scattering.
- Connor Cassiday** Spring 2023 – present
William & Mary undergraduate student researching topics in three-body scattering.
Honors Thesis: *Revisiting the Role of One-Pion Exchange in the Omega Meson*

Mentoring & Outreach Activities

Outreach Programs

N3AS Undergraduate Research Program Science project mentor at UC Berkeley.	Spring/Summer 2023
REYES Mentor Program Online mentorship program through the Remote Experience for Young Engineers and Scientists, included 180 students ranging from high school to graduate school educations. Also Summer 2021 and 2022.	Summer 2023
Engineering Summer Program Instructor & Group Leader for Purdue University Northwest Three week program for local middle- and high-school students. Also Summer 2010.	Summer 2011

Student Mentees

Tess Messerer UC Berkeley undergraduate researching topics in nuclear reaction theory.	2023
Adriana Baniecki High School student who continued research after the 2021 REYES Mentor Program.	2021 – 2023
Taylor Powell Old Dominion University undergraduate student researching topics in three-body scattering.	2021 – 2022
Ajah Harris James Madison University undergraduate student researching topics in three-body scattering.	Summer 2021
Connor McCarty High School student researching topics in three-body scattering.	2019 – 2020
Kevin Saldaña CSU Bakersfield undergraduate student researching topics in three-body scattering.	Summer 2018

Publications

Citation count (according to inspirehep.net) as of January 17, 2025:
1,153 total citations to 33 published papers at an average of 34.9 cites/paper, h -index of 20

Preprints

- [1] **“Finite-volume quantization condition from the N/D representation”**
S. M. Dawid, A. W. Jackura, and A. P. Szczepaniak
[arXiv:2411.15730](https://arxiv.org/abs/2411.15730) [[hep-lat](https://arxiv.org/abs/2411.15730)] (Nov. 2024) *submitted to Phys. Rev. Lett.*
- [2] **“Partial-wave projection of relativistic three-body amplitudes”**
R. A. Briceño, C. S. R. Costa, and A. W. Jackura
[arXiv:2409.15577](https://arxiv.org/abs/2409.15577) [[hep-ph](https://arxiv.org/abs/2409.15577)] (Sept. 2024) *accepted to Phys. Rev. D*

Refereed Journal Publications

- [1] **“Electroweak three-body decays in the presence of two- and three-body bound states”**
R. A. Briceño, A. W. Jackura, D. A. Pefkou, and F. Romero-López
JHEP **05**, 279 (2024) [📄](#) [pdf](#)
- [2] **“Partial-wave projection of the one-particle exchange in three-body scattering amplitudes”**
A. W. Jackura and R. A. Briceño
Phys. Rev. D **109**, 096030 (2024) [📄](#) [pdf](#)
- [3] **“Evolution of Efimov states”**
S. M. Dawid, M. H. E. Islam, R. A. Briceño, and A. W. Jackura
Phys. Rev. A **109**, 043325 (2024) [📄](#) [pdf](#)

- [4] **“Prospects for $\gamma^*\gamma^* \rightarrow \pi\pi$ via lattice QCD”**
R. A. Briceño, A. W. Jackura, A. Rodas, and J. V. Guerrero
Phys. Rev. D **107**, 034504 (2023) [↗](#) pdf
- [5] **“Three-body scattering and quantization conditions from S-matrix unitarity”**
A. W. Jackura
Phys. Rev. D **108**, 034505 (2023) [↗](#) pdf
- [6] **“Two-current transition amplitudes with two-body final states”**
K. H. Sherman, F. G. Ortega-Gama, R. A. Briceño, and A. W. Jackura
Phys. Rev. D **105**, 114510 (2022) [↗](#) pdf
- [7] **“Novel approaches in hadron spectroscopy”**
M. Albaladejo et al.
Prog. Part. Nucl. Phys. **127**, 103981 (2022) [↗](#) pdf
- [8] **“On-shell representations of two-body transition amplitudes: Single external current”**
R. A. Briceño, A. W. Jackura, F. G. Ortega-Gama, and K. H. Sherman
Phys. Rev. D **103**, 114512 (2021) [↗](#) pdf
- [9] **“Solving relativistic three-body integral equations in the presence of bound states”**
A. W. Jackura, R. A. Briceño, S. M. Dawid, M. H. E. Islam, and C. McCarty
Phys. Rev. D **104**, 014507 (2021) [↗](#) pdf
- [10] **“Consistency checks for two-body finite-volume matrix elements: II. Perturbative systems”**
R. A. Briceño, M. T. Hansen, and A. W. Jackura
Phys. Rev. D **101**, 094508 (2020) [↗](#) pdf
- [11] **“Consistency checks for two-body finite-volume matrix elements: Conserved currents and bound states”**
R. A. Briceño, M. T. Hansen, and A. W. Jackura
Phys. Rev. D **100**, 114505 (2019) [↗](#) pdf
- [12] **“Moments of angular distribution and beam asymmetries in $\eta\pi^0$ photoproduction at GlueX”**
V. Mathieu, M. Albaladejo, C. Fernández-Ramírez, A. W. Jackura, M. Mikhasenko, A. Pilloni, and A. P. Szczepaniak
Phys. Rev. D **100**, 054017 (2019) [↗](#) pdf
- [13] **“Equivalence of three-particle scattering formalisms”**
A. W. Jackura, S. M. Dawid, C. Fernández-Ramírez, V. Mathieu, M. Mikhasenko, A. Pilloni, S. R. Sharpe, and A. P. Szczepaniak
Phys. Rev. D **100**, 034508 (2019) [↗](#) pdf
- [14] **“Three-body scattering: Ladders and Resonances”**
M. Mikhasenko, Y. Wunderlich, A. Jackura, V. Mathieu, A. Pilloni, B. Ketzer, and A. P. Szczepaniak
JHEP **08**, 080 (2019) [↗](#) pdf
- [15] **“Interpretation of the LHCb $P_c(4312)^+$ Signal”**
C. Fernández-Ramírez, A. Pilloni, M. Albaladejo, A. Jackura, V. Mathieu, M. Mikhasenko, J. A. Silva-Castro, and A. P. Szczepaniak
Phys. Rev. Lett. **123**, 092001 (2019) [↗](#) pdf
- [16] **“Determination of the pole position of the lightest hybrid meson candidate”**
A. Rodas et al.
Phys. Rev. Lett. **122**, 042002 (2019) [↗](#) pdf
- [17] **“Pole position of the $a_1(1260)$ from τ -decay”**
M. Mikhasenko et al.
Phys. Rev. D **98**, 096021 (2018) [↗](#) pdf
- [18] **“Phenomenology of Relativistic $3 \rightarrow 3$ Reaction Amplitudes within the Isobar Approximation”**
A. Jackura, C. Fernández-Ramírez, V. Mathieu, M. Mikhasenko, J. Nys, A. Pilloni, K. Saldaña, N. Sherrill, and A. P. Szczepaniak
Eur. Phys. J. C **79**, 56 (2019) [↗](#) pdf

- [19] **“Regge phenomenology of the N^* and Δ^* poles”**
 J. A. Silva-Castro et al.
 Phys. Rev. D **99**, 034003 (2019) [📄](#) pdf
- [20] **“Structure of Pion Photoproduction Amplitudes”**
 V. Mathieu, J. Nys, C. Fernández-Ramírez, A. N. Hiller Blin, A. Jackura, A. Pilloni, A. P. Szczepaniak, and G. Fox
 Phys. Rev. D **98**, 014041 (2018) [📄](#) pdf
- [21] **“Global analysis of charge exchange meson production at high energies”**
 J. Nys, A. N. Hiller Blin, V. Mathieu, C. Fernández-Ramírez, A. Jackura, A. Pilloni, J. Ryckebusch, A. P. Szczepaniak, and G. Fox
 Phys. Rev. D **98**, 034020 (2018) [📄](#) pdf
- [22] **“What is the right formalism to search for resonances? II. The pentaquark chain”**
 A. Pilloni et al.
 Eur. Phys. J. C **78**, 727 (2018) [📄](#) pdf
- [23] **“Khuri–Treiman equations for $\pi\pi$ scattering”**
 M. Albaladejo, N. Sherrill, C. Fernández-Ramírez, A. Jackura, V. Mathieu, M. Mikhasenko, J. Nys, A. Pilloni, and A. P. Szczepaniak
 Eur. Phys. J. C **78**, 574 (2018) [📄](#) pdf
- [24] **“Vector Meson Photoproduction with a Linearly Polarized Beam”**
 V. Mathieu, J. Nys, C. Fernández-Ramírez, A. Jackura, A. Pilloni, N. Sherrill, A. P. Szczepaniak, and G. Fox
 Phys. Rev. D **97**, 094003 (2018) [📄](#) pdf
- [25] **“Studying the $P_c(4450)$ resonance in J/ψ photoproduction off protons”**
 A. N. Hiller Blin, C. Fernández-Ramírez, A. Jackura, V. Mathieu, V. I. Mokeev, A. Pilloni, and A. P. Szczepaniak
 Few Body Syst. **59**, 104 (2018) [📄](#) pdf
- [26] **“What is the right formalism to search for resonances?”**
 M. Mikhasenko et al.
 Eur. Phys. J. C **78**, 229 (2018) [📄](#) pdf
- [27] **“Features of $\pi\Delta$ Photoproduction at High Energies”**
 J. Nys et al.
 Phys. Lett. B **779**, 77–81 (2018) [📄](#) pdf
- [28] **“Analyticity Constraints for Hadron Amplitudes: Going High to Heal Low Energy Issues”**
 V. Mathieu, J. Nys, A. Pilloni, C. Fernández-Ramírez, A. Jackura, M. Mikhasenko, V. Pauk, A. P. Szczepaniak, and G. Fox
 EPL **122**, 41001 (2018) [📄](#) pdf
- [29] **“New analysis of $\eta\pi$ tensor resonances measured at the COMPASS experiment”**
 A. Jackura et al.
 Phys. Lett. B **779**, 464–472 (2018) [📄](#) pdf
- [30] **“On the η and η' Photoproduction Beam Asymmetry at High Energies”**
 V. Mathieu, J. Nys, C. Fernández-Ramírez, A. Jackura, M. Mikhasenko, A. Pilloni, A. P. Szczepaniak, and G. Fox
 Phys. Lett. B **774**, 362–367 (2017) [📄](#) pdf
- [31] **“Amplitude analysis and the nature of the $Z_c(3900)$ ”**
 A. Pilloni, C. Fernández-Ramírez, A. Jackura, V. Mathieu, M. Mikhasenko, J. Nys, and A. P. Szczepaniak
 Phys. Lett. B **772**, 200–209 (2017) [📄](#) pdf
- [32] **“Finite-energy sum rules in eta photoproduction off a nucleon”**
 J. Nys et al.
 Phys. Rev. D **95**, 034014 (2017) [📄](#) pdf
- [33] **“Studying the $P_c(4450)$ resonance in J/ψ photoproduction off protons”**
 A. N. Hiller Blin, C. Fernández-Ramírez, A. Jackura, V. Mathieu, V. I. Mokeev, A. Pilloni, and A. P. Szczepaniak
 Phys. Rev. D **94**, 034002 (2016) [📄](#) pdf

Conference Proceedings

- [1] **“Three-pion effects in $K^0 - \bar{K}^0$ mixing”**
A. W. Jackura, R. A. Briceño, and M. T. Hansen
PoS **LATTICE2022**, 062 (2023) [📄](#) [pdf](#)
- [2] **“Connecting Matrix Elements to Multi-Hadron Form-Factors”**
A. W. Jackura
PoS **LATTICE2021**, 108 (2022) [📄](#) [pdf](#)
- [3] **“Matrix Elements of Bound States in a Finite Volume”**
A. W. Jackura
PoS **LATTICE2019**, 079 (2019) [📄](#) [pdf](#)
- [4] **“Tensor resonances in $\eta\pi$ using COMPASS data”**
A. Jackura
PoS **Hadron2017**, 035 (2018) [📄](#) [pdf](#)
- [5] **“Unitarity approach to the mass-dependent fit of 3π resonance production data from the COMPASS experiment”**
M. Mikhasenko, A. Jackura, B. Ketzer, and A. Szczepaniak
EPJ Web Conf. **137**, 05017 (2017) [📄](#) [pdf](#)
- [6] **“Amplitude analysis of resonant production in three pions”**
A. Jackura, M. Mikhasenko, and A. Szczepaniak
EPJ Web Conf. **130**, 05008 (2016) [📄](#) [pdf](#)

Other Non-Refereed Articles

- [1] **“Snowmass white paper: Need for amplitude analysis in the discovery of new hadrons”**
M. Albaladejo et al.
arXiv:2203.08208 [hep-ph] (Mar. 2022)
- [2] **“Issues and Opportunities in Exotic Hadrons”**
R. A. Briceño et al.
Chin. Phys. C **40**, 042001 (2016) [📄](#) [pdf](#)



Presentations

As of January 17, 2025, I have given 40 invited talks (including colloquia, seminars, and research lectures), as well as 30 contributed talks at workshops and conferences.



Invited Talks

Conferences & Workshops




- “Three Hadron Systems from Lattice QCD”** May 2024
International Workshop on Partial Wave Analyses and Advanced Tools for Hadron Spectroscopy (PWA13/ATHOS8), Williamsburg, VA
- “Towards Multi-hadron matrix elements from Lattice QCD”** Apr 2023
APS April Meeting 2023, Minneapolis, MN.
- “Few-Body Dynamics from QCD”** [📄 slides](#) Nov 2022
4th Workshop on Future Directions in Spectroscopy Analysis.
- “JSA Postdoctoral Award Talk – Three-Body Nuclear Phenomena from QCD”** [📄 slides](#) Jun 2021
2021 Jefferson Lab Users Organization Annual Meeting.
- “Solving relativistic integral equations for three body systems”** Aug 2020
“Accessing and Understanding the QCD Spectra”, INT Workshop (virtual)
- “Update on JPAC Activities in Hadron Spectroscopy”** Jun 2019
XVI International Workshop on Hadron Structure and Spectroscopy, Aveiro, Portugal

- “Towards an Analytical Description of Three Particle Scattering”**  slides Apr 2019
8th Workshop of the APS Topical Group on Hadronic Physics, Denver, CO.
- “Dispersive approach to three body scattering”**  slides Jul 2018
International Workshop on Partial Wave Analyses and Advanced Tools for Hadron Spectroscopy (PWA10/ATHOS5), IHEP, Beijing, China
- “Hadron Spectroscopy and JPAC Activities”** Nov 2017
The 84th Annual Meeting of the APS Southeastern Section, Milledgeville, GA.

Colloquia

- “Towards the Three-Hadron S Matrix from QCD”** Sep 2024
Physics & Astronomy Colloquium, University of North Carolina, Chapel Hill, NC.
- “From Newton to Nuclei”** Apr 2023
Distinguished Speaker Series, Purdue University Northwest, Hammond, IN.
- “Nuclear Reactions & QCD Spectroscopy”** Apr 2023
Triangle Nuclear Theory Colloquium, University of North Carolina, Chapel Hill, NC.
- “Nuclear Reactions & QCD Spectroscopy”** Mar 2023
Physics Colloquium, Old Dominion University, Norfolk, VA.
- “Nuclear Reactions & QCD Spectroscopy”** Mar 2023
Physics Colloquium, William & Mary, Williamsburg, VA.
- “Exotica: Challenges and Opportunities in Hadron Spectroscopy”** Apr 2022
Physics Colloquium, Old Dominion University, Norfolk, VA. (virtual)
- “Few-Body Dynamics from the Finite-Volume”**  slides,  recordings Feb 2022
Virtual Lattice Field Theory Colloquium Series, MIT, Cambridge, MA. (virtual)







Seminars

- “Towards Few-Hadron Matrix Elements from QCD”** Mar 2023
Theory Center seminar, Jefferson Lab, Newport News, VA.
- “Toward Few-Body Nuclear Dynamics from QCD”** Jan 2023
Nuclear Theory seminar, Lawrence Berkeley National Lab, Berkeley, CA.
- “Developments on Multi-Hadron Matrix Elements from Lattice QCD”** Jan 2023
University of California, Berkeley, Berkeley, CA.
- “Few-Body Dynamics from QCD”** Apr 2022
Theory Center seminar, Jefferson Lab, Newport News, VA. (virtual)
- “Few-Body Nuclear Phenomena from Lattice Quantum Chromodynamics”** Oct 2021
Theory seminar, TRIUMF, Vancouver, British Columbia, Canada. (virtual)
- “Three-body nuclear interactions from QCD”**  slides Nov 2020
Nuclear Theory seminar, Lawrence Berkeley National Lab, Berkeley, CA. (virtual)
- “Finite-Volume Matrix Elements of Two-Hadron States”** Oct 2019
Theory seminar, MIT, Cambridge, MA.
- “Finite-volume matrix elements of two hadron-states”**  slides Oct 2019
Theory Center seminar, Jefferson Lab, Newport News, VA.
- “Phenomenology of Three Particle Scattering Amplitudes”** Jan 2019
Nuclear Theory seminar, Argonne National Laboratory, Lemont, IL.
- “Phenomenology of $3 \rightarrow 3$ Scattering”**  slides Oct 2018
Theory Center seminar, Jefferson Lab, Newport News, VA.

Lectures

“Finite-Volume physics” [3 lectures]  recordings	Oct 2024
ICTP-SAIFR/ExoHad School on Few-Body Physics: Nuclear Physics from QCD	
“Finite-Volume Field Theory & QCD Spectroscopy” [5 lectures]	Jul 2024
Modern Techniques in Hadron Spectroscopy at Bochum Germany	
“Scattering Theory & QCD Spectroscopy” [5 lectures]	Jun 2024
Hampton University Graduate Studies (HUGS) Program	
“Nuclear Reactions – Protons, Neutrons, and Nuclear Binding” [1 lecture]	Aug 2023
REYES Nuclear Physics Mentor Program (virtual)	
“QCD Spectroscopy – An Introduction” [2 lectures]	Jun 2023
Advanced Cyberinfrastructure Training at Rensselaer Polytechnic Institute. (virtual)	
“QCD Spectroscopy – An Introduction” [2 lectures]  recordings	Jul 2022
REYES Nuclear Physics Mentor Program (virtual)	
“Hadron Spectroscopy” [3 lectures]  recordings	Jun 2022
Advanced Cyberinfrastructure Training at Rensselaer Polytechnic Institute. (virtual)	
“Introduction to Nuclear Reactions” [3 lectures]  recordings	Aug 2021
REYES Nuclear Physics Mentor Program (virtual)	
“Hadron Spectroscopy and Resonances” [4 lectures]  recordings	Jun 2021
INT Summer School on Problem Solving in Lattice QCD. (virtual)	
w/ Raúl Briceño. Primary duties included creation of numerical exercises,  git repo	
“Introduction to Lattice Field Theory” [8 lectures]	Summer 2020
Informal lectures for graduate students associated with Jefferson Lab. (virtual)	
“Partial Wave Analysis & Resonances” [2 lectures]  recordings	Jul 2017
International Summer School on Reaction Theory, Bloomington, IN.	
w/ Marc Vanderhaeghen.	
“Education through Experimentation” [1 lectures]	Aug 2013
ANL Training Course with the Minor Academy of Sciences of Ukraine	
w/ Joe Braun. Primary duties included preparation of exercises and lecture material.	
“Exercises in Probabilistic Safety Assessment” [2 lectures]	Oct 2012
IAEA-ANL Training Course on the Safety Assessment of NPPS to Assist Decision Making	
w/ Joe Braun. Primary duties included preparation of exercises and lecture material	
“Four (Six) Factor Formula & Neutron Life Cycle” [1 lecture]	Aug 2012
IAEA-ANL Training Course on Leadership & Management for Introducing and Expanding Nuclear Power Programmes	
w/ Walt Deitrich and Joe Braun. Primary duties included preparation of exercises and lecture material.	

Contributed Talks

“Electroweak three-hadron decays in a finite-volume”	Apr 2024
2024 American Physical Society April Meeting, Sacramento, CA.  link	
“Towards accessing $\gamma^* \gamma^* \rightarrow \pi\pi$ from lattice QCD”  slides	Apr 2023
10th Workshop of the APS Topical Group on Hadronic Physics, Minneapolis, MN.	
“Few-Body Dynamics from QCD”  slides	Sep 2022
The 9th International Conference on Quarks and Nuclear Physics (QNP2022) (virtual).	
“Few-Body Dynamics from QCD”  slides	Sep 2022
14th Conference on the Intersections of Particle and Nuclear Physics (CIPANP), Lake Buena Vista, FL.	
“Progress in relativistic three-hadron scattering from lattice QCD”	Oct 2021
2021 Fall Meeting of the APS Division of Nuclear Physics, (virtual).	
“Connecting Matrix Elements to Multi-Hadron Form-Factors”  slides	Jul 2021
The 38th International Symposium on Lattice Field Theory, (virtual).	
“Progress in relativistic three-hadron scattering from lattice QCD”  slides	Jul 2021
19th International Conference on Hadron Spectroscopy and Structure (HADRON 2021), (virtual).	

“Integral equations for relativistic three-hadron scattering” 📄 slides	Apr 2021
9th Workshop of the APS Topical Group on Hadronic Physics, (virtual).	
“Finite volume relations for two hadron matrix elements and form factors”	Nov 2020
2020 Fall Meeting of the APS Division of Nuclear Physics, (virtual).	
“Connecting Matrix Elements to Multi-Hadron Form-Factors” 📄 slides	Aug 2020
Asia-Pacific Symposium for Lattice Field Theory (APLAT 2020), (virtual).	
“Matrix Elements of Bound States in a Finite Volume” 📄 slides	Jun 2019
The 37th International Symposium on Lattice Field Theory, Wuhan, China.	
“Phenomenology of 3-to-3 Scattering” 📄 slides	May 2018
Scattering from the Lattice: application to phenomenology and beyond, Dublin, Ireland.	
“Dispersive approach to three-particle systems” 📄 slides	Feb 2018
“Multi-Hadron Systems from Lattice QCD”, INT, Seattle, WA.	
“Tensor resonances in $\eta\pi$ production at COMPASS”	Nov 2017
2nd Workshop on Future Directions in Spectroscopy Analysis, Mexico City, Mexico.	
“Peripheral Production of $\eta\pi$ Resonances”	Oct 2017
Fall Meeting of the APS Division of Nuclear Physics, Pittsburgh, PA.	
“Tensor Resonances in $\eta\pi$ Using COMPASS Data” 📄 slides	Sep 2017
XVII International Conference on Hadron Spectroscopy (HADRON 2017), Salamanca, Spain.	
“Exotica in Hadron Spectroscopy”	Sep 2017
4th PIKIO Meeting, Lexington, KY.	
“Amplitude analysis for diffractive resonance production” 📄 slides	Mar 2017
International Workshop on Partial Wave Analyses and Advanced Tools for Hadron Spectroscopy (PWA9/ATHOS4), Bad Honnef, Germany.	
“Phenomenological studies on hadronic reactions and resonances extraction”	Mar 2017
3rd PIKIO Meeting, Bloomington, IN.	
“Unitarized amplitudes for diffractive production of three pion resonances”	Feb 2017
7th Workshop of the APS Topical Group on Hadronic Physics, Washington, D.C.	
“Partial wave analysis of 3π with pion and photon beams”	Oct 2016
2016 Fall Meeting of the APS Division of Nuclear Physics, Vancouver, BC, Canada.	
“Amplitude analysis of resonant production in three pions” 📄 slides	Jun 2016
14th International Workshop on Meson Production, Properties and Interaction (MESON), Kraków, Poland.	
“Amplitude Analysis of Exotic XYZ Quarkonium States” 📄 slides	Sep 2015
XVI International Conference on Hadron Spectroscopy (HADRON 2015), Newport News, VA.	
“Amplitude Analysis of Exotic Hadrons”	Sep 2015
XXVIII Midwest Theory Get-Together, Argonne National Laboratory, Lemont, IL.	

Posters

“Studies of Exotica and the Global Analysis Efforts at JPAC”	Apr 2018
SURA Board of Trustees Meeting, Jefferson Lab, Newport News, VA.	
“Partial Wave Analysis of 3π Systems”	Jul 2016
National Nuclear Physics Summer School, MIT, Cambridge MA.	
“Design of a Remote Lens Cover for Northwest Indiana Robotic Observatory”	Apr 2012
Undergraduate Research Grant Program Exhibition, Purdue University Northwest, Hammond IN.	
“Design of Flat Field Lamp Using LED Array”	Apr 2012
Undergraduate Research Grant Program Exhibition, Purdue University Northwest, Hammond IN.	

Misc.

“Towards $3\pi \rightarrow 3\pi$ partial waves from QCD”	Jan 2025
ExoHad Collaboration meeting (virtual).	
“3π on the Lattice”	Oct 2023
ExoHad Collaboration meeting (virtual).	
“Design of Green Energy Systems and HVAC Laboratory”	May 2010
Presented to the PNW Engineering Board of Advisors, Purdue University Northwest, Hammond, IN.	

Professional Service

University Service at William & Mary

University Committees and Service

Undergraduate Research Committee Spring 2025 – present
Reviewer of undergraduate research proposals for Honors or Charles Center funding.

Physics Department Committees

Diversity Advisory Committee Fall 2024 – present

External Relations/Events Committee Fall 2024 – present

Graduate Admissions Committee Fall 2023 – present

Ph.D. Defense Committee member Summer 2024 – present

- Mikayla R. Anderson, “*Extensions of the Standard Model with Improved Ultraviolet Behavior*” (2024)

Graduate student Annual Review Committee member Fall 2023 – present
Taylor Powell, Ben Spaude, Nick Chambers

Other Departmental Service

Visiting Teaching Faculty Search Committee Fall 2024
Hired Dr. Caleb Cook.

Physics Community Service

ExoHad Travel Committee Fall 2023 – present
Manage and approve travel requests for members of the ExoHad collaboration.

Reviewer of submitted papers for academic journals 2019 – present
Physical Review Letters, Physical Review D, Journal of High-Energy Physics

Reviewer of submitted proposals for high-performance computing allocations 2021
DiRAC-RAC

Science Olympiad 2010 – 2013
Volunteer for Indiana Regional Science Olympiad

Conference Organization

ICTP-SAIJR/ExoHad School on Few-Body Physics: Nuclear Physics from QCD Oct 2024
São Paulo, Brazil – Lead organizer.

22nd edition of Particles and Nuclei International Conference (PANIC) Sep 2021
Lisbon, Portugal – Convener of the “*Hadron Spectroscopy and Exotics*” track

International Summer Workshop on Reaction Theory Jun 2017
Bloomington, Indiana – organizer

International Summer Workshop on Reaction Theory Jun 2015
Bloomington, Indiana – organizer

Skills

Languages: English (Native)

Programming: C, C++, Python, Fortran, MATHEMATICA, MATLAB, JAVA, x86 Assembler

Web Development: HTML, CSS, JavaScript

Mechanical Drawing and Modeling: Autodesk AutoCAD, Inventor, PTC Creo

Analysis Software: ANSYS Mult-physics and Fluent, MCNP

Document Creation: L^AT_EX, Markdown, Microsoft Office Suite