

Wouter Deconinck

Activity Report, Calendar Year 2015

Major Contributions:

In 2015, Deconinck taught the undergraduate electronics lab course and introductory physics for life sciences. Notable, he also introduced a new course on gender & race in the physical sciences to local and national interest. Juan Carlos Cornejo successfully defended his dissertation in August, marking the first graduate student to defend under Deconinck's advisement. Research-wise, 2015 brought new projects in 3D printing of scintillators, and the publication of the Qweak experimental apparatus paper.

Scholarly and Professional Activities-Research:

Invited Talks

- *Parity-Violating and Parity-Conserving Asymmetries in ep and eN Scattering in the Qweak Experiment*, 31st Winter Workshop on Nuclear Dynamics, Keystone, CO. January 2015.

Contributed Talks/Posters

- (none)

Refereed Papers Published

1. *Transverse-target-spin asymmetry in exclusive ω -meson electroproduction*, HERMES Collaboration (A. Airapetian et al.). arXiv:1508.07612 [hep-ex]. doi:[10.1140/epjc/s10052-015-3825-7](https://doi.org/10.1140/epjc/s10052-015-3825-7). Eur.Phys.J. C75 (2015) 12, 600.
2. *Bose-Einstein correlations in hadron-pairs from lepto-production on nuclei ranging from hydrogen to xenon*, HERMES Collaboration (A. Airapetian et al.). arXiv:1505.03102 [hep-ex]. doi:[10.1140/epjc/s10052-015-3566-7](https://doi.org/10.1140/epjc/s10052-015-3566-7). Eur.Phys.J. C75 (2015) 8, 361.
3. *Double Spin Asymmetries of Inclusive Hadron Electroproductions from a Transversely Polarized ^3He Target*, Jefferson Lab Hall A Collaboration (Y.X. Zhao et al.). arXiv:1502.01394 [nucl-ex]. doi:[10.1103/PhysRevC.92.015207](https://doi.org/10.1103/PhysRevC.92.015207). Phys.Rev. C92 (2015) 1, 015207.
4. *Pentaquark Θ^0 search at HERMES*, HERMES Collaboration (N. Akopov et al.). arXiv:1412.7317 [hep-ex]. doi:[10.1103/PhysRevD.91.057101](https://doi.org/10.1103/PhysRevD.91.057101). Phys.Rev. D91 (2015) 5, 057101.
5. *Measurement of Parity-Violating Asymmetry in Electron-Deuteron Inelastic Scattering*, D. Wang et al. arXiv:1411.3200 [nucl-ex]. doi:[10.1103/PhysRevC.91.045506](https://doi.org/10.1103/PhysRevC.91.045506). Phys.Rev. C91 (2015) 4, 045506.
6. *The Qweak experimental apparatus*, Qweak Collaboration (T. Allison et al.). arXiv:1409.7100 [physics.ins-det]. doi:[10.1016/j.nima.2015.01.023](https://doi.org/10.1016/j.nima.2015.01.023). Nucl.Instrum.Meth. A781 (2015) 105-133.
7. *Precision Measurements of A_n in the Deep Inelastic Regime*, Jefferson Lab Hall A Collaboration (D.S. Parno et al.). arXiv:1406.1207 [nucl-ex]. doi:[10.1016/j.physletb.2015.03.067](https://doi.org/10.1016/j.physletb.2015.03.067). Phys.Lett. B744 (2015) 309-314.

Unpublished Reports

1. *Precision Electron-Beam Polarimetry using Compton Scattering at 1 GeV*, A. Narayan et al. arXiv:1509.06642 [nucl-ex].
2. *Electroexcitation of the $\Delta^+(1232)$ at low momentum transfer*, A. Blomberg et al. arXiv:1509.00780 [nucl-ex].

Grants and Awards

- NSF MPS "Precision Electroweak Measurements using Parity-Violating Electron Scattering", 06/2012-05/2016, \$300k.
- NSF MPS "Precision Studies of the Standard Model using Parity-Violating Electron Scattering" (as co-PI with PI Armstrong), 08/2014-07/2017, \$900k.
- NSF REU "REU Site: Physics Research in America's Historic Triangle" (as PI with co-PI Irina Novikova): 06/2014-05/2017, \$309k.
- W&M IDEA Fund "Open student/faculty forum on "Equity and Inclusion in STEM at William & Mary," \$1500.
- W&M Open Educational Resources "PHYS 252 Electronics as an open educational resource," \$1000.
- NSF AAG "Resolving Time-Dependent Atmospheric Dynamics on Jupiter and Saturn: Feature Tracking and Impact Detection" (as co-PI with PI Kunio Sayanagi, Hampton University): 09/2016-08/2019, \$397k (pending).
- NSF UISE "Collaborative Research: The PIPELINE Network" (as PI with APS as lead institution, PI Crystal Bailey), 08/2016-07/2019, \$596k (pending).
- W&M Creative Adaptation "E* Physics: Development of Modules for an Engineering/Entrepreneurship Physics Track" (as co-PI with PI Ale Lukaszew), 05/2016-04/2018, \$39k (pending).
- W&M Green Fee Fund "Green Roof for Small Hall," \$52,865.27 (denied).

Teaching:

Courses

- Spring 2015, PHYS252, "Electronics." Three sections of the (required) core electronics lab course, which now included an introduction to digital logic in the last weeks, at the expense of some of the intricacies of transistors. No physics major should graduate without knowing some digital logic! Excellent evaluations.
- Fall 2015, PHYS107, "Physics for Life Sciences." New educational technologies: TopHat course response systems, just-in-time teaching. Course evaluations showed marked improvement in student satisfaction compared to the Fall 2014 rendition of this course...
- Fall 2015, PHYS481, "Gender & Race in the Physical Sciences." Discussion course (1-credit) on diversity and equity in science for seven students.

Senior/Honor Theses

- Oscar Deaver (2015): "Uniformity and Crosstalk in Multi-Anode Photomultiplier Tubes." [\[PDF\]](#) (Summer 2014 - Spring 2015).
- Christopher Haufe (2015, with honors): "GEANT4 Simulation of Detector Properties in the MOLLER Experiment." [\[PDF\]](#) (Spring 2013 - Summer 2015). Currently he is graduate student at UNC.
- Alice Perrin (2015, with honors): "3D Printing Scintillating Detectors for Field Emission Detection in Niobium SRF Cavities." [\[PDF\]](#) (Summer 2014 - Spring 2015). Alice received the JSA Minority Undergraduate Research Assistantship and the Alumni Research Prize. Currently she is graduate student in materials science at CMU.
- Marcus Starman (2015, with honors): "Effects of Hyperons on Pion Asymmetries Measured in the Qweak Experiment." [\[PDF\]](#) (Fall 2013 - Spring 2015). Currently completing second major at W&M.
- Wyndham Batchelor (2016): "PHA Biopolymer Filament for 3D Printing" (Fall 2015 - Spring 2016).
- Matt Ferry (2016): "Tungsten-Infused Filaments for Additive Manufacturing: Radiation Shielding of Particle Detector Components" (Fall 2015 - Spring 2016).

2016).

- David Greene (2016): “Mechanical and Radiation Hardness Testing of 3D Printed Scintillators” (Fall 2015 - Spring 2016).
- Simon Ranagan (2016): “Uses and Capabilities of the Laguna IQ CNC Router” (Fall 2015 - Spring 2016).
- Richie Thaxton (2016): “Biodegradable PHA filaments” (Fall 2015 - Spring 2016).

Summer Research Students (REU)

- Jacob Elledge (Summer 2015): “Effects of Hyperons on Pion Asymmetries Measured in the Qweak Experiment.”

Undergraduate Research Students

- August Williams: “Building a thermally controlled enclosure” (Spring 2015, Fall 2015).

Graduate Students

- Juan Carlos Cornejo (Fall 2010-Summer 2015): Compton polarimetry for the Qweak experiment at JLab, successfully defended in August 2015.
- Valerie Gray (Fall 2011-present): Track reconstruction and simulations for the Qweak experiment at JLab, anticipated graduation Spring/Summer 2017.
- Kurtis Bartlett (Summer 2012-present): Simulation of Moller scattering in the Qweak experiment using Geant4 and analysis of parity-conserving transversely polarized Carbon and Aluminum elastic scattering, anticipated graduation Fall 2017.

Post Docs

- (none)

Service:

Department

- Fall 2010-present: Graduate admissions committee (APS April 2015 and APS DNP 2015 grad fairs, presentations to senior class and SPS on graduate applications; review of statements for several current seniors applying to grad school).
- Summer 2012-present: W&M Physics REU site coordinator (12-15 non-W&M students and ~20 W&M students, implemented new program components such as tutorials, poster session, power plant trip), represented program at the Council for Undergraduate Research (CUR) symposium, Fall 2015, including poster session at the National Science Foundation (one invited poster by REU student Jordan Eagle, who worked with Buzz Wincheski at NASA LaRC).
- Fall 2012-present: External relations committee (quarterly newsletters to alumni, website improvements, development of publicity materials).
- Fall 2013-present: Small Hall MakerSpace coordinator with Josh Erlich.
- Fall 2015-present: Faculty search committee for experimental nuclear/hadronic physics faculty position.
- Fall 2015: Member of local organizing committee for APS Conversation Visit on Diversity and Equity.
- Annual review committee: Raymundo Ramos, Melissa Cummings, Zhen Wang, Brandon Eskridge, Yang Wang, Josh Magee, Jim Dowd, Sebouh Paul, AJ Pyle (and my own graduate students).
- Dissertation committee: Melissa Cummings (adviser: Averett), Josh Hoskins (adviser: Armstrong).
- Seminar host for 8 nuclear and hadronic experimental physics speakers in Fall 2015: Seamus Riordan (Stony Brook), Narbe Kalantarians (Hampton), Paul Mattione (JLab), Elena Long (UNH), Buddhini Waideyawansa (JLab), Simona Malace (JLab), Kalyan Allada (MIT), Ciprian Gal (UVA).
- Colloquium host: “Spin-Momentum Correlations, Aharonov-Bohm, and Color Entanglement in Quantum Chromodynamics,” Christine Aidala (UMich), “The Structure of the Nucleon,” Simona Malace (JLab), “Hexagon and Polar Vortex,” Kunio Sayanagi (Hampton U), “Breaking the Myth of the “Non-Traditional” Physicist,” Crystal Bailey (APS), “Asteroids and Comets,” Erin Ryan (NASA Goddard and U Maryland), “Development of a Polarized Helium-3 Ion Source for an Electron Ion Collider,” James Maxwell (JLab).

University

- Member of the Ad Hoc Committee for Engineering, Design, and Innovation (Fall 2015-present).
- Member of the organizing committee for the 2015 Boswell Symposium on the topic of “LGBT Youth.”
- Member of the COLL 300 STEM committee.
- Member of the LGBTQ Climate committee (sub-committee chair).
- Freshmen adviser, Spring 2015 (8 students), Fall 2015 (8 students). Major adviser (9 students).
- Student club adviser: W&M Model Rocketry Club, W&M Astronomy Club, W&M oSTEM Chapter.

Physics Community

- CoPI on Jefferson Science Associates Initiatives Fund “Promising Young Physicist” project: selection of JLab postdocs for mock job interviews, including review and feedback on job application dossiers and presentations. Hosted Simona Malace (Jefferson Lab) for W&M colloquium.
- LGBT issues/gender diversity in physics:
 - Organizer of discussion session at APS April 2015 meeting in Baltimore, MD.
 - Member of the APS Ad Hoc Committee on LGBT+ Issues in Physics.

Public Outreach

- Participated in NNPS STEM Community Days, RVA MakerFest, PhysicsFest 2015, B&N Mini MakerFaire, Young Aeronautics Educational Foundation aerodynamics and 3D printing workshop.