

Wouter Deconinck

Activity Report, Calendar Year 2016

Major Contributions:

In the spring of 2016, Deconinck taught a new freshman COLL 100 course "Rocket Science," "Gender & race in the physical sciences," and a novel project-based course around the development of a tele-robotically controlled Mars/Lunar rover with NASA. Research-wise, 2016 brought new projects in the development of arduino-based accelerometer data-logging tags for shark research; this research project was profiled on the NSF Science360 page. In the fall of 2016, Deconinck was on leave.

Scholarly and Professional Activities-Research:

Invited Talks

- *Physics Innovation and Entrepreneurship at a Liberal Arts University*, AAPT Summer 2016 meeting, Sacramento, CA.
- *Physics Innovation and Entrepreneurship at a Liberal Arts University*, GWU Physics Colloquium, October 2016, Washington, DC.

Contributed Talks/Posters

- *Parity-Violating and Parity-Conserving Asymmetries in $e p$ and $e N$ Scattering in the Qweak Experiment*, APS April 2016 meeting, Salt Lake City, UT.

Refereed Papers Published

1. *The tracking analysis in the Q-weak experiment*, J. Pan et al. *Hyperfine Interact.* 237 (2016) no.1, 161.
2. *Measurements of $d_2^{\{n\}}$ and $A_1^{\{n\}}$: Probing the neutron spin structure*, D. Flay et al. (Jefferson Lab Hall A Collaboration). *Phys. Rev. D* 94 (2016) no.5, 052003; arXiv:1603.03612 [nucl-ex].
3. *Precision Electron-Beam Polarimetry using Compton Scattering at 1 GeV*, A. Narayan et al. *Phys. Rev. X* 6 (2016) no.1, 011013; arXiv:1509.06642 [nucl-ex].
4. *Electroexcitation of the $\Delta^+(1232)$ at low momentum transfer*, A. Blomberg et al. *Phys. Lett. B* 760 (2016) 267-272; arXiv:1509.00780 [nucl-ex].

Unpublished Reports

1. *A novel comparison of Møller and Compton electron-beam polarimeters*, J.A. Magee et al. arXiv:1610.06083 [physics.ins-det].
2. *First measurement of unpolarized SIDIS cross section and cross section ratios from a ^3He target*, X. Yan et al. arXiv:1610.02350 [nucl-ex].
3. *LGBT Climate in Physics: Building an Inclusive Community*, T.J. Atherton et al. American Physical Society, College Park, MD, 2016.

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 MPS "Precision Studies of the Standard Model using Parity-Violating Electron Scattering" (as co-PI with PI Armstrong), 08/2017-07/2020, \$784,400k (under review).
- NSF REU "REU Site: Physics Research in America's Historic Triangle" (as PI with co-PI Irina Novikova): 06/2014-05/2017, \$309k.
- NSF UISE "Collaborative Research: The PIPELINE Network" (as PI with APS as lead institution, PI Crystal Bailey), 08/2016-07/2019, \$596k.

Teaching:

Courses

- Spring 2016, PHYS100, "Rocket Science." COLL100 course for 25 freshmen with an introduction to rocket science and aeronautical engineering, including addressing of the historical, societal, and economic context of the emerging private space industry. Students designed their own model rockets using free software (OpenRocket) based on aerodynamic, chemical, and physical consideration taught in the course.
- Spring 2016, PHYS481, "Robo-Ops." Project-based course for 15 enrolled students (1-3 credits). Design, construction, testing of vision system for a tele-robotically operated Mars/Lunar rover concept in collaboration with Dave North and Lawrence Taylor (NASA). Operation from NASA Langley main control room during Robo-Ops competition (May 26, 2016). Ranked 3rd of 8 finishers and 11 attempting teams.
- Spring 2016, PHYS481, "Gender & Race in the Physical Sciences." Discussion course (1-credit) on diversity and equity in science for 15 students.

Senior/Honor Theses

- 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).
- 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).
- Jacob McCormick (2017): "Simulation of pion detectors for the MOLLER experiment at Jefferson Lab" (Fall 2016, co-supervised with David Armstrong).

Summer Research Students (incl. REU)

- Dominic Lunde (Summer 2016): "Simulation of various pion generators for the MOLLER experiment at Jefferson Lab."
- Connor Simpson (Summer 2016): "Simulation of a novel hydrogen Moller polarimeter for Jefferson Lab."
- Scott Mundy (Summer 2016): "Simulation of pion detectors for the MOLLER experiment at Jefferson Lab."
- William Laney (Summer 2016): "Sharkduino: developing low-cost accelerometer data logging tags for animal research."
- George Denny (Summer 2016): "Asteroid lightcurve observations."

Undergraduate Research Students (for credit)

- Alexandra Cramer: "Observation of asteroid impacts on Jupiter" (Spring 2016).
- William Laney: "Sharkduino: developing low-cost accelerometer data logging tags for animal research" (Spring 2016-present).
- Scott Mundy: "Simulation of pion detectors for the MOLLER experiment at Jefferson Lab" (Spring 2016, Fall 2016, co-supervised with David Armstrong).
- Karen Ficenec: "3D printing of plastic scintillators" (Spring 2016).
- Jacob Gunnarson: "Observation of asteroid impacts on Jupiter" (Spring 2016).

- Jacob McCormick: “3D printing of plastic scintillators” (Spring 2016).

Graduate Students

- Valerie Gray (Fall 2011-present): Track reconstruction and simulations for the Qweak experiment at JLab, anticipated graduation Spring/Summer 2017, co-supervised with David Armstrong.
- 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 (recruiting at APS March 2016, APS April 2016, NSBP 2016, presentations to senior class and SPS on graduate applications, presentations to VUU physics students).
- 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.
 - Development
- Fall 2015-Spring 2016: Faculty search committee for experimental nuclear/hadronic physics faculty position.
- Annual review committee: AJ Pyle, Kyle Eskridge, Jim Dowd, Yang Wang, Joe Karpie (and my own graduate students).
- Dissertation committee: Josh Magee (adviser: Armstrong), Siyuan Yang (adviser: Armstrong).

University

- Member of the Ad Hoc Committee for Engineering, Design, and Innovation (Fall 2015-Spring 2016).
- 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.
- W&M Hackathon faculty adviser and workshop speaker.
- Organizer of May seminars on “Makerspace technologies in the liberal arts classroom” and “Entrepreneurial and innovative activities as COLL 400 courses.”
- Invited speaker (WM SURE): Keivan Stassun (Vanderbilt)

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.
- LGBT issues/gender diversity in physics:
 - Invited speaker on LGBT issues and male privilege at CUWiP at ODU, January 2016.
 - Organizer of session at APS March 2016 meeting in Baltimore, MD, and APS April 2016 meeting in Salt Lake City, UT.
 - Member of the APS Ad Hoc Committee on LGBT+ Issues in Physics.

Public Outreach

- Participated in RVA MakerFest (September 2016)
- Young Aeronautics Educational Foundation (YAEF): aerodynamics and 3D printing workshop aimed at middle school kids, January 2016.