Robert Craig Group

Curriculum Vitae

Office Address
Department of Physics, UVa
382 McCormick Rd.
PO Box 400714
Charlottesville, VA 22904-4714
tel: 434-243-5552

Home Address
3784 Skyline Crest Dr.
Charlottesville, VA 22903
email: rcg6p@virginia.edu
https://uva.theopenscholar.com/craig-group
tel: 630-200-1879

RESEARCH EXPERIENCE

Professor of Physics: University of Virginia 2023 – current
Leader in research, review, and fabrication efforts on particle physics experiments at Fermilab and SLAC. Experienced mentor to junior faculty, scientists and students. Innovative classroom instructor with experience in successful course design.

Associate Professor of Physics: University of Virginia 2016 – 2023
Research on the Mu2e and NOvA experiments at Fermilab. Leader of the fabrication effort for the Mu2e cosmic-ray-veto system which was being fabricated at UVA. Our focus on the NOvA experiment was exotic searches and contributions to neutrino oscillation analyses. Member of the LDMX collaboration that has proposed a new accelerator-based light dark matter experiment.

Assistant Professor of Physics: University of Virginia 2010 – 2016
(Associate Scientist at Fermilab – position is joint with Fermilab)
Research with leadership positions on the CDF, Mu2e, and NOvA experiments at Fermilab: level-3 manager of the fabrication effort of the cosmic-ray-veto system on the Mu2e experiment; convener for the computing effort on the NOνA experiment; and leader of the low-mass Higgs boson search at the CDF experiment where evidence was first reported for a Higgs boson-like particle decaying to b-quark pairs.

Research Associate: Fermilab 12/2006 – 8/2010
Major contributions to the first observation of electroweak top quark production and the search for the Higgs boson produced in association with a W boson. Co-convener for the Single Top and $WH \to \ell\nu b\bar{b}$ analysis groups.

EDUCATION

Ph.D. in Physics, Dec. 2006. (GPA=4.0) Gainesville, FL
University of Florida, Advisor: Richard D. Field and Konstantin Matchev
Thesis: *Inclusive Jet Production using the Midpoint Algorithm in Run II at CDF*

M.S. in Physics, Aug. 2001. (GPA=3.8) Tallahassee, FL
Florida State University, Advisor: Harrison B. Prosper

B.A. in Physics, May 1999. Due West, SC
Erskine College

RECENT RESEARCH HIGHLIGHTS

Mu2e Experiment: 2009 - present

Management of CRV fabrication effort: May 2010 - present
UVA led the design and construction of a detector that will be used to veto false signals in the Mu2e experiment caused by cosmic-ray muons. We fabricated this major detector system and I managed the fabrication effort (in total, the CRV project cost is ∼$10M).

R&D efforts for the CRV detector: 2009 - present
Led group members (postdoc, technicians, and students) on assembly and commissioning of prototype cosmic ray veto detectors for the Mu2e experiment. These efforts included several test-beam runs at Fermilab, studies of the properties of fiber and photodetectors, and measurements and simulations of the effects of neutron radiation on the CRV detector.

Light Dark Matter Experiment (LDMX): 2018 - present

Design and Fabrication efforts for the Hadronic Calorimeter: May 2019 - present
UVA joined LDMX in 2018. The plan is to use similar technology to the Mu2e CRV to fabricate the hadronic calorimeter. We are working to design, fabricate, and test prototypes for this proposed accelerator-based dark matter experiment. In addition, we are investigating the use of a visible signature to further expand the hunt for dark matter at LDMX.

NOνA Experiment: 2012 - present

Dark Matter Searches at NOνA: 2012 - present
Currently, our group is using the Near Detector to search for light dark matter that might be produced by the proton beam. This search has worl-leading sensitivity in some mass ranges for light dark matter. I led the effort to use the NOνA detector as a neutrino telescope to search for dark matter annihilation in the center of the Sun. I assembled a team that studied the feasibility of this search and implemented a trigger for upward-going muons that can be useful for atmospheric neutrino studies.

Convener of the computing effort: 2012 - 2015
Worked to streamline the computing environment so that the processing of the first experimental data will be successful. I lead several post-doctoral researchers and graduate students on these computing efforts. I estimated the required resources for the experiment and negotiated with the Fermilab computing division and laboratory management on behalf of the NOvA spokespeople.

PAST RESEARCH HIGHLIGHTS

CDF Experiment:

Single Top and Higgs boson work 2008 - 2014
- Co-convener of the single top group (2008-2009)
- Observation of electroweak single top production (2009)
- First observation of s-channel single top quark production (2014)
- Co-convener of the Higgs Analysis Group (2011-2012)
- First evidence for a new particle (consisten with the Higgs boson) in the $b\bar{b}$ decay mode (2012)

QCD studies 2005 - 2009
- Measured the inclusive jet cross section for the first time with a cone algorithm.
- Measured the properties of the underlying event in CDF collisions.

FUNDING HISTORY

Approximate total DOE and project funds for my efforts (2010-2027) – **$6M**

– **DoE UVA Intensity Frontier task – $1,600,000**: 2024-2027
(∼1/2 of this support is for my efforts, $800k)
– **DoE UVA Intensity Frontier task (supplemental) – $70K**: 2022
(∼1/2 of this support is for my efforts, $35k)
– **DoE UVA Intensity Frontier task – $1,300,000**: 2021-2024
(∼1/2 of this support is for my efforts, $650k)
– **DoE UVA Intensity Frontier task – $1,600,000**: 2018-2021
(∼2/5 of this support is for my efforts, $700k)
– **DoE UVA Intensity Frontier task – $1,500,000**: 2015-2018
(∼2/5 of this support is for my efforts, $650k)
– **DoE UVA Intensity Frontier task – $1,100,000**: 2012-2015
(∼1/3 of this support is for my efforts, $400k)

– **Mu2e Project Award $4,200,000**: FY2013-FY2024
(∼1/2 of this support is for my efforts $2M)

– **R&D for LDMX – $140,000**: 2020-2025
(∼1/2 of this support is for my efforts $70k)

– **DoE supplementary for CDF experiment – $58,000**: 2011-2013

Start-up funds:
– **UVA – $250,000**: 2010-2013
– **Fermilab (travel and summer Salary) ∼ $100,000**: 2010-2015

PPRA Summer Program:
– **Jefferson Trust grant – $28,800**: 2012-2015
– **Fermilab support – ∼$25,000**: 2012-2015

Other:

– **DOE SCGSR Fellowship, J. Pascadlo – $20k + travel** 2024
– **DEI Action Grant – $1,000**: 2024
– **URA Visiting Scholar Award (M. Solt) – $20,000**: 2022-2023
– **DOE SCGSR Fellowship, A. Sutton – $36k + travel** 2018-2019
– **Page-Barbour Grant – $10,000**: 2016-2017 (PI)
– **HEET equipment funds – $110,000**: 2000-2016 (+1 co-PI)
– **URA Visiting Scholar Award (Y. Oksuzian) – $20,000**: 2011-2012
– **Mead Honored Faculty – $3000**: 2012
– **Dean's travel awards – $9000**: 2012-2024
– **Undergraduate and graduate student travel awards – ∼$10,000**: 2011-2019
– **Undergraduate summer Mitchell fellowships – ∼$60,000**: 2011-2024

HONORS AND AWARDS

American Physical Society Career Mentoring Fellow 2022
Mentorship program at the APS April meeting.

The European Physics Society: The High Energy and Particle Physics Prize 2019
To the CDF and DO Collaborations for the discovery of the top quark and the detailed measurement of its properties.

2nd place research award: Joint Institute of Nuclear Research, Russia 2019
"Innovative method of light yield rising for scintillating detectors of Mu2e experiment", A.Artikov, D.Chokheli, C.Dukes, V.Glagolev, C.Group...

SPS Outstanding Chapter Advisor Award Finalist 2017 and 2018
I was honored to be nominated twice by our SPS students for this national award.

Cory Family Teaching Award 2015
Annual award recognizing excellence in undergraduate instruction at UVA.

Recognized at Terman Award Receipient Banquet 2013
Recognized as outstanding pre-college mentor for award recepient, Stanford.

Mead Honored Faculty Recipient 2012
Project for undergraduate students to explore and develop physics demos.

Outstanding Mentor Award 2009
DOE Office of Science, for mentoring students on the CDF experiment.

Alumni Fellowship 08/2002 – 08/2006
Department of Physics, University of Florida.

Marsh W. White Award (Sigma Pi Sigma) 1999
Design of a Foucault pendulum to be publicly displayed at Erskine College

MENTEE HONORS AND AWARDS

Kieran Wall: Award for Best Oral Presentation 2024
UVA, Sigma Pi Sigma Research Symposium

Kieran Wall: Award for Best Undergraduate Oral Presentation 2024
South Easter Section of APS (SESAPS)

Kieran Wall: Best Student Talk - Rae Carpenter Award 2024
Annual Meeting of the Virginia Academy of Science

Jessica Pascadlo: DOE SCGSR Fellowship 2024
Department of Energy, Office of Science

Andrew Sutton: Springer Thesis Award 2023
Springer Theses series - Publication of thesis in book.

Lincoln Curtis: Best Student Talk - Rae Carpenter Award 2023
Annual Meeting of the Virginia Academy of Science

Matt Solt : URA Visiting Scholar Award 2022
University Research Alliance to support efforts at Fermilab

Lincoln Curtis: Award for Best Undergraduate Oral Presentation 2022
South Easter Section of APS (SESAPS)

Matt Solt: Best PosterAward 2022
NuFact: International Workshop on Neutrinos from Accelerators

Sydney Roberts: Best Student Talk - Rae Carpenter Award 2022
Annual Meeting of the Virginia Academy of Science

Andrew Sutton: 2nd Outstanding Graduate Research Award in Physics 2022
Department of Physics, University of Virginia

Andrew Sutton: DOE SCGSR Fellowship 2018
Department of Energy, Office of Science

Peter Farris: Best Student Talk - Rae Carpenter Award 2018
Annual Meeting of the Virginia Academy of Science

Steven Stetzler: Steve Thornton Undergraduate Research Award 2018
Department of Physics, University of Virginia

Sophia Xiao: Steve Thornton Undergraduate Research Award 2014
Department of Physics, University of Virginia

Yuri Oksuzian : URA Visiting Scholar Award 2011
University Research Alliance to support efforts at Fermilab

David Abbot :Award for Best Undergraduate Oral Presentation 2011
South Eastern section of APS (SESAPS), Roanoke, VA

LEADERSHIP

Chair, Collaboration Board, LDMX Collaboration (2023-2028)
Vice President, President Elect, President, Virginia Academy of Science, 2024-2027
Chair, Virginia Academy of Science, Astronomy, Math, and Physics Section, 2023-
Member-at-Large, Southeast Section of American Physical Society, 2024-2028
Level-2 Manager, Operations Planning for CRV, Mu2e experiment (2019 - 2024)
Level-3 Manager, Fabrication for Cosmic Ray Veto, Mu2e experiment (2011 - 2024)
Collaboration Board, LDMX Collaboration (2019-)
Chair, Speaker's Board, LDMX Collaboration (2019-2023)
Deputy Level-2 Manager, Cosmic Ray Veto, Mu2e Experiment (2015)
Computing Convener, NOvA experiment (2012-2015)
Elected member of the Fermilab Users' Executive Committee (2012 - 2014)
−− > Secretary (2013-2014)
−− > Quality of Life, Users' Meeting, and Government Relations subcommittees
Executive Board member, CDF Experiment (2011 - 2014)
Higgs Analysis Group co-convener, CDF Experiment (2011 - 2013)
WH and Single Top sub-group co-convener, CDF Experiment (2008 - 2011)
Philomathean Literary Society, President (1999, Erskine College), Vice President (1998)
Kappa Mu Epsilon, President (1999, Erskine College)

COMMUNITY SERVICE

Member, APS Committee on Scientific Meetings,2026-2028
Member, Selection Committee for APS Meenakshi Narain Mentoring Award,2024,2025
Councilor, Virginia Academy of Science, Astronomy, Math, and Physics Section, 2021-2024
Session Chair, Workshop on Future muon program at Fermilab (Mu2eII CRV and AMF Conversion experiments), March 2023
Scientific Program Committee, Workshop on Neutrinos from Accelerators,NuFact, 2019-2025
Session Chair, Intersections between particle physics and cosmology, June 2022
Session Chair, Dark Matter - Experimental Searches, DPF, Virtual, July 2021
Judge for SESAPS Posters, 2018,2023
Convener, Muon Working Group for NuFact Conference, 2016-2018
Session Chair, Muon working group plenary/parallel sessions, NuFact 2018, Blacksburg, VA
Session Chair, Muon working group, NuFact 2017, Uppsala, Sweden
Host/organizer, SPS National Zone 4 meeting, Charlottesville, 2017
Session Chair, LLWI, Lake Louise, Canada, 2017
Reviewer, DOE Early Career Award Application Reviewer: 2016, 2017
Member Fermilab Computational Science Strategy Group, 2016
Organizing Committee, 2016 SESAPS Meeting, Charlottesville, VA, November 2016
– Also session chair for low-energy parallel.
Organizing Committee, PASCOS 2016, Quy Nhon, Vietnam, 2016
– Also organized low-energy parallels and chaired plenary session.
Organizing Committee, Charged Lepton Flavor Violation 2016, Charlottesville, VA, May 2016
Session Chair, Parallel Session, CHEP2015, Okinawa Japan, April 2015
Session Chair, HEP Parallel Session, SESAPS, Columbia SC, Nov 2014
Session Chair, Fermilab Users Meeting, Batavia, IL, June 2014
Participant Fermilab UEC trip to D.C., advocate for fundamental science, 2013-2016
Organizer, Fermilab UEC trip to D.C., advocate for fundamental science, 2013 and 2014
Contributor, P5 Virtual Town Hall Meeting, particle physics planning exercise, 2013
Organizer, Fermilab Symposium, UEC non-academic job discussion, 2013
Session Chair, Top Physics Plenary Session, APS, Atlanta, GA, April 2012
Scribe, Charged Lepton Session, Intensity Frontier Workshop, Rockville MD, Nov. 2011
Session Chair, Higgs Physics Parallel Session, SESAPS, Roanoke, VA, Oct. 2011
Session Chair, Low Energy Searches Parallel Session, DPF, Providence RI, July 2011
Poster Session Judge, Fermilab User's Meeting, 2008,2013

REFEREE EXPERIENCE

Member of the Phys. Rev. Lett. Editorial Board 2026-2028
Reviewer for Office of Science Graduate Student Research Program2024,2025
Member DOE Early Career Award Panel2024
Member of DOE IF Comparative Review Panel2021,2024
Editor, Virginia Academy of Science, Astronomy, Math, and Physics Section, 2018-2021
12 proposals -DOE Base Proposal Comparative Review 2018,2019,2021,2024
1 paper - Radiation Measurements 2024
11 papers - Physical Review Letters 2011, 2012, 2014, 2016, 2 in 2017, 2 in 2018, 2019,2021, 2 in 2022, 2023
2 paper- Nuclear Instruments and Methods in Physics 2018,2023
7 papers - Physical Review D. 2011, 2012, 2013, 2014,2020, 2022, 2024,2025
5 papers - Phys. Letters B 2012,2013,2014,2015, 2018
1 paper - Physical Review AB 2019
1 paper - Journal of Instrumentation 2022
NuFact Conference Proceedings 2019,2020,2024
10 proposals -DOE ECA Proposal review 2015,2016,2024

MEMBERSHIP

American Physical Society (lifetime member)
APS Division of Particles and Fields (lifetime member)
Virginia Academy of Science (lifetime member)
User Stanford Linear Accelerator Lab (2019-current)
User Fermi National Accelerator Lab (2000-current)
Speaker's board for the Mu2e Experiment (2016-2017)
Publication board for the Mu2e Experiment (2014-2015)
Mu2e committee on authorship policy (2014)
NOvA committee on publication policy (2012-2013)
CDF committee on data preservation (2012-2013)
Tevatron New Phenomenon and Higgs Working Group (2011 - 2013)
National Scholars, Honor Society (inducted 2007)
Phi Kappa Phi, Honor Society (inducted 2006)
Philomathean Literary Society, Erskine College
Kappa Mu Epsilon, Mathematics Honor Society
Sigma Pi Sigma, Physics Honor Society

EXPERIMENT AND PROJECT REVIEW EXPERIENCE

Internal Review for DUNE TMS,2024
DOE-HEP Facilities Division Committee of Visitors, 2023-2024
Fermilab Director's Review, US-CMS, Endcap Calorimeter, CD2 2022, CD3 2023
LDMX DMNI Progress Review, 2021,2022
NOνA Computing Portfolio Management Review, Jan. 2013, April 2014, Jan. 2015
NOνA Fermilab Director's Readiness Review, Nov.2014
Mu2e IPR -Independent Project Review, 2018,2019,2021
Mu2e Operations Review, 2020
Mu2e CRV Construction Readiness Review, October 2018
Mu2e DOE CD0/CD1/CD2/CD3 Review, 2009/2012/2014/2016
Mu2e Fermilab Director's Review, CD2/CD3, 2014/2016
Mu2e CRV Module Factory Safety Review, 2016, 2017,2019, 2021
Mu2e Final Design Review, February 2016
Mu2e Independent Cost Review, August 2014
Reviewer: Mu2e Offline Computing Review, February 2014

DEPARTMENTAL AND UNIVERSITY SERVICE

Co-lead HHMI Driving Change, 2024-2026
Undergraduate Program Committee, 2015-2021,2024-2026
Outstanding Student Award Committee,Chair: 2018-2021, Member 2025-2026
Faculty Advisor to NSBP, 2025-?
Science and Society Task Force, 2025
Long Range Planning Committee, 2011,2021-2024
Teaching Committee,2019-2025
Chair,Physics Outreach and Education Committee,2024-2025
Chair, Scholarship/Fellowship Committee,2021-2024
Helped organize the UVA contribution to, and tours for, the NSBP meeting, 2022
Faculty Advisor to SPS and Sigma Pi Sigma, 2013-2021
– Recognized by SPS as Distinguished (2013,2014,2015,2018,2021), Outstanding (2016,2017,2019,2020)
– Hosted zone meeting: 2017, and 2020 (delayed COVID-19)
Arts and Sciences Dean's Task Force on Peer Review,2018-2019
Arts and Sciences Committee on Personnel Policy,2018-2020
Committee on Infrastructure and Safety,2018-2019
Physics Building Rennovation Committee, 2014,2018-2019
Astrophysics Search Committee, 2017
Organized trip for students to PhysCon, 2016,2018
Ph.D. Committees: Tyler Horoho and Jessica Pascadlo (2025), Jozef Trokan-Tenorio (External, William and Mary, 2025), Mojdeh Tarighat (Math, 2025), Joe Boyd (2024), Ang Li and Anna Hall (2023), Luis Reyes (External, William and Mary, 2023), Grace Cummings and Andrew Sutton (2022), Matt Feller (Math, 2022), Konstantin Lehmann (External, Simon Frazer University, 2022), Matt Joyce(2021), Steve Boi and Cristiana Principato (2021), Charlie Glaser (2020), Trinh Le(2017), Ji Liu (External, William and Mary, 2016), John Wood and Tim Pennucci (Astronomy,2015), Hao Liu (2014), Rachael Beaton (Astronomy, 2014)
M.S. Committees: Ziyuan Wang (2025), Chris Martin (2024), Serdar Kurbanov (2016)
Research Review Committees: Wang, Goodell, Li, Wood, Xiao, Glaser, Boyd, Le, Walker, Watkins, Li, Chung, Jose, Menon
Graduate Recruitment Fair Participant, SESAPS 2014, 2018, 2022, 2023, 2024, 2025: NSBP 2022, 2024
Undergraduate Advising, 2011-2012,2013-2014, 2016-2017, 2018-2019, 2024-2026
Judge for Undergraduate Research Symposium, 2013, 2021, 2025
Long Range Planning Committee, Elected by faculty, 2013
High Energy Physics Seminar Organizer, 2013-2015
Graduate Program Committee, 2012-2013
Graduate Student Poster Session Judge, 2011,2013

TEACHING EXPERIENCE AT UVA

PHYS 1420 Spring 2026
Lectured and managed this course for approximately 50 first-year Physics majors per year. The course covered the topics of classical mechanics, fluids, and thermodynamics.

PHYS 1610 Fall 2013, 2014, 2025
Lectured and managed this course for approximately 50 first-year Physics majors per year. The course covered the topics of classical mechanics and special relativity.

PHYS 1655 SP 2022,FL 2022, SP 2023,FL 2023, SP 2024, SU 2024, FL 2024, FL 2025
Introduction to Python for Scientists and Engineers: I designed this new course! Provided science and engineering students with a valuable and broad introduction to computing with Python and basic statistical tools for data analysis. The course climax is a two-week discussion of machine learning, and we even train a Neural Network!

Crash Course in ML/AI J-Term 2025
I co-designed this new course! The course was designed as a Gen Ed course that tries to start with the basics of Machine Learning and build up to explain the current state of Artificial Intelligence (Large Language Models, for example) with hardly any code. In addition, we explore the positive and negative impact on society of these new tools.

DEI Action Grant Award 2024
I submitted a proposal to study the impact of our grading policies on the modern, more diverse student body. I'm interested in alternative grading systems that have been applied at major universities around the world. I believe that the standard grading strategy employed at most modern universities, which was born in the 1800s, is no longer valid as universities serve a more diverse student body.

DEI Faculty Learning Community 2024
I applied and was accepted into this community. We read a book, met four times, and discussed the challenges and importance of DEI in modern universities.

DSECOP Workshop, UMD Summer 2022
I was invited to participate in the Workshop on Data Science Education in the Physics Curriculum. The primary goal of this workshop is to develop a community around incorporating data science into the undergraduate physics curriculum.

PHYS 2620 Fall2020,Fall2021
Modern Physics: Provided 80 students with a rigorous introduction to many topics in Modern Physics.

PHYS 2660 Spring 2019, Spring 2020, Spring 2021
Fundamentals of Scientific Computing: Provided 40 students per semester with a valuable introduction to computing and statistics in physical sciences.

PHYS 1010 Spring 2016 and 2017
The Physical Universe I: I redesigned this physics course for non-science majors.

PHYS 1710 Fall 2015, 2016, and 2017
I redesigned this first-semester physics major course.

PHYS 1610 Fall 2013, 2014
Lectured and managed this course for approximately 50 first-year Physics majors per year. The course covered the topics of classical mechanics and special relativity.

Nucleus Program, UVA 2015
Nucleus is a program designed to help faculty improve STEM education at UVA using research-based pedagogies and assessment.

Course Design Institute, UVA Summer 2015
CDI is an intensive, multi-day, hands-on seminar. I applied these learning-focused course design ideas to the redesign of PHYS 1710 and PHYS 1010.

PHYS 2020 Spring 2011, 2012, and 2013
Lectured and managed this course for approximately 200 pre-med students per year. The course covered the topics of electricity and magnetism, geometrical optics, and modern physics.

PHYS 3993 Spring 2013
I have had one student do independent study with me who registered for PHYS 3993:
– Elton Ho (Spring 2013)

PHYS 3995 2011 – 2022
I have had almost 20 undergraduate students do research with me and register for the individual supervised research course PHYS3995.

Teaching Workshop Summer 2011
College Park, MD
Attended a three-day new physics and astronomy faculty teaching workshop held by American Association of Physics Teachers.

TEACHING EXPERIENCE PRIOR TO UVA

Substitute Lecturer Summer 2005
Department of Physics, University of Florida
Lectured for calculus based Electricity and Magnetism course in large lecture hall at the request of instructor.

Teaching Assistant 2003 – 2004
Department of Physics, University of Florida
Led discussion sections, held office hours, and graded exams for Introductory Physics II.

Teaching Assistant 1999 – 2000
Department of Physics, Florida State University
Taught lab sessions, held office hours, and graded lab reports for introductory Astronomy class.

Private Tutor 2000 – 2005
Department of Physics, University of Florida
Department of Physics, Florida State University

Teaching Assistant 1998 – 1999
Erskine College
Assisted students in setup and performance of modern physics lab.

GENERAL OUTREACH EXPERIENCE

Started "Scientist Saturdays" at Science Museum of Virginia (2026):

REU Lunch With a Scientist: NuFact 2022:

Judge for Oral and Poster Presentations:
– APS April Meeting 2022
– SESAPS 2018,2023,2024,2025
– ΣΠΣ Research Symposium, 2012, 2016, 2021
– UVA Undergraduate Research Network, 2017
– Fermilab User's Meeting, 2008, 20012

UVA College Science Scholars:
Particle physics overview and tour of UVA HEP lab. 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, and 2022.

Organized Public Lectures:
Using funds from a Page-Barbour grant, I organized two public lectures. In Fall 2016 more than 450 people attended nobel laureate, Adam Riess's, lecture "The Accelerating Universe" at the Jefferson Theater in downtown Charlottesville. In Spring 2017 about 100 attended well-known scientist, Francis Halzen's, lecture "Ice Fishing for Neutrinos at the South Pole" in the Dome Room at the Rotunda.

Boy Scouts - nuclear physics merit badge:
Particle and nuclear physics overview and tour of UVA HEP lab. Fall 2014.

Q&A Session for the documentary film *Particle Fever*:
Downtown Mall, Regal Cinema in Charlottesville, Spring 2014.

Tours of the CDF Experiment:
– REU summer students, Aug. 5, 2009
– Fermilab Open House, Feb. 11 2007 and Jan. 17, 2009
– Linear Collider Accelerator School students October 24, 2008
– Hadron Collider Summer School students Aug 16, 2008
– Tour of CDF for local high school students May 21, 2008
– Private tour of Fermilab for small group of college students from Texas, March 19 2007
– Tour for Congressman Kirk and group of 7th graders, Feb. 17, 2007

Blogger for the Mu2e Experiment on Quantum Diaries (2011)):
– I wrote a few short articles about some aspects of the Mu2e experiment.
– http://www.quantumdiaries.org/author/fermilab/

Editor for "Result of the Week" in Fermi Today (2008 - 2010) : For two years I served as the editor for bi-weekly articles featuring new results from the CDF experiment in the online newsletter "Fermi Today". I selected the topic and worked closely with the researchers and the editors of Fermi Today to ensure that the article was interesting and understandable to the non-scientists at Fermilab.

POLITICAL OUTREACH EXPERIENCE

– Tour of UVA HEP lab for Representative Robert Hurt (April 2014)
– DC trip to advocate for support of particle physics (2013, 2014, 2015, and 2016)
– Government Relations Committee, Fermilab Users' Executive Committee
(Organizer for 2013 and 2014 DC trip to advocate for support of particle physics.)
– Lunch with Steve Koonin, DOE Under Secretary for Science
(Fermilab Users' meeting 2010)
– Lunch with Daniel Poneman, DOE Deputy Secretary and William Brinkman, DOE director of the Office of Science

MENTOR EXPERIENCE

I take pride in my mentorship roles, and I have a history of success at receiving support for and directing undergraduate and high-school students on research projects in experimental particle physics. In 2009, I was recognized with the Outstanding Mentor Award by the US Department of Energy for my work with undergraduate students on the CDF experiment. In addition to the list below, I have served as a mentor to dozens of students and postdoctoral researchers through my leadership roles on the CDF, Mu2e, NOνA, and LDMX experiments. 2011-2015 I started and directed a summer research program with support from the UVA Jefferson Trust for undergraduate physics majors at UVA, in which two students each summer engage in an intense research experience at Fermilab. I'm always looking for ways to improve my mentoring skills. For example, in 2022, I served as an APS Career Mentoring Fellow. As of summer 2025, I have graduated 5 Ph.D. students with another expected by the end of this year.

Postdoctoral Researchers

Natalie Harrison, 2024 - ?? . Natalie earned her Ph.D. from Ohio State University. Natalie will work to commission Mu2e and analyze the first data from the experiment. Natalie is also helping with a dark matter search using the NOvA Near Detector, and will contribute to LDMX when the experiment is funded.

Matt Solt, 2020 - 2024 . Matt is now a scientist at Northrop Grumman. He received his Ph.D. from Stanford in the summer of 2020 and joined our group in the fall of 2020. His experience in accelerator-based dark matter searches made him a valuable addition to our LDMX efforts. He also helped to fabricate the Mu2e cosmic ray veto and led the QC effort of those modules.

Reddy Gandrajula, 2020 - 2022 . Reddy had experience on the NOvA experiment at Fermilab and helped lead our efforts, and our graduate students, there. He also contributed to the testing of CRV modules as they arrived at Fermilab.

Michael Baird, 2017 - 2020. Michael had experience on the NOvA experiment at Fermilab and helped lead our efforts, and our graduate students, there. He had several leadership roles on NOvA, including convening the 3-flavor neutrino oscillation analysis group.

Yuri Oksuzian, 2010 - 2018. Yuri received a well-deserved permanent scientist position at Argonne National Lab. Yuri played a leading role in the R&D efforts for the cosmic ray veto system of the Mu2e experiment, where he served as a co-convener for the Neutron and Gamma Working group and L3 manager for the CRV fiber effort. On the CDF experiment, Yuri optimized the b-jet tagging strategy of the low-mass Higgs effort. Yuri was selected as a 2011 URA Visiting Scholar and received $20,000 to support his research efforts at Fermilab. Yuri also joined the NOvA experiment, where he did database work and made contributions to a new trigger to support our group's effort to use NOvA as a neutrino telescope for dark matter searches.

Current and Recent Graduate Students

Josh Greaves, Josh passed the Qualifier exam in May 2024, and spent his first summer at Fermilab studying the performance of the CRV system. He will search for Dark Matter with the NOvA Near Detector.

Tyler Horoho (student of Craig Dukes), **Ph.D. July 2025**. I worked closely with Tyler on two Dark Matter searches. One uses data from the NOvA near detector, and a second simulation-based analysis for the LDMX experiment.

Jessica Pascadlo, **Ph.D. July 2025**. Jessica was intrumental in a simulation-based analysis searching for visibly decaying dark matter and a beamline test, both for the LDMX experiment.

Anna Hall, **Ph.D. July 2025**. Anna made important progress in the data-driven calibration techniques for the NOvA flagship neutrino analysis.

Andrew Sutton, **Ph.D. 2022**. Domain Generalization with Machine Learning in the NOvA Experiment.

Cristiana Principato, **Ph.D. 2021**. An Indirect Search for Weakly Interacting Massive Particles in the Sun Using Upward-going Muons in NOvA.

Steve Boi (student of Craig Dukes), **Ph.D. 2021**. Design and Fabrication of a Large-area, High-efficiency Cosmic Ray Veto Detector for the Mu2e Experiment.
Serdar Kurbanov, University of Virginia, **M.S. 2016**. Data Driven Trigger Design and Analysis for the NOvA experiment
Hao Liu, **Ph.D. 2014**. Measurement of the s-channel Single Top Quark Cross Section at the CDF Experiment and Contributions to the Evidence of $H \to b\bar{b}$.

Current and Recent Undergraduate Students

Directed work on the LDMX Experiment:
So far, 4 UVA undergraduate students have worked under my supervision to help design, prototype,the LDMX detecor and analyze simulated data.

Design and Fabrication of the Mu2e Cosmic Ray Veto:
Over 25 UVA undergraduate students have worked under my supervision to help design, prototype, and build the CRV for the Mu2e experiment.

Research Adventure in Particle Physics at Fermilab for UVA Undergraduates:
Over 4 years (2012-2015), I **sent 8 students to Fermilab** to work on searches for dark matter with the NOvA experiment, analyze test beam data from a Mu2e CRV prototype, and make a QCD measurements with the CDF experiment.

Directed Research of UVA Physics Major (2011 - 2013):
Before I started the Fermilab program I worked with 4 students on directed research.

Past Graduate Students (prior to UVA)
Karen Bland, Baylor University, Ph.D. Summer 2012
Karen focused on optimizing a standard model Higgs boson search by improving photon identification efficiency and background rejection.
Barbara Alvarez, Universidad de Oviedo, Spain; Ph.D. completed 2010
Search for a Higgs boson produced in association with a W boson. Barbara focused her efforts on improving the jet energy resolution information which is used in the matrix element analysis.
Bruno Casal, Universidad de Cantabria, Spain; Ph.D. completed 2009
Observation of Single Top Quark production. Bruno focused his efforts on improving muon signal acceptance and optimizing search techniques using boosted decision trees.

Past Undergraduate and High School Students

High School Students on Mu2e (Summer 2009 and 2010): Led local high school students on R&D for the cosmic ray test stand of the Mu2e experiment.

IMSA Student at CDF (2007 - 2009): Supervised an Illinois Math and Science Academy high school student on an analysis of CDF data, which searched for the Higgs boson decaying to two photons. The student was extremely successful, and we wrote two PRLs based on his efforts.

Italian Summer Student (2008): Wrote a proposal for and supervised a participant of the INFN-DOE Summer Students program.

SULI Summer Student at CDF (2008): Wrote a proposal for and supervised a participant of the DOE's Science Undergraduate Laboratory Internships program.

Pre-Service Teaching Internship at CDF (2007): Wrote a proposal for and supervised a participant of the DOE's Pre-Service Teaching internship.

REU Summer Student (2003): NSF REU program at the University of Florida.

RECENT CONFERENCE TALKS AND SEMINARS

"Expanding the search for dark matter with accelerator-based experiments"
(Invited Colloquium)
−Virginia Commonwealth University, Richmond, VA, Feb 2026
−James Madison University, Harrisonburg, VA, Jan 2026
−University of Florida, Gainesville, FL, Jan 2022
−College of William and Mary, Williamsburg, VA, April 2022

"Experimental Particle Physics"
Research Showcase, UVA, Nov 2025

"Opportunities for Physics Teachers with the Virginia Academy Science"
Invited, Fall Meeting of CSAAPT, VCU, Oct 2025

"The Status of LDMX and Related Opportunities"
Invited, Simons Symposium, Illuminating Dark Matter, Germany, June 2025

"Dark Matter Searches at the Intensity Frontier"
– SESAPS Meeting, James Madison University, Oct 2025
– University of Florida, Gainesville, FL, Feb. 2025
– University of South Carolina, Columbia, SC, Feb 2025

"Career Paths of Physics Degree Holders"
– USC Colloquium, Columbia, SC, Feb 2025
– UF Colloquium, Gainesville, FL, Feb 2025
– UVA Colloquium, Charlottesville, VA, Nov 2024
– Mentoring Workshop, SESAPS, Lexington, KY, Nov 2023
– SPS Zone 4 Meeting, Charlottesville VA, April 2023
– Mentoring Workshop, SESAPS, Oxford MS, Nov 2022

"A Renaissance for Muon Physics"(Invited Colloquia)
– Carnegie Mellon University, Pittsburgh, PA, Dec 2023
– Florida State University, Tallahasse, FL, Jan 2022
– Michigan State University, virtual, Nov 2021
– Lund University, Sweeden, virtual, June 2021
– University of South Carolina Colloquium, Columbia, SC, Sept. 2019
– Baylor Colloquium, Waco, TX, Oct. 2018
– Texas A&M Colloquium, College Station, TX, Oct. 2018

"Introduction to Python for Scientists and Engineers - A bootcamp for data science"
– SESAPS Meeting, Eastern Kentucky University, Nov 2023
– CSAAPT Meeting, James Madison University, April 2023
– DSECOP Workshop, University of Maryland, June 2022

"LDMX:The Light Dark Matter eXperiment"
– Invited, South Eastern section of APS (SESAPS), Oxford MS, Nov 2022
– Interconnections between Particle Physics and Cosmology, St. Louis, June 2022
– Virginia Academy of Science, May 2022
– Duke Joint HEP/Theory Seminar, Zoom, COVID-19, May 2021
– APS April Meeting, Virtual, COVID-19, April 2020
– Brandeis Dark Universe Seminar, Boston, MA, Oct. 2019
– Virginia Tech Neutrino Seminar, Blacksburg, VA, Dec. 2019

"What is Hiding Beyond the Standard Model'
Colloquium, University of Virginia, Sept. 2022

"The Mu2e Experiment at Fermilab"
– Plenary, Interplay Between Particle and Astroparticle Physics, Vienna, Cancelled - COVID, Austria, Sept. 2022
– Invited, 23rd International Workshop on Neutrinos from Accelerators, Salt Lake City, Utah, August 2022
– Invited, Conference on Intersections of Particle and Nuclear Physics, Vail, CO, May 2015

"Asking the Universe Fundamental Questions"
– Invited Public Lecture, UMW, September 2021
– Society of Physics Students, UVA, Feb. 2022

"Fabrication of a high-efficiency cosmic ray veto detector for the Mu2e experiment"
– Poster: 23rd International Workshop on Neutrinos from Accelerators, Salt Lake City, Utah, August 2022
– Meeting of the APS Division of Particles and Fields, Virtual, July 2021
– Meeting of the Virginia Academy of Science, Richmond, VA, May. 2017

"Fabricating scintillator-based veto detectors for particle physics experiments at UVA"
Meeting of the Virginia Academy of Science, Virtual, COVID, May. 2021

"Recent Results from the NOvA Experiment'
– Invited, South Eastern section of APS (SESAPS), Knoxville TN, Nov 2018
– Invited Seminar, U. Tennessee, Knoxville TN, Nov. 2018 – Lake Louise Winter Institute, Canada, Feb. 2017
– XXX Rencontres de Physique de la Vallee d'Aoste, La Thuile, Italy, March 2016

"A Proposed Sensitivity Upgrade for the Mu2e Experiment"
Invited/Parallel, NuFact Workshop, Blacksburg, Aug. 2018

Introduction and Summary talks for the Muon Physics Working Group
Invited/Plenary, NuFact Workshop, Blacksburg, Aug. 2018

"Searching for Charged Lepton Flavor Violation at Fermilab"
Experimental Particle Physics Seminar, Zurich, Switzerland, October 2017

PAST CONFERENCE TALKS AND SEMINARS

"Hoos at Fermilab"
Colloquium, University of Virginia, Sept. 2015

"The Mu2e Experiment at Fermilab"
Invited, Conference on Intersections of Particle and Nuclear Physics, Vail, CO, May 2015

"Computing at the Intensity Frontier"
Plenary, Conference on Computing in High Energy Physics (CHEP), Okinawa, Japan, April 2015

"Status of the NOνA Experiment"
Invited, South Eastern section of APS (SESAPS), Columbia, SC, Oct. 2014

"Studies of Single Top Production at the Tevatron"
XXVIII Rencontres de Physique de la Vallee d'Aoste, La Thuile, Italy, Feb. 2014

"Design considerations for the cosmic-ray-veto system of the Mu2e experiment"
Meeting of the APS Division of Particles and Fields, UC Santa Cruz, Aug. 2013

"Higgs Boson Searches at the Tevatron"
– Lake Louise Winter Institute, Canada, Feb. 2013
– Colloquium, College of William and Mary, Jan. 2013
– Colloquium, University of Virginia, Sep. 2012
– Invited, APS April Meeting, Atlanta, GA, April 2012

"Recent Results from the Tevatron"
Invited, Workshop on The LHC, Particle Physics, and the Cosmos, Aukland, New Zealand, July 2012

"Tevatron Higgs Searches: Past and Future"
Invited, The Next Stretch of the Higgs Magnificent Mile, Chicago, IL, May 2012

"Charged Lepton Flavor Violation Discussion Summary Report"
Intensity Frontier Workshop, Rockville, MD, Nov. 2011

"The Impact of Higgs Searches at the Tevatron in the LHC Era"
– Invited, South Eastern Section of APS (SESAPS), Roanoke, VA, Oct. 2011
– Physics Seminar, James Madison University, Oct. 2011

"Status and Summary of the Mu2e Experiment"
–Meeting of the APS Division of Particles and Fields, Brown University, Aug. 2011
–Invited, Fermi National Accelerator Laboratory, Users' Meeting, June 2011

"Low-mass Higgs Searches at the Tevatron"
Workshop on Higgs Cross Sections for the LHC, Brookhaven National Laboratory, NY, May 2011

"Searches for New Physics at the Tevatron"
Plenary, DIS2011, Newport News, VA, April 2011

"Recent Studies of the Underlying Event from CDF"
Northwestern University HEP Seminar, Evanston, IL, May 2010

"The Race for the Higgs Boson"
– University of Virginia physics colloquium, March 2012
– University of Alabama physics colloquium, March 2010
– FIU Physics Colloquium, Miami, FL, April 2009

"A Foundation for Low-Mass Higgs Searches"
Lawrence Berkeley National Laboratory, CA, Jan. 2010

"R&D Plans for the Cosmic Ray Veto System"
$Mu2e$ Collaboration Meeting, Rice University, Jan. 2010

"Status of Low-Mass Higgs Searches at the Tevatron"
SLAC Experimental Seminar, Menlo Park, CA, November 2009

"Lighting up the Higgs sector with photons at CDF"
– Notre Dame HEP Seminar, Notre Dame, IN, November 2009
– University of Wisconsin HEP Seminar, Madison, WI, April 2009

"Low Mass Higgs Boson Search Improvements at CDF"
Tevatron Higgs Workshop, Fermilab, May 2009

"The Observation of Single Top Production at the Tevatron" (April 2009)
– University of Victoria HEP Seminar, Victoria, Canada
– TRIUMF National Lab Seminar, Vancouver, Canada

"Searching for the Higgs One Single Top at a Time"(Jan. – Feb. 2009)
– FSU HEP Seminar, Tallahassee, FL
– MSU HEP Seminar, East Lansing, MI
– Michigan HEP Seminar, Ann Arbor, MI

"Status of Higgs Searches at CDF"
– Instituto de Fisica de Cantabria HEP Seminar, Santander, Spain, March 2008
– University of Florida HEP Seminar, Gainesville, FL, Feb. 2008
– Lake Louise Winter Institute, Alberta, Canada, February 2009

"Recent QCD Results from the Tevatron" (Jan. - Feb. 2008)
– XXII Rencontres de Physique de la Vallee d'Aoste, La Thuile, Italy
– Argonne HEP Seminar, Argonne National Lab

"The Inclusive Jet Cross Section at CDF" (Feb. - Sept. 2006)
– FSU HEP Seminar, Tallahassee, FL
– Seminar at the Enrico Fermi Institute, Chicago, IL
– Vanderbilt Nuclear and Particle Physics Seminar, Nashville, TN
– Pheno Symposium, Madison, WI
– University of Florida HEP Seminar, Gainesville, FL
– APS April Meeting, Dallas, TX
– CDF Collaboration meeting, FNAL, IL
– UF-FSU Phenomenology Symposium, Tallahassee, FL, December 2004

MENTEE TALKS AND SEMINARS

Postdoctoral researchers:

Natalie Harrison

"A Study of the Cosmic-Ray Induced Backgrounds at Mu2e"
– Fermilab New Perspectives Meeting, June 2025
"The Status of the Mu2e Experiment'
– SESAPS, James Madison University, Oct. 25
– UVA, High Energy Seminar, Oct. 25

Matt Solt:

"LDMX: The Light Dark Matter eXperiment"
– Invited, University of Wisconsin Seminar Madison, WI, Apr. 2023
– International Workshop on Deep Inelastic Scattering, East Lansing, MI, Mar. 2023
– Invited, NuFact: Workshop on Neutrinos from Accelerators, Salt Lake City, Utah, 2022
– Invited, MEPA Workshop, (virtual) China, Dec. 2022
'Dark Matter at Accelerators: the HPS and the LDMX experiments''
– Invited, Society of the Philippines annual conference, Siargao Island, Jul. 2023
– Invited, 14th Intersections of Particle and Nuclear Physics, Florida, Sept. 2022
– Invited, Meeting of the Southeastern Section of APS , Tallahassee FL, Nov. 2021
"Design and Fabrication of the Cosmic Ray Veto for Mu2e"
– APS April Meeting, Minneapolis, MN, April 2023
– Fermilab New Perspectives Meeting, June 2022
"Searching for Long-Lived Dark Photons with the Heavy Photon Search Experiment"'
– University of Virginia HEP seminar, Char- lottesville, VA, Mar. 2023
– Invited, University of Minnesota for a seminar in Minneapolis, MN, Apr. 2023
–APS/DPF Meeting, Virtual COVID-19, July 2021

Reddy Gandrajula:

"Detector performance and Data Quality monitoring at the NOvA Experiment"
APS/DPF Meeting, Virtual COVID-19, July 2021

Michael Baird:

"Latest Oscillation Results from the NOvA Experiment"
– ICHEP 2020 Conference on High Energy Physics,Prague, Czech Republic (virtual), July 2020,
– J-PARC 10th Anniversary Symposium, Tsukuba, Japan, Sept. 2019
– HEP Seminar, University of Maryland, College Park, MD, May 2019
– Aspen Center for Physics,Aspen, CO, March 2018
"Summary of the Second ν_μ Disappearance Results from the NOvA Experiment"
– APS-DPF Meeting, Fermilab, Batavia, IL, July 2017
– HEP Seminar at the University of Virginia, May 2017, Charlottesville, VA

Yuri Oksuzian:

"Looking for answer with muons at g-2 and Mu2e Veto"'
Argonne Division Seminar, Argonne National Lab, IL, May. 2018
"Wavelength-Shifting Fiber Performance for the Mu2e Cosmic Ray Veto"
– 2nd Int. Conf. on Charged Lepton Flavor Violation, Charlottesville, VA, June 2016
– APS Meeting of Division of Particles and Fields, Detroit, MI, 2015
"Studies of Beam-Induced Radiation Backgrounds for the Mu2e CRV"
– APS/DPF, Fermilab, August 2017
– International Conference on High Energy Physics (ICHEP), Chicago, IL, August 2016
– 2nd International Conference on Charged Lepton Flavor Violation, Charlottesville, VA, 2016
– APS Meeting of Division of Particles and Fields, Detroit, MI, August 2015
"A Cosmic Ray Veto Detector for the Mu2e Experiment at Fermilab"
– APS Meeting of Division of Particles and Fields, Detroit, MI, August 2015
– Technology and Instrumentation in Particle Physics, Chicago, IL June 2011
–New Perspectives, Batavia, IL June 2011
"The Mu2e Experiment"
– Argonne Division Seminar, ANL, IL Aug 2017
– APS/DPF, Fermilab, Aug. 2017
– International Workshop on Baryon and Lepton Number Violation, Cleveland, May 2017
– International Symposium on Symmetries in Subatomic Physics, Victoria, Canada, June 2015
– Fermilab Users Meeting, Batavia, IL June 2014
"Latest Results from the Tevatron"
16th Lomonosov Conference on Particle Physics, Moscow, Russia, Aug. 2013
"Searches for New Physics in Top Events at the Tevatron"
Moriond QCD, La Thuile, Italy, March 2013
"Higgs Boson Searches at the Tevatron"
– Annual Postdoctoral Research Symposium, Argonne, Sept. 2012
– BNL Physics Seminar, Upton, NY, Aug. 2012
– Invited, CIPANP 2012, St. Petersberg, FL, May 2012
– APS April Meeting, Atlanta, GA March 2012

Graduate Students:

Josh Greaves:

"Searching for Dark Matter a the NOvA Neutrino Experiment"
–SESAPS, James Madison University, Oct. 2025
–Fermilab New Perspectives Meeting, June 2025
–Virginia Academy of Science, May 2025
–SESAPS, Charlotte NC, Nov. 2024

Rob Mina:

"Updated Technique for the Simulation of Dark Bremmstrahlung in GEANT4"
– SESAPS, Charlotte NC, Nov. 2024

Jessica Pascadlo:

"S30XL test beam at SLC"'
–American Physical Society, March 2025, Anaheim, CA
"Introducing the Light Dark Matter Experiment (LDMX)'
–PHENO/DPF 2024, Pittsburg PA
–Virginia Academy of Science, May 2023
"Visible signatures of the Dark Sector at LDMX'
–Fermilab New Perspectives Meeting, June 2022

Anna Hall:

"Data-Driven Checks for ν_e Selection Efficiency at NOvA"
–UVA High Energy Physics Seminar, April 2022
–UVA Society of Physics Students, April 2022
–APS/DPF Meeting, Virtual COVID-19, July 2021
–APS April Meeting, Virtual COVID-19, April 2021
–APS April Meeting, Virtual COVID-19, April 2020
–Neutrino, Virtual COVID-19, June 2020

Andrew Sutton:

"Latest Long-baseline Oscillation Results from NOvA "
–Oral Presentation, APS April 2021 Meeting, Virtual COVID-19
"NOvA Event Reconstruction Techniques"
–Poster, APS April Meeting, Columbus, OH, April 2018
–Poster, 53rd Annual Fermilab Users Meeting, August 2020
"The NOvA Test-Beam Program"
–Oral Presentation, CALOR2020, Cancelled COVID-19, Sussex
–Oral Presentation, DPF 2019, Boston MA
–Poster, NuFact Workshop, Blacksburg, Aug. 2018

Cristiana Principato, graduate student:

"Searching for Dark Matter Using the NOvA Upward-going Muon Trigger"
–International Conference on High Energy Physics (ICHEP), Chicago, IL, August 2016
– APS/DPF Meeting, Fermilab, IL, 2017

Hao Liu, graduate student:

"Top Quark Production at the Tevatron"
Conference on Large Hadron Collider Physics, New York City, NY, June 2014 ***"Measurement of s-channel single-top-quark production in lepton+jets at CDF"***
APS Meeting of Division of Particles and Fields, Santa Cruz, CA Aug. 2013 ***"Improving the Trigger Efficiency for the WH-lvbb analysis at CDF"***
– APS April Meeting, Atlanta, GA March 2012
– South Eastern section of APS (SESAPS), Roanoke, VA, Oct. 2011

Undergraduate students:

Jeremia Saunders "Testing the Efficiency of the Cosmic Ray Veto at the Mu2e Experiment'
– NSBP, San Jose, California, Nov. 2025
– SESAPS, Charlotte NC, Nov. 2025

Karl Hardrick "Performance of the Cosmic Ray Veto of the Mu2e Experiment"
– SESAPS, Charlotte NC, Nov. 2024

Kieran Wall "The Light Dark Matter Experiment"
–Virginia Academy of Science, May 2024
– SESAPS, Charlotte NC, Nov. 2024 – SESAPS, Lexington KY, Nov. 2023

Anmol Sandhu "A filter to remove background events at the LDMX experiment"
–Virginia Academy of Science, May 2024
– SESAPS, Lexington KY, Nov. 2023

Anran Zhao "Temperature dependence of SiPM performance"
–Virginia Academy of Science, May 2024
– SESAPS, Lexington KY, Nov. 2023

Lincoln Curtis "The Light Dark Matter Experiment: The search for visible decays"
–Virginia Academy of Science, May 2023
– SESAPS, Oxford MS, Nov. 2022

Sydney Roberts "The Search for Hidden Structures in the Temple of Kukulcán Using Cosmic-Ray Muons", Virginia Academy of Science, May 2022

Sydney Roberts "Performance of WLS Fibers for the Mu2e CRV"
APS - Division of Particles and Fields (DPF) Meeting, virtual-COVID, July 2021

"Fabrication of a Cosmic Ray Veto System for the Mu2e Experiment"
– Poster, William Musk, APS 2020, Virtual COVID-19
– Poster with proceedings, Hannah Woodward, DPF 2019, Boston MA.
– Poster, Kyle Fielman, Virginia Academy of Science 2019
– Poster, William Musk, PhysCon 2019, Providence RI.
– Poster, Danny Mills and Ben Barton, NuFact Workshop, Blacksburg, Aug. 2018

Ben Barton "Simulation of the Cosmic Ray Background for the Mu2e Experiment'
APS 2020, Virtual COVID-19

Ben Barton and Danny Mills "The CRV Detector for the Mu2e Experiment"
– Poster, NuFact Workshop, Blacksburg, Aug. 2018
– South Eastern section of APS (SESAPS), Knoxville TN, Nov 2018

Ningshun Chen "Performance of Scintillation Counters as Measured at the Fermilab Test Beam Facility for the Mu2e Cosmic Ray Veto System"
– Poster, NuFact Workshop, Blacksburg, Aug. 2018
– Poster, South Eastern section of APS (SESAPS), Knoxville TN, Nov 2018

Peter Farris "Performance of Wavelength-Shifting Fibers for the Mu2e CRV"
Poster, NuFact Workshop, Blacksburg, Aug. 2018

Peter Farris " Aging Properties of the Mu2e Cosmic Ray Veto System "
– Poster, NuFact Workshop, Blacksburg, Aug. 2018
– South Eastern section of APS (SESAPS), Knoxville TN, Nov 2018

Peter Farris and Pedrom Zadeh "Studies to Understand and Optimize the Performance of Scintillation Counters for the Mu2e Cosmic Ray Veto"
– Poster: DPF, Fermilab, IL, Aug. 2017
– Poster: Undergraduate Research Symposium, **1st place**, UVA, Nov. 2017

"Techniques for the Dark Matter Search at the NOvA Experiment"
– Rob Mina, DPF Meeting, Ann Arbor, MI, August 2015
– Rob Mina, Poster, Computing in High Energy Physics, Okinawa, Japan, April 2015
– Rob Mina, Poster, Fermilab Users Meeting, Batatia, IL, June. 2015
– Rob Mina, SESAPS, Columbia, SC, Nov. 2014
– Eric Fries, SESAPS, Columbia, SC, Nov. 2014
– Liting Xiao, SESAPS, Boiling Green, KY, Nov. 2013
– Ranjani Sarma, SESAPS, Boiling Green, KY, Nov. 2013

Tyler Lam "Accelerated Aging Studies for the Mu2e Cosmic Ray Veto System"
Poster, South Eastern section of APS (SESAPS), Charlottesville, VA, Nov. 2016

Yongyi Wu: "Test beam studies of the Mu2e Cosmic-Ray-Veto Prototypes
– Poster, Fermilab Users Meeting, Batatia, IL, June. 2015
– SESAPS, Columbia, SC, Nov. 2014

Alyssa Henderson: ***"Studies of Silicon Photomultipliers for the Mu2e Experiment"***
South Eastern section of APS (SESAPS), Tallahassee, FL, Nov. 2012

David Wilson: ***"Minumum-bias studies at the Tevatron"***
South Eastern section of APS (SESAPS), Tallahassee, FL, Nov. 2012

David Abbott: ***"Sensitivity of Plastic Scintillator to Fast Neutrons"***
– South Eastern section of APS (SESAPS), Roanoke, VA, Oct. 2011
– UVA Presidential Poster Competition, 2011

Robert Craig Group
Publication List [1]

Recent Publications in Refereed Journals

[1] *"Joint neutrino oscillation analysis from the T2K and NOvA experiments"*, Nature volume 646, pages818–824 (2025)

[2] *"Precision measurement of neutrino oscillation parameters with 10 years of data from the NOvA experiment"*, Submitted, arXiv:2509.04361 (2025)

[3] *"Measurement of the LCLS-II dark current using the LDMX Trigger Scintillator Prototype"*, Submitted to NIM, arXiV:2601.08090 (2026)

[4] *"Expected Sensitivity of the LDMX Experiment to Visible Signatures of Dark Matter "*, In preperation (expected 2026)

[5] *"Searching for Light Dark Matter with the NOvA Near Detector "*, submitted to PRL, arXiv:2507.10754, (2025)

[6] *"Performance Studies of the Mu2e Cosmic Ray Veto Detector "*, Nucl. Instrum. Meth. A 1083, (2026)

[7] *" Temperature-Dependent Calibration Procedures for the Silicon Photomultiplier Readout of the Cosmic Ray Veto Detector for the Mu2e Experiment "*, Nucl. Instrum. Meth. A1081, (2026)

[8] *" Photon-rejection Power of the Light Dark Matter eXperiment in an 8 GeV Beam"*, Journal of High Energy Physics 2023(12)

[9] *" Performance of the Wavelength-Shifting Fiber Upgrade for the Mu2e Cosmic-Ray Veto Detector"*, Journal of Instrumentation, Vol. 18 (2023)

[10] *"Mu2e Run I Sensitivity Projections for the Neutrinoless $\mu \rightarrow e$ Conversion Search in Aluminum"*, Universe 2023, 9(1), 54

[11] *"An Improved Measurement of Neutrino Oscillation Parameters by the NOvA Experiment"*, Phys. Rev. D 106 032004. (2022)

[12] *"Search for Multi-Messenger Signals in NOvA Coincident with LIGO/Virgo Detections"*, Phys. Rev. D 101, 112006 (2020)

[13] *"A High Efficiency Photon Veto for the Light Dark Matter eXperiment"*, Journal of High Energy Physics volume 2020, Article number: 3 (2020)

[14] *"First Measurement of Neutrino Oscillation Parameters using Neutrinos and Antineutrinos by NOvA"*, Phys. Rev. Lett. 123, 151803 (2019)

[1] In addition to publications listed, I was a member of the CDF author list since 2006-2013 with more than 400 publications and almost 30,000 citations (based on the SPIRES - High-Energy Physics Literature Database). I have also made contributions to hundreds of internal experimental notes for the CDF, Mu2e, NOvA, and LDMX experiments.

[15] *" Performance of Wavelength-Shifting Fibers for the Mu2e Cosmic Ray Veto Detector"*, Journal of Instrumentation, Vol. 13 (2018)

[16] *" New constraints on oscillation parameters from ν_e appearance and ν_μ disappearance in the NOvA experiment"* , Phys. Rev. D98,032012 (2018)

[17] *"Photoelectron Yields of Scintillation Counters with Embedded Wavelength-Shifting Fibers With Silicon Photomultipliers"*, Nucl. Instrum. Meth. A890, 84-95 (2018)

[18] *"Constraints on oscillation parameters from ν_e appearance and ν_μ disappearance in NOvA"*, Phys. Rev. Lett. 118, 231801 (2017)

[19] *"Measurement of the neutrino mixing angle θ_{23} in NOvA"'*, Phys. Rev. Lett. 118, 151802 (2017)

[20] *"First measurement of electron neutrino appearance in NOvA "*, Phys. Rev. Lett. 116, 151806 (2016)

[21] *"First measurement of muon-neutrino disappearance in NOvA"'*, Phys. Rev. D. 93, 051104 (2016)

[22] *" A Study of the Energy Dependence of the Underlying Event in Proton-Antiproton Collisions"*, Phys. Rev. D. 92, 092009 (2015)

[23] *"Tevatron Constraints on Models of the Higgs Boson with Exotic Spin and Parity Using Decays to Bottom-Antibottom Quark Pairs "*, Phys. Rev. Lett. 114, 151802 (2015)

[24] *"Constraints on models of the Higgs boson with exotic spin and parity using the full CDF data set "*, Phys. Rev. Lett. 114, 141802 (2015)

[25] *"Observation of s-channel production of single top quarks at the Tevatron"*, Phys. Rev. Lett. 112, 231803 (2014)

[26] *"Evidence for s-channel Single-Top-Quark Production in Events with one Charged Lepton and two Jets at CDF"*, Phys. Rev. Lett. 112, 231804 (2014)

[27] *"First Search for Exotic Z Boson Decays into Photons and Neutral Pions in Hadron Collisions"*, Phys. Rev. Lett. 112, 111803 (2014)

[28] *"Higgs Boson Studies at the Tevatron"*, Phys. Rev. D. 88, 052014 (2013)

[29] *"Combination of Searches for the Higgs Boson Using the Full CDF Data Set"*, Phys. Rev. D. 88, 052013 (2013)

[30] *"Search for Resonant Top-antitop Production in the Semi-leptonic Decay Mode Using the Full CDF Data Set"*, Phys. Rev. Lett. 110, 121802 (2013)

[31] *"Evidence for a particle produced in association with weak bosons and decaying to a bottom-antibottom quark pair in Higgs boson searches at the Tevatron"*, Phys. Rev. Lett. 109, 071804 (2012)

[32] *"Search for a Higgs boson in the diphoton final state using the full CDF data set"*, Physics Letters B 717 (2012) 173–181

[33] *"Combined search for the standard model Higgs boson decaying to a bb pair using the full CDF data set"*, Phys. Rev. Lett. 109, 111802 (2012)

[34] *"Search for the standard model Higgs boson decaying to a bb pair in events with one charged lepton and large missing transverse energy using the full CDF data set"*, Phys. Rev. Lett. 109, 111804 (2012)

[35] *"Search for the standard model Higgs boson produced in association with a $W^{\pm}$ boson with 7.5 fb^{-1}"*, Phys. Rev. D. 86, 032011 (2012)

[36] *"Search for a Higgs Boson in the Diphoton Final State in $p\bar{p}$ at $\sqrt{s} = 1.96$ TeV"*, Phys. Rev. Lett. 108, 011801 (2012)

[37] *"Search for a Higgs Boson produced in Association with a W Boson Using a Method Based on Matrix Element Techniques"*, Phys. Rev. D. 85, 072001 (2012)

[38] *"Observation of Single Top Quark Production and Measurement of Vtb with CDF"*, Phys. Rev. D. 82, 112005 (2010)

[39] *"Measurement of the WW+WZ Production Cross Section Using a Matrix Element Technique in Lepton + Jets Events"*, Phys. Rev. D. 82, 112001 (2010)

[40] *"Studying the Underlying Event in Drell-Yan and High Transverse Momentum Jet Production at the Tevatron"*, Phys. Rev. D. 82, 034001 (2010)

[41] *"Measurement of the WW and WZ production cross section in $\ell\nu jj$"*, Phys. Rev. Lett. 104, 101801 (2010)

[42] *"Search for Standard Model Higgs Bosons in $WH \to \ell\nu b\bar{b}$ "*, Phys. Rev. Lett. 103, 101802 (2009)

[43] *"Observation of Single Top Quark Production"*, Phys. Rev. Lett. 103, 092002 (2009)

[44] *"Search for a Fermiophobic Higgs Boson Decaying into Diphotons at CDF"*, Phys. Rev. Lett. 103, 061803 (2009)

[45] *"Measurement of Single Top Quark Production at CDF"*, Phys. Rev. Lett. 101, 250601 (2008)

[46] *"The Inclusive Jet Cross Section Using the Midpoint Algorithm in RunII at CDF"*, Phys. Rev. D78, 052006 (2008)

Conference Proceedings and Non-refereed Publications

[1] T. Akesson *et al.* [LDMX Collaboration], *"Design Report of the LDMX Experiment,"* [arXiv:2508.11833].

[2] S. Corrodi *et al.* [Mu2e-II and AMF], *"Workshop on a future muon program at FNAL,"* [arXiv:2309.05933].

[3] K. Byrum *et al.* [Mu2e-II], Snowmass Contribution, *"Mu2e-II: Muon to electron conversion with PIP-II,"* [arXiv:2203.07569].

[4] M. Aoki *et al.* , Snowmass Contribution, *"A New Charged Lepton Flavor Violation Program at Fermilab,"* [arXiv:2203.08278].

[5] T. Åkesson, *et al.*, Snowmass contribution, *"Current Status and Future Prospects for the Light Dark Matter eXperiment,"* [arXiv:2203.08192].

[6] *"A Proposed Evolution of the Mu2e Experiment"*, Published, PoS NuFACT2018 (2019) 129.

[7] *"Studies of the Aging Properties of the Mu2e Cosmic Ray Veto System"*, Published, PoS NuFACT2018 (2019) 040.

[8] *"A High-efficiency Cosmic Ray Veto Detector for the Mu2e Experiment"*, Published, PoS NuFACT2018 (2018) 034.

[9] *"Dark Sector Physics with a Primary Electron Beam Facility at CERN"*, CERN-SPSC-2018-023.

[10] *"Expression of Interest for Evolution of the Mu2e Experiment "*, arXiv:1802.02599.

[11] *" Studies to Understand and Optimize the Performance of Scintillation Counters for the Mu2e Cosmic Ray Veto System"*,C17-07-31,arXiv:1709.09831.

[12] *"Progress in the Search for Dark Matter Using Upward-going Muons in NOvA"*, PoS ICHEP, **2016**, 201 (2016).

[13] *"Performance of Wavelength-Shifting Fibers for the Mu2e Cosmic Ray Veto Detector"*, DPF 2015, arXiv:1511.06225

[14] *"Performance of Scintillator Counters with Silicon Photomultiplier Readout"*, DPF 2015, arXiv:1511.00374

[15] *"A first look at data from the NOνA upward-going muon trigger"*, DPF 2015, arXiv:1511.00155

[16] *"Fermilab Computing at the Intensity Frontier"*,
Conference on Computing in High Energy Physics (CHEP2015), J. Phys. Conf. Ser. 664 (2015) 3, 032012

[17] *"Implementation of an Upward-going Muon Trigger for Indirect Dark Matter Searches at the NOνA Far Detector"*, Conference on Computing in High Energy Physics (CHEP2015), J. Phys. Conf. Ser. 664 (2015) 082034

[18] *"Recent Evolution of the Offline Computing Model of the NOvA Experiment"*, Conference on Computing in High Energy Physics (CHEP2015), J. Phys. Conf. Ser. 664 (2015) 3, 032011

[19] *"Mu2e Technical Design Report"*, The Mu2e Project and the Mu2e Collaboration, arXiv:1211.7019 (2014)

[20] *"Observation of the s-channel and other studies of single top quarks at the Teq vatron"*, XXVIII Rencontres de Physique de la Vallee d'Aoste, Italy, arXiv:1405.0071 (2014)

[21] *"Software Trigger Algorithms to Search for Magnetic Monopoles with the NOvA Far Detector"*, Conference on Computing in High Energy Physics, Journal of Physics, Vol. 513, 2014

[22] *"Charged Leptons"*, Summary Report of Snowmass Community Summer Study 2013, arXiv:1311.5278 (2013)

[23] *"Design considerations for the cosmic-ray-veto system of the Mu2e experiment"*, Proceedings, APS Division of Particles and Fields, Santa Cruz, CA, arXiv:1310.1377 (2013)

[24] *"Feasibility Study for a Next-Generation Mu2e Experiment"*, Contribution to the Snowmass Community Summer Study 2013, arXiv:1307.1168 (2013)

[25] *"The Mu2e Conceptual Design Report"*, The Mu2e Project and the Mu2e Collaboration, arXiv:1211.7019 (2012)

[26] *"Updated Combination CDF and D0 Searches for Standard Model Higgs Boson Production with up to 10.0 fb^{-1} of Data"*, Tevatron New Phenomena and Higgs Working Group, arXiv:1207.0449 (2012)

[27] *"Fundamental Physics at the Intensity Frontier"*, Intensity Frontier Workshop, arXiv:1205.2671 (2012)

[28] *"Combined CDF and D0 Search for Standard Model Higgs Boson Production with up to 10.0 fb^{-1} of Data"*, Tevatron New Phenomena and Higgs Working Group, arXiv:1203.3774 (2012)

[29] *"Combined CDF and D0 measurement of WZ and ZZ production with b-tagged jets"*, Tevatron New Phenomena and Higgs Working Group, arXiv:1203.3782 (2012)

[30] *"Combined CDF and D0 Limits on Higgs Boson Production with up to 8.6 fb^{-1} of Data"*, Tevatron New Phenomena and Higgs Working Group, arXiv:1107.5518 (2011)

[31] *"Combined CDF and D0 limits on Fermiophobic Higgs Boson Production with up to 8.2 fb^{-1} "*, Tevatron New Phenomena and Higgs Working Group, arXiv:1109.0576 (2011)

[32] *"Combined CDF and D0 Searches for the Higgs Boson Decaying to Two Photons"*, Tevatron New Phenomena and Higgs Working Group, arXiv:1107.4960 (2011)

[33] *"Higgs Boson Searches at CDF "*, Contributed to Lake Louise Winter Institute, arXiv:0905.4267 (2009)

[34] *"Combination of CDF and DØ Single Top Quark Cross Sections Measurements"*, Tevatron New Phenomena and Higgs Working Group, arXiv:0908.2171 (2009)

[35] *"Combination of Single Top Quark Production Results from CDF"*,
Contributed to ICHEP 2008, arXiv:0809.4670 (2008)

[36] *"Recent QCD Studies at the Tevatron"*,
Contributed to XXII Rencontres de Physique de la Vallee d'Aoste, arXiv:0804.4494 (2008)

[37] *"PDF use from the Tevatron to the LHC"*,
Contributed to TeV4LHC workshop, QCD Group Report, hep-ph/0605240 (2005)

[38] *"Slepton Mass Measurements at the LHC II"*,
Contributed to TeV4LHC workshop, Exotics Group Report, hep-ph/0608322 (2005)

[39] *"Slepton Mass Measurements at the LHC"*,
Contributed to Linear Collider Workshop, hep-ph/0507002 (2005)

[40] *"PYTHIA Tune A, HERWIG, and JIMMY in Run 2 at CDF"*,
Contributed to Hera and the LHC workshop, hep-ph/0510198 (2005)

[41] *"The Les Houches Accord PDFs (LHAPDF) and LHAGLUE"*,
Contributed to Hera and the LHC workshop, hep-ph/0508110 (2005)