



USCMS Undergraduate Summer Internship 2023

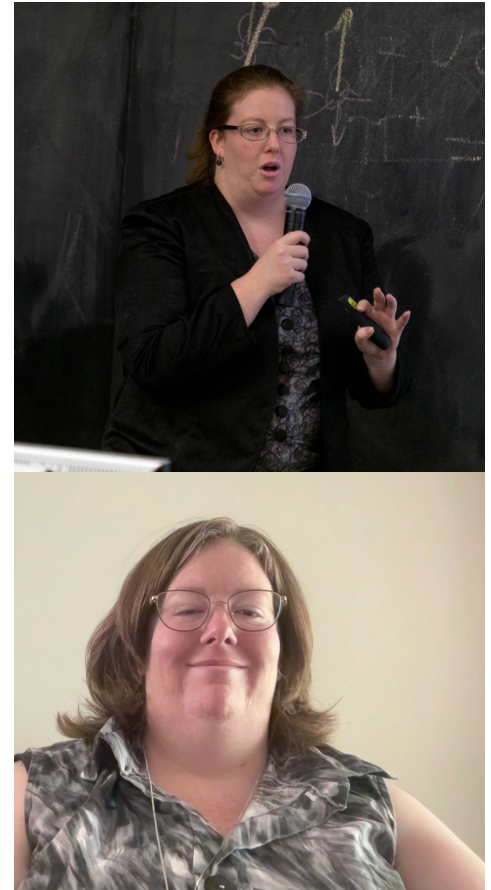
USCMS Career Talk

Scarlet Norberg

June/21/2023

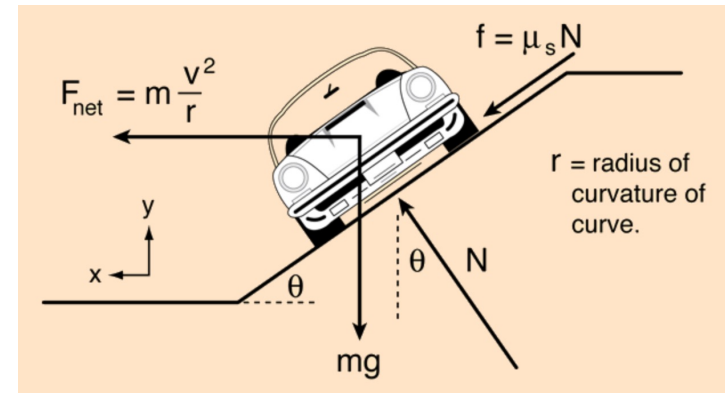
Introduction

- Software Developer at Fermilab
- Not yet a year, only been in this position 10 months
- Working on making a monitoring system for a tape system at the lab
- Was a post Doc for 7 years
- Was a graduate student for 6 years
- Did a summer program almost every summer from high school till graduate school
- Was an under grad for 4 years



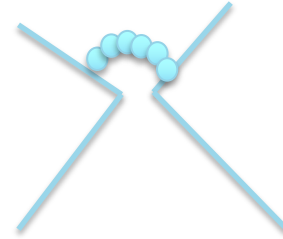
Formative Years

- High School Heritage high school in Newport News VA
- Loved Math but not going to be an actuary
Guidance counselor said go into science
- Did Biology --- No
- Did Chemistry ---No
- Did Physics ---Yes
- The equations and math behind a car going around a curve is so cool
- Opportunity to do a mentorship program with Jefferson Lab



Under Grad

- Kent State University
- Go Flashers
- Went in as a physics major
- SULI program for 2 Summers
- Hampton University Optics summer internship
- Project on how Salt falls
- Applied for Grad Schools
- Took the GRE and applied to some schools because it allowed me to do that.



Graduate School

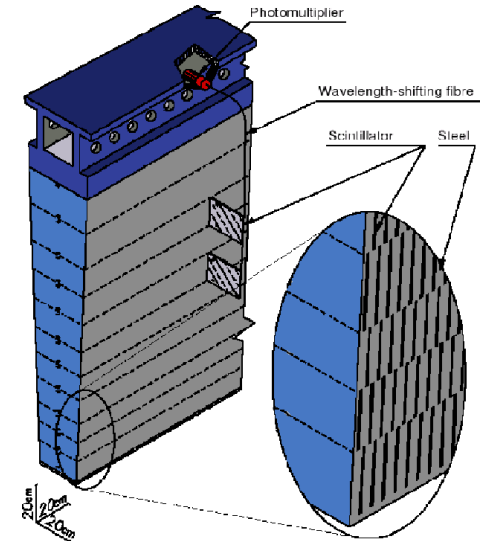
- University of Oklahoma
- Worked the summer before school started
- Worked with who eventually became my Advisor
- Did Particle physics
- Could not do research till after passing my quals
- Failed my Qualls on the first try (Did not study enough)
- E&M very hard qual for me to pass
- Quickly passed my Specialists in Jets



$$\begin{aligned}\mathbf{B}_{l,m}^{(E)} &= \sqrt{l(l+1)} \left[B_l^{(1)} h_l^{(1)}(kr) + B_l^{(2)} h_l^{(2)}(kr) \right] \Phi_{l,m} \\ \mathbf{E}_{l,m}^{(E)} &= \frac{i}{k} \nabla \times \mathbf{B}_{l,m}^{(E)} \\ \mathbf{B}_{l,m}^{(M)} &= \sqrt{l(l+1)} \left[E_l^{(1)} h_l^{(1)}(kr) + E_l^{(2)} h_l^{(2)}(kr) \right] \Phi_{l,m} \\ \mathbf{E}_{l,m}^{(M)} &= -\frac{i}{k} \nabla \times \mathbf{B}_{l,m}^{(M)},\end{aligned}$$

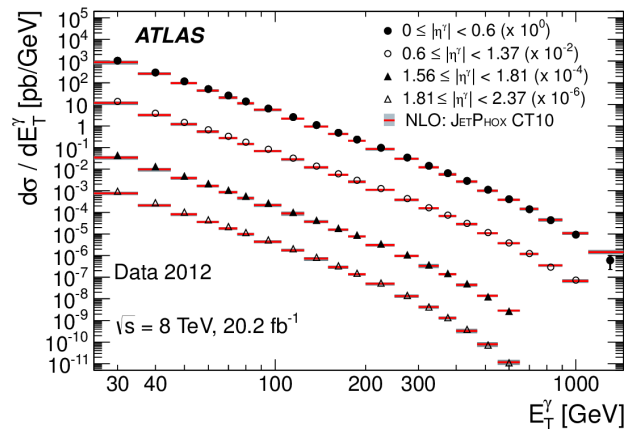
ATLAS Argonne Fellowship

- Argon to Lemont IL First time in IL
- Packed up took my stuff found a year lease without looking at the apartment
- Was told talk to the scientist there and start doing analysis and service work
- Service work was first because need to meet requirements to get authorship
- Tile Calo issue tracking for Single Event Upsets (SEU's)
- Worked on a photon measurement
- Worked on a SUSY bino wino measurement
- Conference in Italy first time in Europe alone
- Best Advice I got was to be passionate about what you are doing even when giving a 7 am update talk



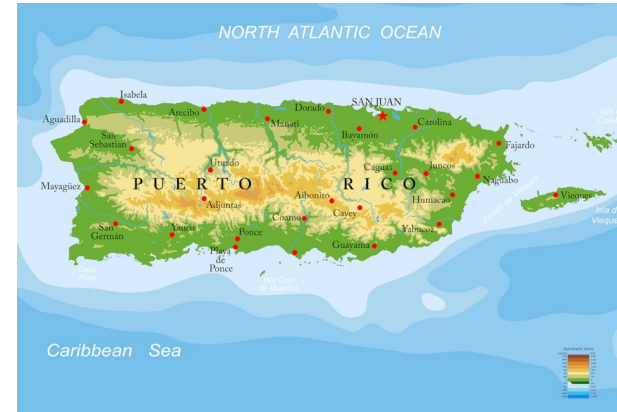
ATLAS CERN

- First time at CERN
- Fortunate that my University had an apartment in Saint Genis France
- Lived there for 2 years
- Finished the Photon cross section analysis took more time because we did our own corrections and needed to use centralized ones
- Helped test and install the phase 1 pixel detector for ATLAS
- Then move on to doing a SUSY analysis for wino and bino
- Went back to Ok to finish writing my thesis and Graduate



Post Doc

- Took a few months off
- Started applying in 2015 did not know how to apply
- Talked to my Supervisor
- Then talked to contacts at Argonne
- Really reformed my application and started another round of applying
- Got to interview for two positions one in Spain on ATLAS and a smaller second experiment
- One at PR with CMS



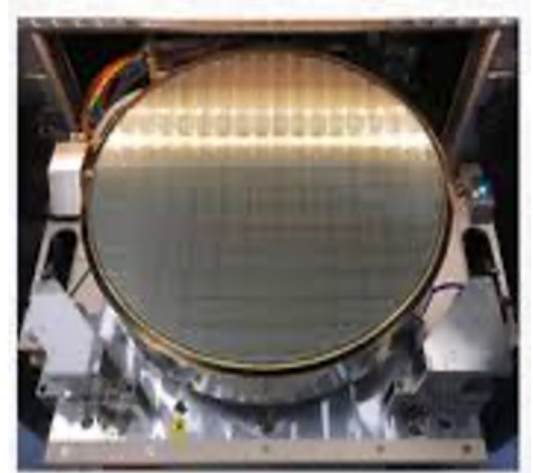
CMS

- University of Puerto Rico Mayaguez
- Switched to CMS
- Heard it could be good for my career
- Learned I would be based at Fermilab
- Pretty big group enough people to talk to about work
- Moved to IL and to Fermilab in Oct 2015
- Lived in the village till Dec 2015
- Found an apartment in Aurora



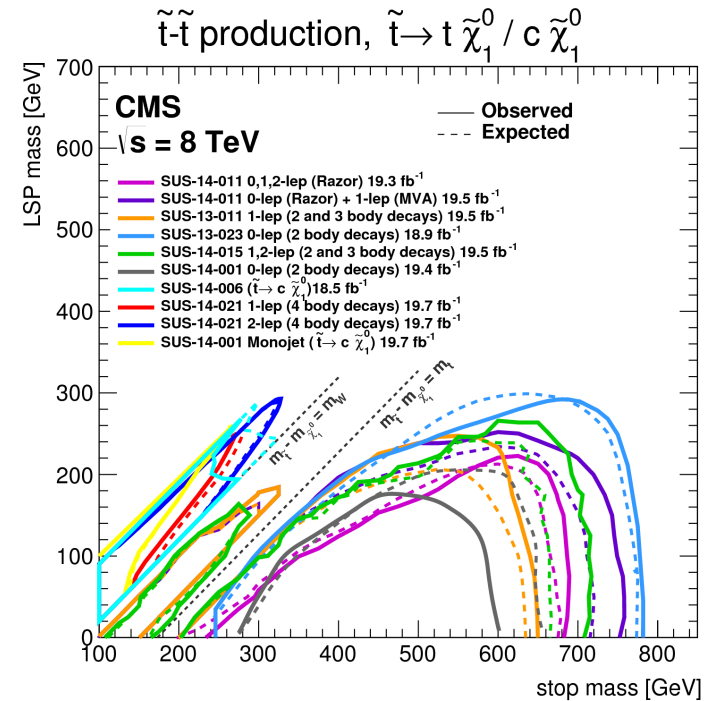
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- Service work
- Starting over I need to figure out what the rules are which were changing when I started
- Joined an experiment that had magnet issues
- Also worked on testing pixel modules for phase 1 installation
- I helped organize and take shifts and then grade modules
- I did integration testing
- When I was at CERN got to test bare pixels



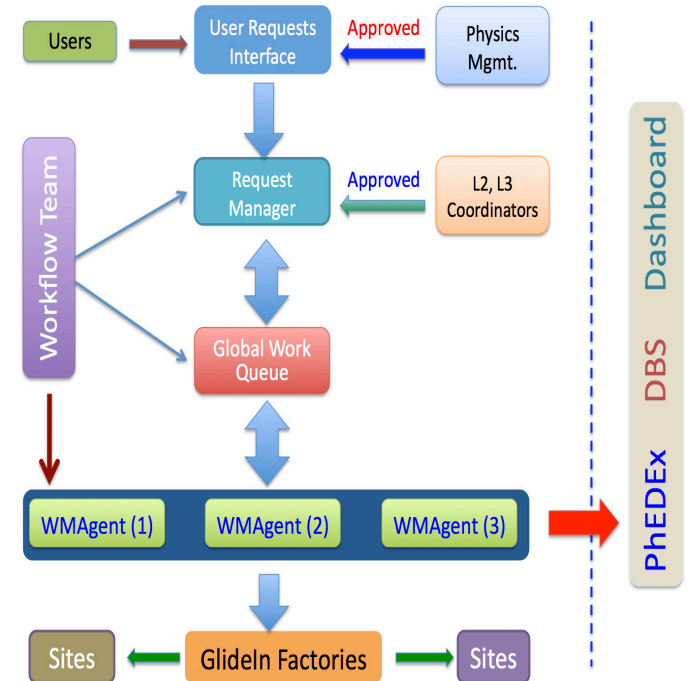
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- Analysis Started work on the Stop SUSY search
- Did that for 5 years
- Did the partial 2016 analysis mostly did scale factors and became familiar with the analysis
- Did the full 2016 analysis helped with the Z invisible background
- Did the full Run 2 analysis had students working on the background and helped with Ntuple production
- We moved to NanoAOD because the size of our Ntuples were too large
- Also combined with another SUSY group



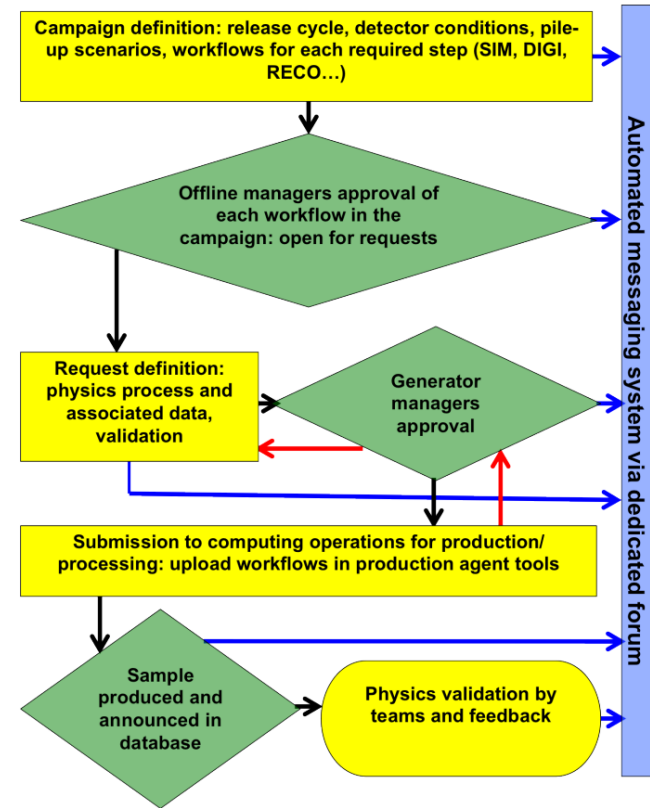
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- Service Work
- Got involved in the production and reprocessing group PnR which had people at FNAL working in it
- They restructured the group right after I joined, I then got to hold a position
- Highly involved and initially just looked at computers and said hey these seem to be having issues
- Started working on workflows
- Started working on campaigns
- Heard complaints



CMS

- Being in P&R started to see this computing vs analysis was like let me see what analysis does
- Joined a group called PDMV
- This is the group that submits the WF's
- Saw that I need to learn a new language
- Started to make sure computing and PDMV communicated
- Got the two groups to meet once a month (Still meet now)
- Had close ties to both groups
- And made them both better



CMS

- Outreach and Students
- Quark net originally (Which is affording me opportunities now)
- Girls Scout event at the lab
- Open houses at the lab
- A little Saturday morning Physics
- Approximatly 7 students over 7 years at the end
- Giving talks to groups who come in like you guys

Fermilab To Host Girl Scout Badge Event on Saturday, November 6

November 4, 2004



Media contact

- Davide Castelvecchi, Fermilab, castel@fnal.gov, 630-840-2877

Batavia, Ill.-Area Girl Scouts will visit the U.S. Department of Energy's Fermi National Accelerator Laboratory on Saturday, Nov. 6 from 9:00 a.m. to 3:00 p.m. for the Girl Scout Fermi Workshop, as they earn their newly designed Fermilab Girl Scout Badges.

The Scouts will come in small groups and engage in a variety of activities, including exploring Wilson Hall's 15th floor visitors' area; viewing a video on Fermilab's Prairie Restoration Project; hiking on prairie trails; and learning about the Prairie School of Architecture. In case of bad weather, the activities will be indoors and will include visiting the Lederman Science Education Center. Previously, a rain date had been announced but was canceled.

At the end of the day, girls who have completed a minimal number of activities will get to sew a Fermilab Badge onto their uniform. "Scouts like to earn their badges, and to show them off on their uniforms," said workshop organizer Anne Lucietto of Fermilab.

Volunteers from Fermilab's staff will provide directions and brief presentations on Fermilab topics at key points of interest throughout the laboratory's grounds.


"The point of the workshop is to get the word out that Fermilab is here," Lucietto said, "and that there are a lot of things to see and learn, and it's not just the physics."

The newly minted Fermilab badges come in three types, each for a different age group: "Try-it" triangles for ages 6-8, round badges for ages 9-11, and rectangular "Interest Patches" for ages 12 and over. All badges feature two classic Fermilab symbols: The buffalo and the silhouette of Wilson Hall.

Media representatives wishing to cover the event should contact the Office of Public Affairs by Nov. 5 to arrange for access to the site.

Fermilab is a DOE Office of Science national laboratory, operated under contract by Universities Research Association, Inc.

Software Developer

- Work for CMS and Energy Frontier
 - FNAL has a system now called Enstore
 - Moving towards Cern Tape Archive (CTA)
 - Spent the first Month reading over projects that the group work on
 - Started playing with virtual machines and docker and Kubernetes
 - Started installing CTA on my own
- 
- Moved to putting Monitoring and figuring out how to monitor and what to monitor
 - Two other new hires about a year or less and one new hire after me
 - Still 20% under staffed

Collaborations / Partnerships / Members [19.5pt Bold]

