

# **USCMS Undergraduate Summer Internship 2024**

## **Report of Contributions**

Contribution ID: 1

Type: **not specified**

## **Start at 7:30 AM from Hyatt for FNAL for Badging at Fermilab Aspen East**

*Tuesday 28 May 2024 07:30 (30 minutes)*

**Session Classification:** Morning

Contribution ID: 2

Type: **not specified**

## **FNAL ID and Badging Time**

**Session Classification:** Morning

Contribution ID: 3

Type: **not specified**

## Distribution of Certificates

*Friday 2 August 2024 14:30 (30 minutes)*

Contribution ID: 4

Type: **not specified**

## Schedule Format

**Session Classification:** Morning

Contribution ID: 5

Type: **not specified**

## Welcome

*Tuesday 28 May 2024 10:00 (20 minutes)*

**Presenters:** BANERJEE, Santanu (Tougaloo College); MALIK, Sudhir (University of Puerto Rico (US)); BOSE, Tulika (University of Wisconsin Madison (US))

**Session Classification:** Morning

Contribution ID: 6

Type: **not specified**

## **CMS Detector - a discovery tool**

*Tuesday 28 May 2024 16:00 (1 hour)*

**Presenter:** NAHN, Steve (Fermilab)

**Session Classification:** Afternoon

Contribution ID: 7

Type: **not specified**

## **The UNIX Shell: A guide through the basics of the file systems and the shell**

*Wednesday 29 May 2024 09:00 (3 hours)*

**Primary author:** THAKORE, Mitanshu (University of Wisconsin Madison (US))

**Presenter:** THAKORE, Mitanshu (University of Wisconsin Madison (US))

**Session Classification:** Morning



Contribution ID: 8

Type: **not specified**

## **The UNIX Shell: A guide through the basics of the file systems and the shell**

*Wednesday 29 May 2024 14:30 (2h 30m)*

**Presenter:** THAKORE, Mitanshu (University of Wisconsin Madison (US))

**Session Classification:** Afternoon

Contribution ID: 9

Type: **not specified**

## **Git I - In this lesson we use Git from the Unix Shell**

*Thursday 30 May 2024 09:00 (3 hours)*

**Presenter:** FIDALGO RODRIGUEZ, Guillermo Antonio (University of Puerto Rico at Mayagüez)

**Session Classification:** Morning

Contribution ID: **10**

Type: **not specified**

## **"P5 Report: The future of particle physics" by Tulika Bose (WH1W)- Wilson Hall One West**

*Wednesday 29 May 2024 13:00 (1h 30m)*

**Presenter:** BOSE, Tulika (University of Wisconsin Madison (US))

**Session Classification:** Afternoon

Contribution ID: 11

Type: **not specified**

## **FNAL Summer Lecture - Intro to Accelerators (Jeffrey Eldred) - Room (Curia II)**

*Thursday 30 May 2024 13:00 (1 hour)*

**Session Classification:** Afternoon

Contribution ID: 12

Type: **not specified**

## **Git II - In this lesson we use Git from the Unix Shell¶**

*Thursday 30 May 2024 14:00 (3 hours)*

**Presenter:** FIDALGO RODRIGUEZ, Guillermo Antonio (University of Puerto Rico at Mayagüez)

**Session Classification:** Afternoon

Contribution ID: 13

Type: **not specified**

## **CMS Physics Overview**

*Tuesday 28 May 2024 13:00 (1 hour)*

**Presenter:** BOSE, Tulika (University of Wisconsin Madison (US))

**Session Classification:** Afternoon

Contribution ID: 14

Type: **not specified**

## Introduction to Python

*Friday 31 May 2024 09:00 (3 hours)*

**Presenter:** MOREIRA COIMBRA, Bruno (Fermi National Accelerator Lab. (US))

**Session Classification:** Morning

Contribution ID: 15

Type: **not specified**

## **CMS 101**

*Friday 31 May 2024 13:00 (1 hour)*

**Presenters:** FIDALGO RODRIGUEZ, Guillermo Antonio (University of Puerto Rico at Mayagüez); CRUZ CANDELARIA, Roy (University of Puerto Rico - Mayagüez); MALIK, Sudhir (University of Puerto Rico (US)); MAZURETS, Tetiana (University of Puerto Rico (US))

**Session Classification:** Afternoon



Contribution ID: 16

Type: **not specified**

## Python II: Building Programs with Python

*Friday 31 May 2024 14:00 (3 hours)*

**Presenter:** MOREIRA COIMBRA, Bruno (Fermi National Accelerator Lab. (US))

**Session Classification:** Afternoon

Contribution ID: 17

Type: **not specified**

## Python for HEP

*Monday 3 June 2024 09:00 (3 hours)*

**Presenter:** CRUZ CANDELARIA, Roy (University of Puerto Rico - Mayagüez)

**Session Classification:** Morning

Contribution ID: **18**

Type: **not specified**

## Python for HEP

*Monday 3 June 2024 13:00 (3 hours)*

**Presenter:** CRUZ CANDELARIA, Roy (University of Puerto Rico - Mayagüez)

**Session Classification:** Afternoon

Contribution ID: 19

Type: **not specified**

## **How to do Particle Physics in a Climate Emergency? (Curia II-WH2SW) - Wilson Hall 2nd floor South West**

*Monday 3 June 2024 16:00 (1h 30m)*

**Presenter:** BLOOM, Kenneth (University of Nebraska Lincoln (US))

**Session Classification:** Afternoon

Contribution ID: 20

Type: **not specified**

## PyROOT and RDataFrame

*Tuesday 4 June 2024 09:00 (3 hours)*

**Presenter:** SHEN, Xiaohe (Brown University (US))

**Session Classification:** Morning

Contribution ID: 21

Type: **not specified**

## **FNAL Summer Lecture - Intro to Particle Detectors (Evan Niner) - Room (Curia II)**

*Tuesday 4 June 2024 13:00 (1 hour)*

**Session Classification:** Afternoon

Contribution ID: 22

Type: **not specified**

## PyROOT and RDataFrame

*Tuesday 4 June 2024 15:00 (2h 15m)*

**Presenter:** SHEN, Xiaohe (Brown University (US))

**Session Classification:** Afternoon

Contribution ID: 23

Type: **not specified**

## Machine Learning

*Wednesday 5 June 2024 09:00 (3 hours)*

**Presenters:** Dr CHEN, Caixia (Tougaloo College); THAKORE, Mitanshu (University of Wisconsin Madison (US))

**Session Classification:** Morning



Contribution ID: 24

Type: **not specified**

## Machine Learning Exercises

*Wednesday 5 June 2024 14:00 (3 hours)*

**Presenter:** THAKORE, Mitanshu (University of Wisconsin Madison (US))

**Session Classification:** Afternoon

Contribution ID: 25

Type: **not specified**

# High-energy Collisions through the Ages

*Wednesday 5 June 2024 13:00 (1 hour)*

**Presenter:** QUIGG, Chris (Fermi National Accelerator Lab. (US))

**Session Classification:** Afternoon

Contribution ID: 26

Type: **not specified**

**C++**

*Thursday 6 June 2024 09:00 (2 hours)*

**Primary author:** CRUZ CANDELARIA, Roy (University of Puerto Rico - Mayagüez)

**Presenter:** CRUZ CANDELARIA, Roy (University of Puerto Rico - Mayagüez)

**Session Classification:** Morning

Contribution ID: 27

Type: **not specified**

## **FNAL Summer Lecture - Neutrino Physics (Meghna Bhattacharya)**

*Thursday 6 June 2024 13:00 (1 hour)*

**Session Classification:** Afternoon

Contribution ID: 28

Type: **not specified**

## Containers and Apptainer

*Thursday 6 June 2024 14:00 (2h 30m)*

**Presenter:** MAMBELLI, Marco (Fermilab (US))

**Session Classification:** Afternoon

Contribution ID: 29

Type: **not specified**

## Coding Dojo

*Friday 7 June 2024 09:00 (3 hours)*

**Session Classification:** Morning

Contribution ID: **30**

Type: **not specified**

## **Roc Tour and FNAL officials meeting**

*Friday 7 June 2024 13:00 (1 hour)*

**Session Classification:** Afternoon

Contribution ID: **31**

Type: **not specified**

## **Classes Q&A and Assignments**

*Friday 7 June 2024 14:00 (1 hour)*

**Session Classification:** Afternoon



Contribution ID: **32**

Type: **not specified**

## **CMS computing**

*Friday 7 June 2024 15:00 (1 hour)*

**Presenter:** MELO, Andrew Malone (Vanderbilt University (US))

**Session Classification:** Afternoon

Contribution ID: 33

Type: **not specified**

## **Coordination with mentors and sendoff**

*Friday 7 June 2024 16:00 (1 hour)*

**Session Classification:** Afternoon

Contribution ID: 34

Type: **not specified**

## Entering Research

*Tuesday 28 May 2024 14:00 (2 hours)*

**Presenter:** PALMER, Chris (University of Maryland (US))

**Session Classification:** Afternoon

Contribution ID: 35

Type: **not specified**

## **Tour of Quantum Garage at Fermilab**

*Tuesday 4 June 2024 14:00 (1 hour)*

**Presenter:** ROY, Tanay (Fermilab)

**Session Classification:** Afternoon

Contribution ID: **36**

Type: **not specified**

## **Tour of Sidet (Silcon Detector Facility)**

*Thursday 6 June 2024 11:00 (1h 5m)*

**Presenter:** DICKINSON, Jennet Elizabeth (Fermi National Accelerator Lab. (US))

**Session Classification:** Morning

Contribution ID: 37

Type: **not specified**

## Particle Physics Career Mentoring

*Thursday 6 June 2024 16:30 (30 minutes)*

**Presenter:** HARRIS, Robert (Fermi National Accelerator Lab. (US))

**Session Classification:** Afternoon

Contribution ID: **38**

Type: **not specified**

## **Badging at Aspen East (8:00 AM - 9:30 AM)**

*Tuesday 28 May 2024 08:00 (1h 30m)*

**Session Classification:** Morning

Contribution ID: 39

Type: **not specified**

## **Shuttle/Transport from Aspen East to Wilson Hall**

*Tuesday 28 May 2024 09:30 (30 minutes)*

**Session Classification:** Morning



Contribution ID: 40

Type: **not specified**

## **Introductions (Slide Deck) - Interns and Mentors**

*Tuesday 28 May 2024 10:20 (30 minutes)*

**Session Classification:** Morning

Contribution ID: 41

Type: **not specified**

## Cohort building session

*Tuesday 28 May 2024 10:50 (1h 10m)*

**Presenter:** BELLIS, Matthew (Cornell University/Siena College (US))

**Session Classification:** Morning

Contribution ID: 42

Type: **not specified**

## Tracking Detectors

*Wednesday 12 June 2024 13:00 (1 hour)*

**Presenter:** DICKINSON, Jennet Elizabeth (Fermi National Accelerator Lab. (US))

Contribution ID: 43

Type: **not specified**

## 5 min - 5 slides

*Friday 14 June 2024 13:00 (3 hours)*

### Suggested order of speakers

- 1 Jordan Vickers
- 2 Isabella Freitas
- 3 Casandra Saxon
- 4 Danielle Nunez
- 5 Ada Collins
- 6 Juan Guadalupe
- 7 Camila Pazmino Izquierdo
- 8 Jakia Choudhury
- 9 Chinyemba Kalenga
- 10 Iris Horn
- 11 Tsion Dessalegn
- 12 Fredrick White
- 13 Raven Lee
- 14 Ruvarashe Nyabando
- 15 Luis Felipe Koehler Domingues
- 16 Dwight Ross
- 17 Noah Omordia
- 18 Liz Mirra de Carvalho Rachid
- 19 Bhattarabodin Sonrod
- 20 Richard Kasongo

**Presenters:** FIDALGO RODRIGUEZ, Guillermo Antonio (University of Puerto Rico at Mayagüez); THAKORE, Mitanshu (University of Wisconsin Madison (US)); SHARMA, Richa (University of Puerto Rico (US)); CRUZ CANDELARIA, Roy (University of Puerto Rico - Mayagüez); MALIK, Sudhir (University of Puerto Rico (US)); MAZURETS, Tetiana (University of Puerto Rico (US))

Contribution ID: 44

Type: **not specified**

## Feedback and other discussions

*Friday 2 August 2024 15:00 (30 minutes)*

Contribution ID: 45

Type: **not specified**

## Machine Learning for Vector-Like Quarks

*Monday 17 June 2024 13:00 (1 hour)*

**Presenter:** BONILLA, Johan (Northeastern University (US))

Contribution ID: 46

Type: **not specified**

## **Studying high-energy nuclear physics and heavy ion collisions with CMS**

*Wednesday 3 July 2024 13:00 (1 hour)*

**Presenter:** BATY, Austin Alan (University of Illinois Chicago)

Contribution ID: 47

Type: **not specified**

## Trigger

*Monday 29 July 2024 13:00 (1 hour)*

**Presenter:** KENNEDY, Kiley Elizabeth (Princeton University (US))



Contribution ID: 48

Type: **not specified**

## Career Development Session

*Monday 24 June 2024 13:00 (1 hour)*

**Presenter:** HOGAN, Julie (Brown University, Bethel University (US))

Contribution ID: 49

Type: **not specified**

## Jet Reconstruction

*Wednesday 26 June 2024 13:00 (1 hour)*

**Presenter:** ROLOFF, Jennifer (Brown University (US))

Contribution ID: **50**

Type: **not specified**

## Unanswered-questions

*Monday 1 July 2024 13:00 (1 hour)*

**Presenter:** LINCOLN, Don (Fermi National Accelerator Lab. (US))

Contribution ID: 51

Type: **not specified**

## **Future Colliders - Muon Collider**

*Monday 22 July 2024 13:00 (1 hour)*

**Presenter:** JINDARIANI, Sergo (Fermi National Accelerator Lab. (US))

Contribution ID: 52

Type: **not specified**

## CMS Calorimetry

*Monday 8 July 2024 13:00 (1 hour)*

**Presenter:** YU, David (University of Nebraska Lincoln (US))

Contribution ID: 53

Type: **not specified**

## Dark Matter Searches

*Wednesday 10 July 2024 13:00 (1 hour)*

**Presenter:** PINNA, Deborah (University of Wisconsin Madison (US))

Contribution ID: 54

Type: **not specified**

## Office Hour

*Friday 5 July 2024 15:00 (1 hour)*

**Presenter:** BOSE, Tulika (University of Wisconsin Madison (US))

Contribution ID: 55

Type: **not specified**

## **Career Development Session - Part 2**

*Wednesday 17 July 2024 13:00 (1 hour)*

**Presenter:** HOGAN, Julie (Brown University, Bethel University (US))



Contribution ID: 56

Type: **not specified**

# Higgs Physics

*Wednesday 24 July 2024 13:00 (1 hour)*

**Presenter:** CHANG, Philip (University of Florida (US))

Contribution ID: 57

Type: **not specified**

## **Meet a USCMS scientist**

*Monday 15 July 2024 01:00 (1 hour)*

**Presenter:** BERRY, Douglas Ryan (Fermi National Accelerator Lab. (US))

Contribution ID: 58

Type: **not specified**

## **Q&A with PURSUE alumni**

*Wednesday 31 July 2024 01:00 (1 hour)*

Ralph Ortiz, Andrea Ola, Elena Vlaskovic, Kirstin Poppen, Carlos Romero

Contribution ID: 59

Type: **not specified**

## Talk 1 - Rucio Rebalancer

*Thursday 1 August 2024 09:00 (30 minutes)*

**Presenter:** KALENGA, Chinyemba (Fermi National Accelerator Lab. (US))

**Session Classification:** Morning

Contribution ID: **60**

Type: **not specified**

## **Talk 2 - Development of a Cosmic Ray Trigger for Quality Control of HGICAL Scintillator Tile-Modules**

*Thursday 1 August 2024 09:30 (30 minutes)*

**Presenter:** NUNEZ, Danielle

**Session Classification:** Morning

Contribution ID: 61

Type: **not specified**

## **Talk 3 - DAQ Upgrade of Step 3 in Quality Control Procedure for CMS GEM Chambers**

*Thursday 1 August 2024 10:00 (30 minutes)*

**Presenter:** MIRRA DE CARVALHO RACHID, Liz

**Session Classification:** Morning

Contribution ID: 62

Type: **not specified**

## **Talk 4 - Investigating the production of top quark together with W boson and a Z boson (the tWZ process)**

*Thursday 1 August 2024 10:30 (30 minutes)*

**Presenter:** DESSALEGN, Tsion

**Session Classification:** Morning

Contribution ID: 63

Type: **not specified**

## **Talk 5 - Calibrating Neutrino Detection and W Boson Mass Measurements**

*Thursday 1 August 2024 11:00 (30 minutes)*

**Presenter:** LEE, Raven

**Session Classification:** Morning



Contribution ID: **64**

Type: **not specified**

## **Talk 6 - Improvements to the Tracer Log Viewer**

*Thursday 1 August 2024 11:30 (30 minutes)*

**Presenter:** KASONGO, Richard

**Session Classification:** Morning

Contribution ID: 65

Type: **not specified**

## **Talk 13 - Implementing CMS Open Data from 2016 into the AGC Coffea workbook**

*Friday 2 August 2024 09:00 (30 minutes)*

**Presenter:** VICKERS, Jordan

**Session Classification:** Morning

Contribution ID: 66

Type: **not specified**

## **Talk 14 - Measuring Properties of Exotic Charged Particles at the L1 Trigger of CMS**

*Friday 2 August 2024 09:30 (30 minutes)*

**Presenter:** DOMINGUES, Luis Felipe

**Session Classification:** Morning

Contribution ID: 67

Type: **not specified**

## **Talk 15 - HGCAL Project: ECONT and ECOND Testing**

*Friday 2 August 2024 10:00 (30 minutes)*

**Presenter:** SAXON, Casandra (Fermi National Accelerator Lab. (US))

**Session Classification:** Morning

Contribution ID: 68

Type: **not specified**

## **Talk 7 - Prospects of Top Quark Entanglement at the High Luminosity Large Hadron Collider (HL-LHC)**

*Thursday 1 August 2024 13:00 (30 minutes)*

**Presenter:** FREITAS, Isabella

**Session Classification:** Afternoon

Contribution ID: 69

Type: **not specified**

## Talk 8 - The 3 Project Problem

*Thursday 1 August 2024 13:30 (30 minutes)*

**Presenter:** OMORDIA, Noah

**Session Classification:** Afternoon

Contribution ID: 70

Type: **not specified**

## Talk 9 - BinaryTransparency Toolkit Development

*Thursday 1 August 2024 14:00 (30 minutes)*

**Presenter:** ROSS, Dwight

**Session Classification:** Afternoon

Contribution ID: 71

Type: **not specified**

## **Talk 10 - Testing and Calibration of Inner Tracker Silicon Detector Modules AND Track Clustering via Quantum Annealing**

*Thursday 1 August 2024 14:30 (30 minutes)*

**Presenter:** HORN, Iris

**Session Classification:** Afternoon



Contribution ID: 72

Type: **not specified**

## **Talk 19 - Measurements of High Energy Higgs Boson Production in the $H \rightarrow b\bar{b}$ decay channel**

*Friday 2 August 2024 13:00 (30 minutes)*

**Presenter:** NYABANDO, Ruvarashe Tapiwa (Fermi National Accelerator Lab. (US))

**Session Classification:** Afternoon

Contribution ID: 73

Type: **not specified**

## **Talk 20 - Characterizing AXOL1TL's Trigger Efficiency**

*Friday 2 August 2024 13:30 (30 minutes)*

**Presenter:** COLLINS, Ada Carolyn (University of Colorado Boulder (US))

**Session Classification:** Afternoon

Contribution ID: 74

Type: **not specified**

## Talk 16 -

**Session Classification:** Afternoon

Contribution ID: 75

Type: **not specified**

## Talk 15 -

**Session Classification:** Afternoon

Contribution ID: 76

Type: **not specified**

## **Talk 11 - Reweighting NLO Samples with Negative Weights**

*Thursday 1 August 2024 15:00 (30 minutes)*

**Presenter:** SONROD, Bhattarabodin

**Session Classification:** Afternoon

Contribution ID: 77

Type: **not specified**

## **Talk 12 - Developing machine learning based taggers for MDS based for future analyses**

*Thursday 1 August 2024 15:30 (30 minutes)*

**Presenter:** GUADALUPE ROSADO, Juan (University of Puerto Rico (US))

**Session Classification:** Afternoon

Contribution ID: 78

Type: **not specified**

## **Talk 16 - Vector Like Quarks search set-up + Lego ParticleFlow**

*Friday 2 August 2024 10:30 (30 minutes)*

**Presenter:** PAZMINO IZQUIERDO, Camila

**Session Classification:** Morning

Contribution ID: 79

Type: **not specified**

## **Talk 17 - Dark QCD: Dark Matter in Semi-visible Jet**

*Friday 2 August 2024 11:00 (30 minutes)*

**Presenter:** CHOUDHURY, Jakia

**Session Classification:** Morning



Contribution ID: **80**

Type: **not specified**

## **Talk 18 - Building a Computer Board Visual Inspection Pipeline**

*Friday 2 August 2024 11:30 (30 minutes)*

**Presenter:** WHITE, Fredrick

**Session Classification:** Morning

Contribution ID: **81**

Type: **not specified**

## Poster Submission

*Thursday 25 July 2024 23:00 (20 minutes)*

**Presenter:** FIDALGO RODRIGUEZ, Guillermo Antonio (University of Puerto Rico at Mayagüez)

Contribution ID: **82**

Type: **not specified**

## **Interns fill 10-week feedback form**

*Friday 2 August 2024 14:00 (30 minutes)*

**Session Classification:** Afternoon