University of Alabama
Teacher Coding Workshop Agenda
June 5th - 7th, 2023

Workshop Goals

1. Review and apply basic aspects of computer programming in Python, such as conditionals, math functions and plotting, and file manipulation.
2. Use simple programming tools to analyze large datasets generated from the CMS experiment and run analyses of these data. Generate conclusions about these analyses that include both calculations and plots (e.g. of invariant or transverse mass).
3. Search for new scientific datasets available online and write code to perform analyses of these new data.
4. Design a series of code-centered activities that either add onto existing units in a K-12 course, or replace an already existing activity; create a plan for implementation of these activities.

Location: UA Campus, Gallalee Hall, Room #310

UA Faculty Advisor
Prof. Sergei Gleyzer

Quarknet Coding Fellows
Joy Breman - Florida State Center
Megan Alvord - Virtual Center

Alabama Center Participants
Destiny Langford
Monica Watkins
Sarah Newton

Day 1

Session 1	9:00 Welcome ● Stipends → attendance ○ Call Anne Zakas and give SSN ○ 574-631-2789 Encrypted and such

	• Wifi
	• Parking
	• Complete the Quarknet Registration Form
	• Introductions
	
	9:45 Norms discussion and activity
	• Hopes and Fears survey
	• In groups:
	  ○ Norms poster from APS STEP-UP
	  ○ Fermilab norms poster
	  ○ Which poster items resonate with what you're doing this week?
	  ○ Which poster would you hang in your classroom?
	• Hopes and Fears Responses
	
	10:15 Our philosophy re:coding
	• Pair Programming
	
	10:25 Driver/navigator time
	• Remember to MAKE A COPY of the notebooks
	• You can start with this notebook as an Intro to coding
	• Once both group members feel a little more comfortable try this notebook: Probability and Histograms using dice
	
	12:00 Lunch Break

Session 2	1:00 Continue driver/nav work from session 1. • Start on this notebook: Calculate the mass of a muon using CMS data. 1:45 CMS Experiment review (Ana Maria Slivar) Ana Maria's slides 2:20 Continue working on muon mass notebook or start working with the Double Muon Run data 3:45 All hands meeting • Google can be the best programming help • Daily feedback survey

Day 2

Session 1	9:00 All Hands meeting

	● Successes / challenges from yesterday's notebooks ● Group photo later this AM 9:15 Switch to Teacher Hat mode ● What most schools don't teach video ● Work on one of these notebooks and share some things you learned like new code or new ideas and how this could be implemented in a classroom ○ Wrapping paper & surface area example implementation ○ Bigfoot sightings example implementation ○ Learn plate tectonics by inquiry *need access ○ Sunspot counts and locations example implementation ○ Quakes example implementation 10:30 Work solo or in groups ● Implementation advice and examples on CODINGinK12.org Thanks Adam. ● Brainstorm lesson ideas ● Start on implementation plan ○ Resources for data ■ Trends.google.com ■ Data.gov ■ Google data search ■ Nasa Earth Data 11:50 Group Photo #1 12:00 Lunch Break
Session 2	1:00 Continue work on implementation plan 3:45 All Hands Meeting ● Daily feedback survey

Day 3

Session 1	9:00 All Hands ● Thoughts from yesterday ● How to do this without Google access? ○ On your computer: Install Anaconda (includes Jupyter, Python, & all your favorite modules) ○ Free online: Repl.it (anytime this AM) Quarknet Teacher survey ● Please complete this survey. It will take about 15 minutes.

	Processing LHC Data - great video! 9:15 Continue working on implementation plan ● Brainstorm and data search ● develop a plan for implementation with your students ● use whatever format or structure you'd like ● A good place to include your implementation plan is in your coding notebook. ● Be prepared to have others look at your implementation plan and coding activity during Session 2. ● Upload your implementation plan here 11:30 Precision Navigation and Timing and Frequency Lab Tour with Prof. Thejesh Bandi 12:30 Lunch Break (everyone together)
Session 2	1:30 Share plans for implementation ● Each camper shares their lesson concept and notebook. Others participate as a student might. ● Others provide comments/feedback ● The author can make their own notes with comments/feedback. 2:30 Introduction to QuarkNet by Ken Cecire (University of Notre Dame and QuarkNet) - QuarkNet website - QuarkNet data portfolio (activities) - Quarknet Workshops - Ken Cecire, kcecire@nd.edu 3:00 How to do this without Google access? ● On your computer: Install Anaconda (includes Jupyter, Python, & all your favorite modules) ● Free online: Repl.it ○ jupyter.org (free lite version) ○ IBM deepnote (must be 16+, age restricted) 3:15 Resources ● Matplotlib Cheatsheets ● Matplotlib Plot Types ● Example plots 3:40 Group Photo #2 3:45 Housekeeping and sign off ● Daily feedback survey ● Exit Survey

Megan's kinematics python notebooks ← these are still rough drafts, but a different way to model motion.