GMU Computational Physics Workshop
January 4- January 10, 2020

Instructor: William Matzko
Email: wmatzko@gmu.edu
Room: Planetary Hall, 320/324
Time (anticipated): 9:00 AM – 5:00 PM (Lunch from 12:00 – 1:00 PM)

Goal: The goal of this workshop is to get you comfortable with programming in Python, while learning methods of computational physics. This workshop is meant to give a broad, big-picture exposure to these methods as opposed to a deeper understanding of the theory behind them.

Structure: The only way you will learn to code is by coding. Hence, most of your time will be spent solving problems in Python. A set of course notes will be given to you. **You should read the chapters associated for a particular day before coming to class**. These notes are meant to assist you in problem solving and provide insight into certain computational physics techniques. You will use these techniques to complete at least 1 project related to computational physics and present that project to the class on the last day.

From a day-to-day perspective, I will give a brief lecture at the start of the class based on the course notes. Afterwards, you will work on a problem set related to lecture. Once those problems are finished, you should work on your chosen project.

Anticipated Timeline

Day 1 (January 4), Chapters 1-4
- Introductions/housekeeping
- Overview of course
- Math assessment
- Download Anaconda/Python
- Lecture: Basics of Python
- CH 4 Problems

Day 2 (January 5), Chapter 4
- Continue CH 4 problems
- Choose projects & begin work

Day 3 (January 6), Chapters 5, 6
- Lecture: Linear and non-linear equations
- CH 5 and 6 Problem set
- Project work

Day 4 (January 7), Chapters 7, 8
- Lecture: Curve fitting and interpolation
- CH 7 and 8 problem set
- Project work

Day 5 (January 8), Chapters 9, 10
- Lecture: Numerical integration & differentiation
- CH 9 and 10 problem set
- Project work

Day 6 (January 9), Chapter 11
- Lecture: Ordinary Differential Equations
- CH 11 problem set
- Project work

Day 7 (January 10)
- Project work
- Presentations
- Conclusion