**Bioinformatics Bootcamp – Intro to Python for Biomedical Machine Learning**

**Dates and times:** Tuesdays 5-6:50PM

**Location**: Zoom

**Instructor**: Henry Miller, M.S.  
**Title:** 3rd year graduate student, IBMS PhD Program  
**Email:** [millerh1@uthscsa.edu](mailto:millerh1@uthscsa.edu)

**Office hours:** <https://calendly.com/millerh1/30min>

**Instructor**: Simon Levy, M.S.  
**Title:** 5th year graduate student, IBMS PhD Program  
**Email:** [levys@uthscsa.edu](mailto:levys@uthscsa.edu)

**Office hours:** TBD

**Instructor:** Daniel Montemayor, Ph.D.  
**Title:** Assistant Professor, Department of Nephrology  
**Email:** [montemayord2@uthscsa.edu](mailto:montemayord2@uthscsa.edu)

**Office hours:** <https://calendly.com/daniel_montemayor/montemayor-office-hours>

**Description and Learning Outcomes:**

This two-part workshop is designed to prepare biomedical scientists to use the python programming language for machine learning. **Part I** will teach fundamental python programming and basic python data science. **Part II** will teach machine learning fundamentals, building towards capstone projects involving real-world patient data. Most sessions will consist of an hour-long lecture, with 30-minutes of hands-on activities guided by the instructors which, if not completed before the workshop ends, will be finished for homework. The skills gained will include:

Part I: Python for Data Science

1. Data structures
2. If…Else
3. Loops
4. Functions
5. Numpy/Pandas
6. Matplotlib
7. Jupyter Notebook

Part II: Machine Learning for Biomedical Applications

1. Exploratory data analysis
2. Feature selection
3. Regression models
4. Classification models
5. ML Workflows
6. Image processing
7. Introductory Deep learning

**Course outline**

**Preliminary tasks (required for synchronous participation):**

Install [anaconda](https://www.anaconda.com/products/individual) on your computer and then complete the following courses in DataCamp:

1. **\***Introduction to Python
2. **\***Intermediate Python

**\***Alternatively, score > 60% on the “Python Programming” DataCamp assessment.

Once you complete these, let Henry know ([millerh1@livemail.uthscsa.edu](mailto:millerh1@livemail.uthscsa.edu)) and he will give you the invite link for the workshop sessions.

**Part I: Python for Data Science**

**Module 1: Intro to Python Programming**

Lecturer: Henry Miller

Activity/Homework: Module #1 practice problems.

Date: June 8th

**Module 2: Intermediate Python**

Lecturer: Henry Miller

Activity/Homework: Module #2 practice problems.

Date: June 15th

**Module 3: Python for Data Science**

Lecturer: Simon Levy

Activity/Homework: Module #3 practice problems. Begin “Introduction to Supervised Learning with Scikit Learn course” on DataCamp.

Date: June 22nd

**Module 4: Review week**

Lecturer: Henry and Simon

Activity/Homework: Finish “Introduction to Supervised Learning with Scikit Learn course” on DataCamp.

Date: June 29th

**Part II: Intro to Biomedical Machine Learning**

**Module 5: Getting to know your data**

Lecturer: Daniel Montemayor

Activity/Homework: Module #5 practice problems.

Date: July 6th

**Module 6: Feature selection and parsimony**

Lecturer: Daniel Montemayor

Activity/Homework: Module #6 practice problems. Begin working on the Leukemia miniproject.

Date: July 13th

**Module 7: Supervised ML models**

Lecturer: Daniel Montemayor

Activity/Homework: Module #7 practice problems. Continue working on the Leukemia miniproject.

Date: July 20th

**Module 8: End-to-end ML Workflows**

Lecturer: Daniel Montemayor

Activity/Homework: Module #8 practice problems. Continue working on the Leukemia miniproject.

Date: July 27th

**Module 9: Predicting Leukemia Patient Outcomes Prt I**

Lecturer: Daniel Montemayor

Activity/Homework: Complete the leukemia miniproject.

Date: Aug 3rd

**Module 10: Predicting Leukemia Patient Outcomes Prt II**

Lecturer: Daniel Montemayor

Activity/Homework: Complete the “Image processing in Python DataCamp” course.

Date: Aug 10th

**Module 11: Intro to Computer Vision for Biomedical Applications**

Lecturer: Daniel Montemayor

Activity/Homework: Process brain tumor dataset and predict tumor margins.

Date: Aug 17th

**Module 12: Advanced topics**

Lecturer: Daniel Montemayor

Activity/Homework: Process brain tumor dataset with deep learning.

Date: Aug 24th

**Additional information:**

* This workshop does not provide a grade and is not credit-bearing.
* **Zoom lectures will be recorded**
* For additional help, instructors may be reached by email at any time.