NEUS 640

PYTHON BOOTCAMP FOR NEUROSCIENTISTS, Winter term 2018

Monday-Friday, January 8-12, 9:00-11:30am, Vollum 1441

Course Director(s) and Instructors:

- **Ted Laderas, Ph.D.** Assistant Professor in the division of Bioinformatics and Computational Biology at OHSU – email: laderast@ohsu.edu

- **Stephen David, Ph.D.** Assistant Professor in the Otolaryngology department at OHSU / NGP and BEHN Programs – email: davids@ohsu.edu

Co-instructors:

- **Brad Buran, Ph.D.** Research Instructor, Oregon Hearing Research Center, OHSU – email: buran@ohsu.edu

- **Lisa Karstens, Ph.D.** Assistant Professor in the Department of Medical Informatics and Clinical Epidemiology at OHSU – email: karstens@ohsu.edu

- **Michael Mooney, Ph.D.** Assistant Professor in the Division of Bioinformatics & Computational Biology at OHSU – email: mooneymi@ohsu.edu

Teaching Assistants:

- Daniela Saderi Ph.D. Candidate NGP – email: saderid@ohsu.edu

- Lucille Moore Ph.D. Candidate NGP – email: moorlu@ohsu.edu

- Charlie Heller Ph.D. Candidate NGP – email: hellerc@ohsu.edu

- Zachary Schwartz Ph.D. Candidate NGP – email: schwarza@ohsu.edu

Course description: This course is meant to be a gentle introduction to the Python programming language using data types familiar to Neuroscience students, including behavioral, electrophysiology, and imaging data. Emphasis will be put on introducing students to concepts of visualization, data manipulation, and analysis using available Python packages (NumPy, Pandas, Matplotlib).

This course is meant to be a prerequisite to the current Intro to Programming course and Bioinformatics Programming and Scripting (BMI 565/665) available in DMICE.

Prerequisites

A laptop with web browser is required. No experience with Python or programming is necessary.

Learning objectives

After taking this course, students should be able to:

- Understand basic data types in Python
- Conduct data manipulation and analysis
- Automate simple computational tasks
- Be able to visualize data

Course content:

Day 1: Introduction to the Python language: Data types and handling errors (Daniela Saderi & Lisa Karstens)

Day 2: Introduction to Pandas Data Frames: intro to imaging data analysis (Luci Moore & Ted Laderas)

Day 3: More on Pandas and Numpy: electrophysiology data analyis (Charlie Heller & Mike Mooney)

Day 4: Diving deeper into Pandas with imaging data (Brad Buran)

Day 5: In class evaluation exercise; Q&A; Installing Python in your machine (all)

Grading

The successful completion of this course will give students 1 CFU. Grading will be Pass/No Pass based on the following:

- Class attendance* and participation in discussions (50%)
- A short final project consisting of an analysis using a Python Jupyter notebook (50%)

* All enrolled students are expected to attend the full course.

Useful Resources

- Online courses:

- Free material from Python for Everybody textbook and Coursera class ([PY4E](#))
  - [Enthought Training on Demand](#) (great place to get free intro to Python classes for free with edu email)
- [Python documentation](#) and where to find help:
  - [Tutorial](#)
  - [Library Reference](#)
  - [Scientific python stack documentation: numpy, scipy, matplotlib](#), [Stack Overflow](#)
  - [Quick Python reference](#)
- Cheat sheets:
  - [Matlab-to-Python](#)
  - [Matlab-to-Python](#)
  - [Pandas](#)
  - [Numpy](#)
  - [Querying data](#)
  - [Glossary](#)
- Books:
  - [Automate the boring stuff with Python](#)
  - [Python for data analysis](#)

Code of Conduct

We value the participation of every member of our community and want everyone to have an enjoyable and fulfilling learning experience. Accordingly, everyone, including students, TAs, and leaders, are expected to show respect and courtesy to others throughout the course.

To make clear what is expected, everyone taking part in this class is required to conform to the following Code of Conduct. If you experience a violation, please contact one of the class organizers. All communication will be treated as confidential.

- We are dedicated to providing a harassment-free learning experience for everyone, regardless of gender, sexual orientation, disability, physical

appearance, body size, race, religion, or choice of text editor. We do not tolerate harassment of participants in any form.

- All communication should be appropriate for a professional audience including people of many different backgrounds. Sexual language and imagery is not appropriate for any event.

- Be kind and do not insult or put down others. Remember that there are people in the room with different degrees of experience with coding, different learning styles, and different personalities. If you know more, please help your neighbor who might have less experience than you without making than feel ashamed for it. Respect your turn to talk and leave space for peolpe who may be less propensive to talk than you are.

- Behave professionally. Remember that harassment and sexist, racist, or exclusionary jokes are not appropriate.

- Anyone violating these rules may be asked to leave the class.

Thank you for helping make this a welcoming, friendly learning experience for all.

This Code of Conduct was adapted from Mozilla Science *https://science.mozilla.org/code-of-conduct*.

Please note that this is a class specific code of conduct. Students are also expected to adhere to the OHSU Code of Conduct (see below).

OHSU Learning Resources Available to Students*

*Exceptions include online students, Public Health students who have selected PSU as their primary providers, and students whose home campus is a satellite campus. If your home institution is not on the Portland campus, contact your home institution student support services.

Registrar's Office
Mackenzie Hall, Rm. 1120
503-494-7800; regohsu@ohsu.edu

OHSU ITG Help Desk

Sakai Course Management System, please contact the TLC Help Desk at 877-972-5249 or email 503-494-2222; sakai@ohsu.edu

[Office of Student Financial Aid](#)
Mackenzie Hall, Rm. 1120
503-494-7800 or 800-775-5460 – Option 2; finaid@ohsu.edu

[Cashiers Office](#)
Marquam Plaza; 2525 SW Third Ave
503-494-8243; cashiers@ohsu.edu

[Office of Public Safety](#)
Emergency on Campus: 503-494-4444
Non-emergency: 503-494-7744; pubsafe@ohsu.edu

[Joseph B. Trainer Health & Wellness Center](#)
Baird Hall, Rm. 18 (Primary Care) and Rm. 6 (Behavioral Health)
503-494-8665; For urgent care after hours, 503-494-8311 and ask for the Nurse on call.

askjbthealth@ohsu.edu

Ombudsman Office
Gaines Hall, Rm. 117
707 SW Gaines Street, Portland, OR 97239
503-494-5397; graybill@ohsu.edu

Library: [Biomedical Information Communication Center](#)
http://www.ohsu.edu/xd/education/library/contact.cfm

Fitness/Wellness: [March Wellness & Fitness Center](#)
3303 SW Bond Avenue, Portland, OR 97239
503-418-6272

Statement Regarding Students with Disabilities: OHSU is committed to inclusive and accessible learning environments in compliance with federal and state law. If you have a disability or think you may have a disability (mental health, attention-related, learning, vision, hearing, physical or health impacts) contact the Office for Student Access at

(503) 494-0082 or studentaccess@ohsu.edu to have a confidential conversation about academic accommodations. Information is also available at www.ohsu.edu/student-access. Because accommodations may take time to implement and cannot be applied retroactively, it is important to have this discussion as soon as possible.

Student Evaluation of Teaching: Course evaluation results are extremely important and used to help improve courses and the learning experience of future students. Responses will always remain anonymous and will only be available to instructors after grades have been posted. The results of scaled questions and comments go to both the instructor and their unit head/supervisor. Refer to Student Evaluation of Teaching, Policy No. 02-50-035.

Copyright Information

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Sakai course web sites contain material protected by copyrights held by the instructor, other individuals or institutions. Such material is used for educational purposes in accord with copyright law and/or with permission given by the owners of the original material. You may download one copy of the materials on any single computer for non-commercial, personal, or educational purposes only, provided that you (1) do not modify it, (2) use it only for the duration of this course, and (3) include both this notice and any copyright notice originally included with the material.   Beyond this use, no material from the course web site may be copied, reproduced, re-published, uploaded, posted, transmitted, or distributed in any way without the permission of the original copyright holder. The instructor assumes no responsibility for individuals who improperly use copyrighted material placed on the web site.

Syllabi Changes and Retention

Syllabi are not to be considered a contract. Information contained in syllabi, other than the course grade and absence policies, may be subject to change as deemed appropriate by the instructor. Refer to the Course Syllabi Policy, TBD#.

Professional Conduct Expectations
OHSU faculty, staff, and students are expected to conduct themselves in accord with

the high ethical standards expected of health professionals as noted in the OHSU Code of Conduct. In addition the OHSU Code of Conduct, refer to your program's handbook for additional details.

Commitment to Diversity & Inclusion
OHSU is committed to creating and fostering a learning and working environment based on open communication and mutual respect. If you encounter sexual harassment, sexual misconduct, sexual assault, or discrimination based on race, color, religion, age, national origin, veteran's status, ancestry, sex, marital status, pregnancy or parenting status, sexual orientation, gender identity, disability or any other protected status please contact the Affirmative Action and Equal Opportunity Department at 503-494-5148 or aaeo@ohsu.edu. Inquiries about Title IX compliance or sex/gender discrimination and harassment may be directed to the OHSU Title IX Coordinator at 503-494-0258 or titleix@ohsu.edu.

Modified Operations, Policy 01-40-010.

Students should review the Student Portal, O2, or call OHSU's weather alert line at 503-494-9021 for the most up-to-date information on OHSU-wide modified operations which include but are not limited to delays or closures for inclement weather. For specific campus information, outside of Portland, check the following sites:

Ashland Campus

http://www.sou.edu

Klamath Falls Campus

http://www.oit.edu/inclement-weather

La Grande Campus

http://www.eou.edu/ohsu/

Monmouth Campus

http://www.wou.edu/hr/resources/policies/campus-inclement-weather-notice/

For additional information or support contact:

Constance Tucker, M.A., Ph.D.

Vice-Provost for Educational Improvement and Innovation

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