ForBio
Forskerskole i Biosystematikk
Research School in Biosystematics

Introduction to Bioinformatics for Biosystematics

About the workshop

Time: October 3-7 2015 (GNU/Linux and Bash introduction will be given October 1-2)

Place: Biological Station Drøbak, Norway

Credits: 3 ECTS

Level: PhD-level course, aimed at early stage PhD students. Motivated MSc students can be admitted as well.

Registration: Deadline August 1st.

Fee: No fee for ForBio members or associates.

Maximum number of participants: 18

Teachers: Johan Nylander, Hans Henrik Fuxelius

Travel, food and accommodation: Shared accommodation is free of charge. In addition, ForBio will cover travel for *Norwegian* ForBio members. Meals are not included but the station has cooking facilities and food can be bought and prepared together in shifts. BioCEED and NABiS students are encouraged to apply. See www.forbio.uio.no for more information on ForBio and membership.

Course content

Basic programming skills are becoming essential for handling large datasets and performing complex analyses in biosystematics. This course aims to provide the students with tools to solve practical problems often encountered in biosystematic research. The students will be introduced to programming using Python (www.python.org), R (www.r-project.org), and SQL (e.g., http://en.wikipedia.org/wiki/SQL). Other programming languages may be used for specific tasks.

Learning outcomes

Upon completion of the course, the students should be comfortable working with a command-line interface, well oriented in the basics of Python, R, and SQL programming, and familiar with methods for computerized process control and data analysis.

Admission

Deadline for applications is August 1st.All students are requested to apply by filling out the ForBio course registration form at: https://nettskjema.uio.no/answer/71951.html

PhD-students registered at University of Oslo

PhD students from the University of Oslo who would like to take the course as a part of their theoretical syllabus for the PhD degree also need to register through Studentweb https://studweb.uio.no/as/WebObjects/studentweb2?inst=UiO in addition to the ForBio course registration form.

PhD-students registered at Norwegian universities other than University of Oslo:PhD students from Norwegian universities other than University of Oslo who would like to take the course as a part of their theoretical syllabus for the PhD degree can apply for status as a visiting PhD student at http://www.mn.uio.no/english/research/doctoral-degree-and-career/phd-programme/courses/visiting-phd.html.Alternatively you can take our course certificate and apply to have it accepted as part of the special pensum. Please contact the student administration at the University of Oslo (studieinfo@bio.uio.no, +47 2285 6344) for more information.

PhD-students/post-docs registered at non-Norwegian universities:

The student administration at the University of Oslo does not administrate students registered at foreign universities, and PhD-students registered at non-Norwegian universities can therefore not get formal course credits from University of Oslo. However, ForBio will provide all participants that pass the exam with a course certificate.

Prerequisites

The course participants are expected to have basic knowledge in evolutionary biology and phylogenetic analyses of molecular data corresponding to BIO4200 - Molecular Evolution (http://www.uio.no/studier/emner/matnat/ibv/BIO4200/index-eng.html), and BIO4210 - Classification and Phylogeny (http://www.uio.no/studier/emner/matnat/ibv/BIO4210/index-eng.html).

You will need a laptop throughout the course. Make sure you have administrator privileges and can install software on the computer. A virtual machine (VM) containing the Linux operating system with all necessary software are going to be used throughout the course. This will require the installation of the software VirtualBox (www.virtualbox.org) and the VM *prior* to the first day of the course. More information about this will be send out to admitted students.

No programming experience is required but participants are expected to be familiar with the GNU/Linux environment and Bash (www.gnu.org/software/bash). A two day introduction will be arranged for participants with no or limited experience of GNU/Linux and Bash. Please register for the introduction in the application form.

Teaching

All lectures and computer exercises will take place at the Biological Station Drøbak, Norway. Literature: Handouts.

Schedule:October 1-2 (Saturday-Sunday): Introduction to GNU/Linux and Bash. October 3-7 (Monday-Friday): Python, R, SQL.

Exam information

Each student will have to present a written solution to a programming problem given out by the teachers during the course. The solution should be delivered within two weeks after the course ends. The solution will be marked as passed/not passed.

Any questions before that can be sent by email to hugo.deboer@nhm.uio.no

Preliminary program, October (1–2) 3–7

Place: Biological Station Drøbak, Norway.

Map: https://goo.gl/maps/4oQus6jEfs82

Saturday and Sunday are split in morning (10.00 – ca 12.30) and afternoon (ca 13:30 – ca 17:00) sessions with coffee breaks every now and then.

Monday to Friday are split in morning (09:00 – ca 12.30) and afternoon (ca 13:30 – ca 17:00) sessions with coffee breaks every now and then.

Teachers: Hans Henrik Fuxelius (HHF; hfuxelius@gmail.com), Johan Nylander (JN; johan.nylander@nrm.se)

Saturday 1/10 (for participants who signed up for the Introduction to GNU/Linux and Bash)

- Computer setup. Ensuring that all participants have their virtual machines up and running (HHF, JN).
- UNIX/Linux – introducing the computational platform (JN)
- Bash programming (if we have time; JN)

Sunday 2/10 (for participants who signed up for Introduction to GNU/Linux and Bash)

- Bash programming – handling files and software, and communicating with servers (JN)

Monday 3/10

- Welcome and introduction to the course (HdB)
- Introduction to bioinformatics (JN)
- Python – Introduction to Python (HHF)

Tuesday 4/10

- Python – Python standard libraries (HHF)

Wednesday 5/10

- Python – Python libraries for bioinformatics, BioPython (HHF)

Thursday 6/10

- SQL – Introduction to SQL (HHF)
- SQL – SQL and Python interaction (HHF)

Friday 7/10

- R – Introduction to the R statistical programming language (JN)
- R – Data exploration using R, SQL, Python (JN, HHF)