



Program Block course in Evolutionary Medicine BIO 440 (HS 2020) 5.10.2020 (SR)

Lecturers:

Introduction: Frank Rühli (FR), Verena Schüneman (VS), Patrick Eppenberger (PE), Adrian Jäggi (AJ), Kaspar Staub (KS), Nicole Bender (NB), Martin Häusler (MH)

Palaeoradiology: Frank Rühli (FR), Thomas Böni (TB), Patrick Eppenberger (PE), Martin Häusler (MH)

Genetics: Verena Schüneman (VS), Judith Neukamm (JN), Enrique Rayo (ER), Kerttu Majander (KM), Christian Urban (CU)

Evolutionary Morphology: Martin Häusler (MH), Cinzia Fornai (CF), Nicole Webb (NW), Viktoria Krenn (VK)

Rooms Irchel: [Y42 G53](#) (building 42, IEM seminar room), seating capacity with 1.5 m distance n = **18**

Rooms Zentrum: [RAI-D-021](#) (Campus Zentrum, Rämistr. 74, rechter Nebeneingang, Untergeschoss; Mac IT-room, n = 9) / **This room need an access card. You can get one in room [RAI-E-015](#) (Helpdesk, Informatikdienste)**

Frank Rühli's office: Building 42, Floor G, Room 70 (Y42 G53 = opposite of FR's office)

Modality: *On site with video recording / if possible upload videos via switch cast on OLAT.*

Language/slides: English

Participants: 18 (full)

Contacts: karin.niffeler@biol.uzh.ch / 54859 (OLAT problems), Norbert Bölter 42009 (switch Cast problems)



1. Week / **General Introduction and Introduction to the topics**

Date	Room	Teaching Time	Title/Lecturer
Thursday 08.10.2020 09-17h	Y42 G53	09:00-12:00	General Introduction (FR)
	Y42 G53	14:00-17:00	Introduction Topics (VS, PE, MH)
Friday 09.10.2020 09-17h	Y42 G53	09:00-17:00	Preview to BIO 442 (AJ, KS, NB)
			Independent reading (papers)



2. Week / Paleoradiology (PE group)

Date	Room	Teaching Time	Title/Lecturer
Tuesday 13.10.2020 13-17h	RAI-D-021	13:30-15:00 15:30-17:00	Groups A,B,C Introduction: Paleoradiology & Paleopathology + Journal Club (PE) Groups D,E,F Introduction: Paleoradiology & Paleopathology + Journal Club (PE)
Wednesday 14.10.2020 09-17h	RAI-D-021	09:00-12:30 13:30-17:00	Groups A,B,C Practical computer work: Introduction to radiological DICOM viewing software (Virtual osteometry in ancient Egyptian mummies) (PE) Groups D,E,F Practical computer work: Introduction to radiological DICOM viewing software (Virtual osteometry in ancient Egyptian mummies) (PE)
Thursday 15.10.2020 09-17h	RAI-D-021	09:00-09:45 10:00-10:45 11:00-11:40 11:50-12:30 13:30-17:00	Groups A,B,C Paleopathology: Tuberculosis (TB) Groups D,E,F Paleopathology: Tuberculosis (TB) Groups A,B,C Mummy studies: Global mummy database / regression formulae (MH) Groups D,E,F Mummy studies: Global mummy database / regression formulae (MH) All Groups Independent computer work / Preparing of presentations (PE)
Friday 16.10.2020 09-17h	RAI-D-021	09:00-09:45 10:00-10:45 10:00-12:30 13:30-14:30 15:00-16:00	Groups A,B,C Fieldwork in Egypt (FR) Groups D,E,F Fieldwork in Egypt (FR) All Groups Independent computer work / Preparing of presentations Groups A,B,C Presentations (FR/PE) Groups D,E,F Presentations (FR/PE)



3. Week / Genetics group (VS group)

Date	Room	Teaching Time	Title/Lecturer
Tuesday 20.10.2020 13-17h	Y42 G53 / Y01- F-08 / Lab	13:00-14:00	How to analyze ancient DNA data (JN) Lab part /data analysis part
Wednesday 21.10.2020 09-17h	Y42 G53 / Y01- F-08 / Lab	09:00-09:45	How to work in a clean lab (VS) Lab/data analysis
Thursday 22.10.2020 09-17h	Y42 G53 / Y01- F-08 / Lab	09:00-09:45	Microbiomes (ER) Lab part/data analysis part
Friday 23.10.2020 09-17h	Y42 G53 / Y01- F-08 / Lab		Lab part + independent work

4. Week / Morphology group (MH)



Date	Room	Teaching Time	Title/Lecturer
Tuesday 27.10.2020 13-17h	Y42 G53	13:00-13:45 14:00-15:00 15:00-17:00	Why is human birth so complex? The obstetrical dilemma hypothesis revisited (MH/VK) Introduction to surface scanning Independent reading (MH, CF, NW, VK available for questions)
Wednesday 28.10.2020 09-17h	Y42 G53 Y42 G53	9:00-12:00 13:00-17:00	Introduction to medical image segmentation and landmarking (CF/VK/NW) Independent data analysis (MH, CF, NW, VK available for questions)
Thursday 29.10.2020 09-17h	Y42 G53	09:00-12:00 13:00-17:00	Introduction to statistical medical image analysis and geometric morphometrics (CF/VK/NW) Independent data analysis (MH, CF, NW, VK available for questions)
Friday 30.10.2020 09-17h	Y42 G53	09:00-12:00 13:00-17:00	Independent data analysis (MH, CF, NW, VK available for questions) Student's scientific presentations & group discussion



Topics Block course BIO 440 Evolutionary Medicine HS 2020

Topic proposals Evolutionary Morphology (MH, CF, NW, VK)

1.) Obstetric dilemma

The obstetrical dilemma hypothesis attributes birth difficulties in modern humans to a trade-off between natural selection for large-brained neonates and adaptations for bipedal locomotion favouring a narrow pelvis. Recently, this hypothesis has variously been questioned. The present project therefore aims to contribute to this discussion. External pelvic size of expectant mothers has often been recorded in maternal clinics from the 19th to the mid-20th century. The width of the birth canal is, however, not accessible to routine measurement in pregnant women. Here, we want to investigate the relationship of the width of the birth canal with external pelvic dimensions. The aim is to review the relevant literature, reanalyse published data and collect own measurements using the institute's collection of skeletons, CT scans and 3D surface scans.

Topic proposal Paleoradiology group (FR, TB, PE)

2.) Paleoradiology, the radiological examination of ancient human remains, such as skeletal material or mummified soft tissues (including natural and artificial mummies from different cultures and periods), is fundamental to the progress of an evolutionary perspective in medicine. The course includes a theoretical introduction on methods, impact, and technical challenges of radiographic imaging in the context of paleopathology and mummy studies, as well as practical work with historical skeletal remains and imaging data-sets of ancient Egyptian mummies.

Topic proposal Genetic group (VS, JN, ER, KM, CU)

3.) Practical project

The human remains from the medieval cemetery of Dalheim, Germany, have yielded good paleogenetic data (e.g. Warinner et al, 2014; Krüttli et al, 2014; Bouwman et al, 2018). The animal remains have not yet been studied and would potentially inform on the history of zoonotic infections such as *Mycobacterium bovis* (*Mycobacterium tuberculosis* complex). Here the student(s) will, in the dedicated ancient DNA laboratory, extract DNA from animal bone/dentition and analyse small ancient data sets.