"Summer" course 2024

Monday 19 Aug.	🌙☁️	🌤️	🌤️	🌙	22° / 15°
Tuesday 20 Aug.	🌙☁️	🌤️	☀️☁️	🌙☁️	24° / 15°
Wednesday 21 Aug.	🌧️	☁️	☀️☁️	🌙☁️	21° / 15°
Thursday 22 Aug.	🌙☁️	☁️	☁️	☁️	22° / 15°
Friday 23 Aug.	☁️	☀️	☁️	☁️	24° / 19°

Summer course in analysis of high throughput sequencing data for population genetics

Organizers/Lecturers

Ida Moltke
BIO, UCPH

Anders Albrechtsen
BIO, UCPH

Fernando Racimo
GLOBE, UCPH

Martin Sikora,
GLOBE, UCPH

Garrett Hellenthal,
UCL

Cindy Santander
BIO, UCPH

Shyam Gopalakrishnan
GLOBE, UCPH

Co-organizers and TAs

Sabhrina Aninta　Shixu He　Renzo Balboa　Xiaodong Liu　Zilong Li　Carlos Sarabia

Goal of this course

- Comprehensive introduction to a number of topics and common research tools used in analyses of **high throughput genetic data** for **population genetics**

- Go beyond the textbooks
  - Use of cutting edge technique and approaches for NGS data analysis
  - Give hands-on experience with complex analysis and NGS data

- Networking

Intended learning outcomes

After the course you should be able to

- use population genetic theory to infer basic population   ●   gen
  characteristics

- use NGS data incl. low depth for population genetic inference
  - population structure
  - admixture
  - selection
  - demography

- Interpret and discuss the results of own analyses and results
  the scientific literature

Each day

- 2 teaching sessions
  - Morning (9:00 - 12:00) & afternoon (13:00 – 16:00)
  - Mixture of lectures and exercises

- Lunch (on your own)
  - 12:00 – 01:00

- Research talk
  - 16:15-17:00 (Monday 15:30)

- Social session
  - 17:00-18:00 (Monday 16:00)

Monday

Introduction to population genetics and NGS

- **Morning session:**
  Introduction to basic population genetic terms and concepts (Fernando)

- **Afternoon session:**
  Introduction to NGS data (Anders)

- **Research lecture:**
  Patrícia Pečnerová, *BIO, UCPH*
  Using genomics to study the fine line between extinction and survival in mammoths and elephants

- **Social:**
  Reception/social mixer

Tuesday

Analysis of NGS data and population structure

- **Morning session:**
  Estimation of allele frequencies, SNP calling and genotype calling, from NGS data (Anders)

- **Afternoon session:**
  Inference of population structure I (Ida)

- **Research lecture:**
  Rasmus Heller, BIO, UCPH
  Genomes from the "Asian unicorn" reveal a long-standing decline and two highly differentiated populations of saola

- **Social:**
  Boat trip (sightseeing :-))
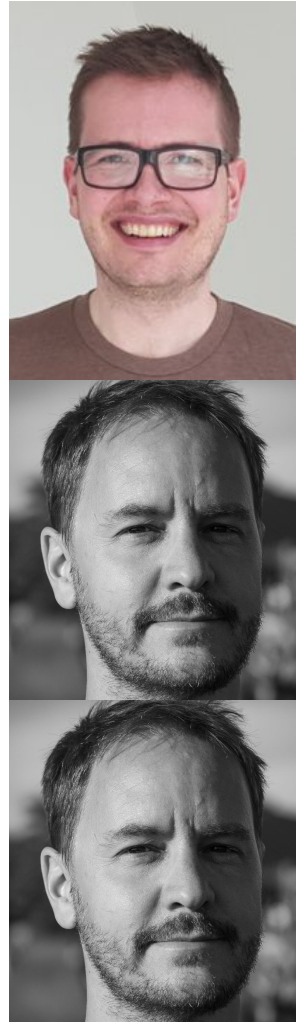
Wednesday

Population structure and gene flow

- **Morning session:**
  PCA in population genetics (Anders)

- **Afternoon session:**
  D/f/F statistics (Martin)

- **Research lecture:**
  Martin Sikora, GLOBE, UCPH
  Using population-scale ancient genomics to study ancestry,
  social organisation and disease in Late Neolithic Scandinavia

- **Social:**
  Relaxed gathering

Thursday
Admixture graphs and selection

- **Morning session:**
  Finestructure (Garrett)

- **Afternoon session:**
  Detecting genomic regions under positive selection (Cindy)

- **Research lecture:**
  Kristine Bohmann,GLOBE, UCPH
  Vacuuming animal DNA from thin air

- **Social:**
  Relaxed gathering

Friday
Selection and demography

- **Morning session:**
  Dating selection and admixture events (Garrett)

- **Afternoon session:**
  Demographic inference (Shyam)

- **Research lecture:**
  Garrett Hellenthal, UCL
  Inferring overlapping admixture events among human populations

- **Social:**
  Relaxed gathering and farewell

Getting connected

- **Wifi**
  - Eduroam
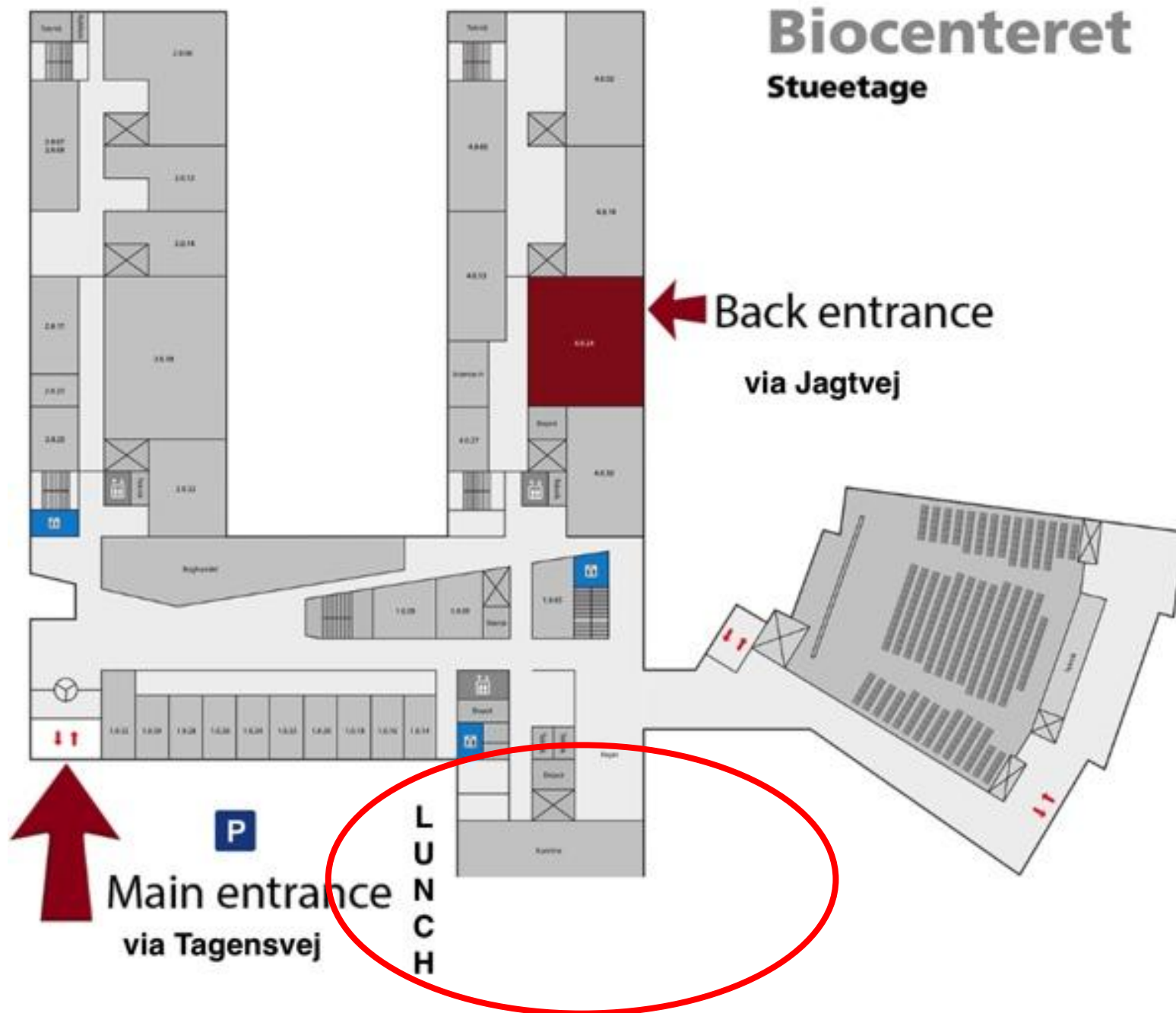   You can connect via Eduroam (if you have an account)

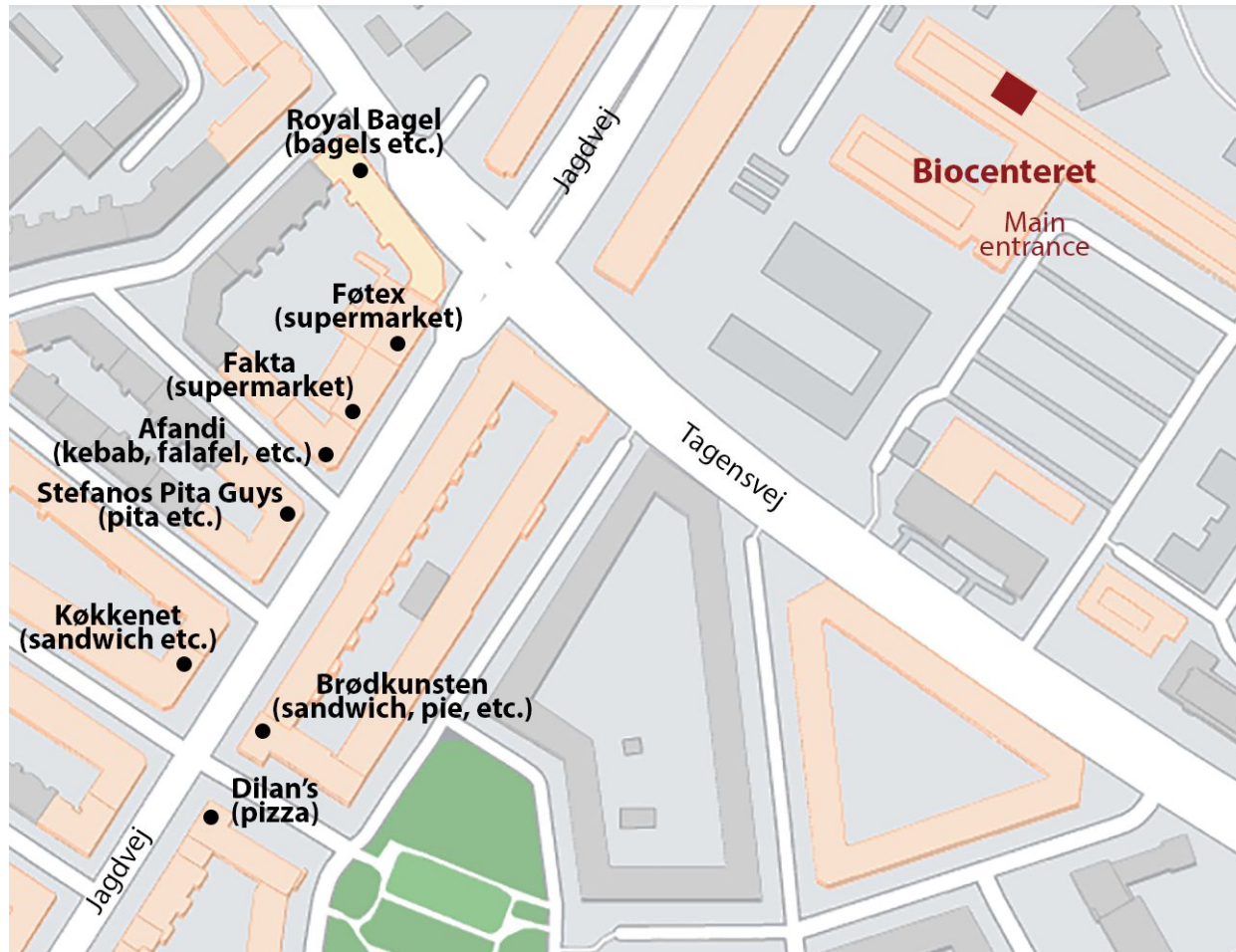 - KU guest
    Create a guest account with your mobile number

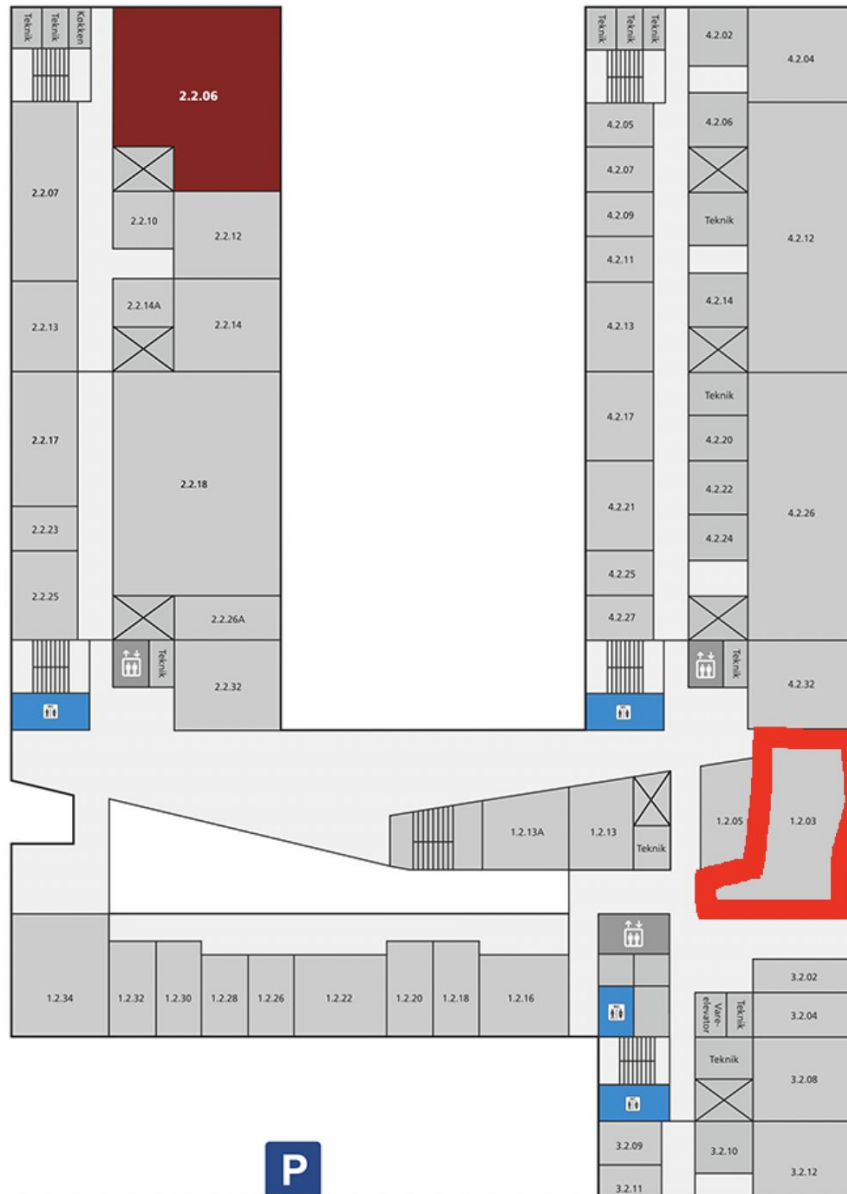- **Login to exercises**

  We will distribute usernames and passwords

Lunch options I

Biocenteret

Stueetage

← Back entrance

via Jagtvej

P

Main entrance

via Tagensvej

L
U
N
C
H

Lunch options II

Afternoon research lectures

Biocenteret

2. sal

(Second floor)

Seminar room

While Fernando gets ready

I'll pass around 2 sheets:

1) One where you have to confirm that you are present
2) One where you can sign up if you want to join the boat trip

And while those are passed around we'd like to do a really quick round of introduction of you (participants from 15 different countries!):