WUR Goes Abroad

1. Student information

Study programme WU	Bachelor of Animal Sciences
Exchange semester (dd/mm/yyyy)	03/02/2024 until 27/06/2024
Exchange destination: University	NMBU
Faculty	Faculty of Biosciences
Country	Norway
City	As

2. Motivation for exchange

a. Why did you choose to go on study exchange?
I have multiple friends/family members that had already participated in an exchange. Their stories and experiences were a great influence for the decision to go on exchange. It is also a great opportunity to be able to travel and study abroad as: making new friends, new study environment and living in a different culture.

b. What is the reason you chose for this country?
I already knew that if I went on exchange I would like to go to the North. It was mainly because of the beautiful nature that you can find there. I also had a few friends that went there before and gave me a recommendation.

c. What is the reason you chose for this university?
It is a good university with a lovely campus and similar student life as Wageningen. It also was the only partner university in Norway.

3. Accessibility to reach destination

a. Do you have any advice about reaching your exchange destination?
Most likely you will travel by plane. I would get one of the apps that are used there for public transport. I used "Vy" during my stay but I believe a similar option is Router. Getting a revolut account can also help with quick payments without paying additional fees. If you take train and bus to As you will have to walk quite a bit to get there so be sure to be able to carry everything as it will most likely take more than 30min.

4. University and studying

a. Could you provide some general information about the followed courses?

	Course	ECTS	Short description of the contents	Appreciation of course: 1(low) – 5(high)	Remarks
1	BIN300	10	This course Is a mix of genetics and statistics. There is always a lecture and later in the week a tutorial with theoretical questions and computation exercises. The main topics are: Introduction to genetics, Gene mapping, Genomic selection and whole genome sequencing. (I will send a screen shot with a more detailed overview of what you need to know.	3	I have not been as present in this course but I did find it interesting when I was studying for the exam. It is also not that easy of a course and quite a lot of new material was taught. I would recommend if you intend to study or work in this field but not if you are only looking for a chill course.
2	BIO325	10	This course Is completely dedicated to the CRISPR method in genetics. Lectures are about CRISPR in: medicine, lab, bacteria, animals etc… there are also a few practical as creating albino zebrafish, and other gene editing.	4	I think this field is very interesting and definitely has a lot of potential for the future. On the other hand the subject is quite new so a lot of organizational stuff is not that well organized, as well as the course material. The teacher is very nice but a bit unorganized but that's just how it is sometimes. The course is not the easiest but definitely doable. Multiple choice exam.
3	HFE314	10	There were 5 topics on animal physiology and nutrition. Each group of around 3 students (total of around 15 in the course) had one topic and prepared a presentation as well as FOTS application. A lot of interesting practical work was done during the course. It is also very interactive and the teachers are really nice as well.	5	Would definitely recommend. You do have to put in some work but would describe it more easy going. It has an oral exam at the end of the semester

Topics covered in BIN300:

Note1: topics may be reformulated into (introductions to) exam questions.

Note2: No need to know formulas

Basics:

- Gene
  - QTL
  - Polymorphic gene
- Locus
- Allele
  - Allele frequency
- Segregation of alleles
- Genotype
  - Hardy-Weinberg frequencies
- SNP

Mapping:

- Genetic distance
  - Recombination
    - Crossovers vs. recombinations
    - Genetic distance vs. recombination fraction
    - Haldane mapping function (assumption)
  - What gametes are produced by parent with genotype N_1M_1 / N_2M_2
- Linkage mapping
  - How to detect whether on same chromosome
  - How to detect SNP order
  - Best design for detecting linkage?
- QTL mapping:
  - Linkage disequilibrium (LD)
    - What factors influence LD
    - How to measure it
  - Back-cross design
  - F2 design
  - F3…F10 design
    - Effect on LD as number of generations increase
    - Effect on mapping as number of generations increase
- QTL mapping in outcross populations
  - Daughter design / sire-family design
    - How many sires needed
  - Power of daughter-design vs. F2 design
  - Association mapping (LD based mapping)
    - Mapping of recessive disease loci
    - GWAS: extension of LD mapping to quantitative traits
      - Statistical model used
        - Statistical test used / hypotheses tested
        - Why does the statistical test indicate presence of QTL
      - Manhattan plot
      - Spurious associations
        - Why do they occur
        - QQ plot
        - How to correct for / avoid spurious associations
        - TDT test
        - Polygenic effect
      - Bayes B, C or R for GWAS
    - Multiple testing problem
      - What are the hypotheses
        - What does P value mean
      - Bonferroni correction
      - Family wise error rate
      - Permutation testing
      - False discovery rate = $N*P_c/c$
        - What is a false discovery
      - Winners curse /Beavis effect
        - How to estimate effect of QTL

Genomic selection (GS):

- The 3 breakthroughs that enabled GS
- Basic structure of GS scheme
- Statistical model used for GS
- GBLUP vs. SNP-BLUP vs. traditional animal model BLUP
  - Equivalence of GBLUP and SNP-BLUP
    - W.r.t breeding value estimates (EBV)
    - How many equations to solve
      - Which is preferred
  - How to get EBV from SNP effects
- Gmatrix
  - How to calculate it
    - 2 ways
      - What are differences
    - What allele-frequency should be used
- Non-linear GS models:
  - Why would we use them
  - What prior on SNP effects are used
  - How is the regression non-linear
- Application of GS
  - In practical breeding schemes
    - Dairy
    - Fish
    - Pigs
  - What factors influence the rate of genetic gain
    - Which of these are affected by GS
  - When to use BayesB instead of GBLUP
    - Number of QTL
    - SNP density => whole genome sequence
    - Genetic distance training population vs. evaluation population
  - Genotype imputation:
    - When to apply
    - How does it work
    - Strategies how to obtain high density genotypes on many animals
    - Strategies on how to use whole-genome sequence data to entire population
  - Effects of GS on inbreeding
- Accuracy of GS
  - Factors that affect the accuracy of GS
  - How to evaluate the accuracy of GS given practical data available
    - N-fold-crossvalidation

Whole genome sequence data:

- The reference genome
- SNP
- InDel
- Copy number variant (CNV)
- Why do we need polymorphism
- Sequencing technologies
  - 1st generation
  - 2nd generation
  - 3rd generation
- What are 'reads'
- Aligning of reads
- RNAseq
  - DE genes
  - Normalization in RNAseq data analysis
    - RKPM
  - Statistical analysis: what test

b. I had sufficient possibilities to select suitable courses that were taught in English (Yes, No - Explain): You can definitely find enough courses. You do have to browse the course catalogue for that. Most of the available courses will be master courses but those are also doable for bachelor students (all my courses were master…) and also look a little bit outside of the your study range as there are more interesting choices to pick.

c. I had sufficient possibilities to select suitable courses in my field of interest (Yes, No - Explain): In the context of your field of interest I think you might have a harder time to find all courses in your field that you would like to do. I think you will have a course or two that are quite new but still in a similar area. (example: As an animal scientist having a more environmental course). But you can still find courses in your area but they might be a little more difficult and time consuming of course depending on your study.

d. I am satisfied with the level of the courses that I followed (Yes, No - Explain): Yes – Being with other master students the level was quite decent. The general level might be a bit lower compared to Wageningen a well as the final examination but you do still need to put in the work.

e. I am satisfied, in the end, with the selection of courses I followed (Yes, No - Explain): Yes – I think the courses were quite nice in the end even though they were a bit harder. I learned quite some new stuff but I'm also sure that I would have enjoyed different courses as well.

f. What is it like to study there?
E.g. Study forms, academic level, examination, workload, lesson material?
You have normally lectures and even practical/tutorials depending on your course. There are way less students in the classes which makes it nicer and more interactive. The level might be a bit compared to Wag. but nothing too drastic. Examination is either oral, multiple choice/written or essay based. The work load is definitely smaller as one semester is basically half a year and you have max 3 classes weekly per course so you have a lot of time to study/other activities.

g. What is the culture of the university?
E.g. How approachable are the lecturers, engagement with local students? What are the differences with WU?
I have a positive experience with the teachers that I had. The classes are way more interactive, also passive learning just by listening but I think the environment is more comfortable. It is not as easy to talk with the other students as most of them will be Norwegian and might know the other people since earlier but they are still very nice people and once you start talking to them they open up a bit.

h. What does the university offer students additionally?
E.g. Catering, sports facilities, laundry facilities?
I find the environment very nice. The campus is beautiful, and you can always find a place to study or chill/eat food. The local gym is pretty much right next to the student housing. There is a gym, team sports classes and even a smaller climbing gym. Laundry facilities are available and shared in each building.

5. Housing-traveling-living

a. What are the possibilities for housing?
E.g. Availability to sign up for a room on campus, private rooms, rent rates?
Through the website I managed to find a room very easily. Most often it's a classic shared corridor with multiple people each having your own room but a shared common facilities. I don't think the rooms were that expensive for it being Norway.

b. What is the culture like?
E.g. Differences with home, local cuisine, habits, manners?
There are differences in the culture and general lifestyles. It is quite easy to get used to and hanging out with Norwegian people is always very nice. It is hard to say as each individual has it differently but that is something for you to discover as well!

c. Could you give some information about public transport infrastructure?
E.g. Cost public transport card, taxi prices, how to travel to the university?
There are buses within As. Mostly you can use Vy or Router apps where you get tickets for trains and buses. It is a bit more expensive but for occasional trips its manageable. If you want to travel further you will most likely have to go to Oslo and from there go by train. Having a car for travelling is definitely recommended.

6. Expenses

a. Can you give an indication of your expenses for/during your exchange?

Category	Expenses
Travelling there	Plane 100+-
Visa - if applicable	/
Vaccinations - if applicable	/
Insurances (extra) - if applicable	/
Daytrips/sight-seeing	Varies a lot…
Housing costs per month & type of housing/accommodation	500 +-
Grocery costs per month	250-300 +-
Public transport costs per month	Varies a lot…
Restaurant/going out for dinner costs per month	Only ocassionally

b. **The price levels were in general [higher; lower; equal] in comparison to in the Netherlands:**
In general Norway is a bit more expensive when eating out and also some products in the store. If you are careful with what you buy you can definitely manage.

c. Additional remarks regarding expenses?
…

7. Free time

a. What are must-sees in the area?
E.g. Nearby destinations, how do you prefer to travel, when to plan?
Lapland trip with ESN. Places to visit with friends/ESN: Oslo, Bergen, Jotunheim Park – Many popular hikes, Stavanger, Friedrikstad etc… Depends on what you like to do – sightseeing, hiking, culture… I would recommend going to Drobak. Its pretty close to As and very pretty near the coast and early summer you can have very nice walks.

b. What does not appear in a travel guide, but is definitely worth seeing/doing?
There is a discgolf course right behind the campus 😊.

8. Challenges & best moment abroad

a. Any challenges? How did you deal with them?
Social life – beginnings might be a bit hard, so going to the introduction week is recommend to meet some people already. You will meet nice people at some point if you're up for it.

b. Best memory?
The volleyball folks.

9. Contact details

Is the reader allowed to contact the writer?	yes ☒	no ☐
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