36685 Immunological Bioinformatics

January 2018

Introduction to Project Work



Immunoinformatics and Machine Learning

Department of Bio and Health Informatics

Introduction to Project Work

- Project time frame
 - Thursday January 11th Thursday January 18th
- Groups
 - The predefined groups of 3-4 students will work together on the project
- Outcome
 - A project presentation (PowerPoint) presented at the exam January 19th
 - Note, you should *not* hand in a project report

Groups

- G01 Line, Solveig and Monica
- G02 Mikael, Jacob and Kathrine
- G03 Sandra, Esteban, Narasimha and Taner
- G04 Signe, Julie, Ina and Aimilia
- G05 Christian, Mikkel and Frank
- G06 Keith, Nadia and Jeppe
- G07 Sofie, Natasja and Ulla

3 DTU Bioinformatics, Technical University of Denmark

05 October 2017

Group folders on DTU inside

DTU INSIDE Leon Eyrich				ch Jessen nformatics
MY COURSES AND TOO GROUPS TOO	LBOX STRUCTURE AND ACADEMIC OFFE	ERS SOCIAL AND POLITICAL	EDUCATIONA ADMINISTRA	
Front page DTU Bioinformatics DTU Bioinformatics	36685 Immunological Bioinformatics Jan 18 🕖 <u>File sharing</u>			*
36685 IMMUNOLOGICAL BIO	File sharing: Student folder			
List of participants	Tree structure 🖂		Dupload file	More 🗸
Messages	Your browser supports drag and drop upload. Drag files onto Path: Filesharing / Student folder /	o the page to upload them t	o this folder.	
Calendar		AUTHOR	LAST MODIFIED	
File sharing	Parent folder (Top)			
Study activity req.	G01 - Line, Solveig and Monica	Leon Eyrich Jessen	03/01/18 12:50	
Links	G02 - Mikael, Jacob and Kathrine	Leon Eyrich Jessen	03/01/18 12:52	
Assignments	G03 - Sandra, Esteban, Narasimha and Taner	Leon Eyrich Jessen	03/01/18 18:48	
Home page	G04 - Signe, Julie, Ina and Aimilia	Leon Eyrich Jessen	03/01/18 12:52	
Course Base	G05 - Christian, Mikkel and Frank	Leon Eyrich Jessen	03/01/18 12:53	
Wiki setup	G06 - Keith, Nadia and Jeppe	Leon Eyrich Jessen	03/01/18 12:53	
Adobe Connect	G07 - Sofie, Natasja and Ulla	Leon Eyrich Jessen	03/01/18 12:53	
Reporting	Delete selected Move selected Download selected	ed as zip		

DTU Bioinformatics, Technical University of Denmark

4

Exam

- Exam is on Friday January 19th 9 17 in building 208, room 062 (Where we are now)
- Examinators will be Morten and Leon
- The group will give the presentation ~10 minutes followed by 5 min of project questioning (Note, <u>everyone</u> is responsible for <u>every</u> aspect of the group project)
- Following the presentation, there will be an individual oral exam in the project <u>and</u> course curriculum, also \sim 15 minutes (Total time per group will be \sim 1 hour)
- In case you would like a specific exam time during the day (for a <u>good</u> reason), please contact Leon (<u>jessen@bioinformatics.dtu.dk</u>)

• Project I – Pathogen vaccine

- a) Choose a single protein from a human pathogen, which would be the best suited for a vaccine considering B-cell epitopes
- b) Make a peptide based t-cell vaccine with both broad HLA* and pathogen coverage. E.g. a polytope consisting of class-I and class-II epitopes. Select from all proteins in the organism. Consider the processing of the final polytope to avoid the presence of neoepitopes and if relevant check to similarity to self
- *You are free to limit your focus to a special population and genotypes, but should justify your choices

• Project II – Cancer vaccine

- As project I, but aimed at cancer specific proteins, e.g. in testis cancer

7 DTU Bioinformatics, Technical University of Denmark

05 October 2017

• Project III – Cancer Immunotherapy

- Humanization project: CAR T-cell humanisation and de-immunisation
- Similar to the "Anti-CD19 CAR T-cells" exercise you did
- E.g. using the tabhu server in the context of eliminating t-cell epitopes (cd4+ class II binders)
- (Don't just follow the questions from the exercise Make the project your own)

• Project X

- Any other great ideas *that will cover several of the methods* introduced are also welcome!

- You should however include a part about HLA immune activation

- Examples of pathogens with fully sequenced genomes:
 - HIV
 - HCV
 - HPV
 - Ebola/Marburg
 - Smallpox
 - Mycobacterium tuberculosis
 - Influenza
 - Chlamydomonas reinhardtii
 - Measles virus
 - Salmonella typhii

Guide to Presentation

- The IMRAD approach
 - Introduction
 - Materials and methods
 - Results And Discussion
- Brief and clear (limit amount of text on each slide)
- Be sure to think about the information you wish to convey with each slide
- Note, *everyone* is responsible for *every* aspect of the project
- Remember to include references, e.g.
 - NetMHCpan-4.0: Improved Peptide–MHC Class I Interaction Predictions Integrating Eluted Ligand and Peptide Binding Affinity Data. Jurtz, V., Paul, S., Andreatta, M., Marcatili, P., Peters, B. and Nielsen, M. J. Immunol. (2017)

Project supervision

- There is a <u>very</u> limited time frame for the project, so you need to start the project today! (Thursday)
- If you get stuck in the project, you should as a point of reference try to solve the challenge in the group
- If this is not possible, then contact:
 - Protein structure and antibodies
 - Kamilla (kamjen@bioinformatics.dtu.dk)
 - Leon (jessen@bioinformatics.dtu.dk)
 - T-cell epitopes and HLAs
 - Leon (jessen@bioinformatics.dtu.dk)
 - Morten (<u>mniel@bioinformatics.dtu.dk</u>)

Course Evaluation

- I will soon open for course evaluation
- Please spend the 5-10 minutes it takes to evaluate
- Your feedback is extremely valuable!



Enjoy the project work! ⁽²⁾



05 October 2017