Hands-on Course

Bioinformatics tools in Clinical Proteomics Data Analysis

Date: May 31 to June 3, 2016

Local: Faculty of Science, University of Lisbon, Building C1, Room 1.5.12.

Coordination: Deborah Penque and Francisco Couto

Application (FrontPage http://www.redeprocura.com)

Course description

In biomarker discovery phase of Clinical Proteomics research, impressive mass spectrometry datasets are generated posing great analytical challenges for downstream interpretation.

The lecture part of the course will give an overview of concepts, methods and technologies used in Clinical Proteomics, with special focus in bioinformatic tools in protein/peptide qualitative and quantitative analysis, data mining and knowledge discovery from high resolution mass spectrometric data. Many available public sources of bioinformatics tools will be provided and discussed.

In the practical part (hands-on training) of the course, participants will be able to go from their own raw mass spectrometry data, to analyse and integrate it into a biological context using the freely web available PathernLab for Proteomics 4.0 (*Carvalho PC et al, Nat Protoc. 2016*). This computational platform allows for formatting of sequence databases, peptide spectrum matching, statistical filtering and data organization, extracting quantitative information from label-free and chemically labeled data, and analyzing statistics for differential proteomics. Visualization methods and semantic similarity based metrics will be also applied to identify sub-sets of proteins in the data with a greater degree of functional annotation "completeness", elucidating their biological roles.

The final aim is to provide attendees with the practical bioinformatics knowledge they need to go back to the lab and process their own data when collected.

Students will be invited to send contributions to the special issue in “Bioinformatics Tutorials” - Journal of Proteomics-Elsevier.

Audience

The course is for those that want to be introduced to clinical proteomics and get a deeper understanding of bioinformatics tools in proteomics data interpretation. The course aimed at research scientists with a minimum of a degree in biological discipline and/or bioinformatics, including laboratory researchers and specialists in related areas. The attendees will have a unique opportunity to interact with though leaders in the field.

Notes: The course is designed for 20 students only. The selection of the students will be based on the CV and motivation letter. The selected students will be requested to confirm their presence and proceed to the registration payment (detailed information for bank transfer will be sent at that stage).

Important Dates

Course days - May 31 to June 3, 2016

Application Deadline - May 16, 2016.

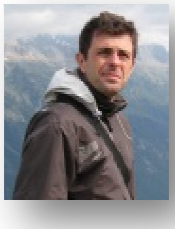
Instructors:

Fredrik Levander is Associate Professor at the Department of Immunotechnology, Lund University and proteomics coordinator for the National Bioinformatics Infrastructure Sweden (NBIS). His research interests are mainly in the field of computational proteomics with emphasis of quantitative proteomics methods. He holds a PhD in applied microbiology and did postdoctoral work in a bioinformatics company as well as in the laboratory of Peter James.

Paulo Carvalho holds a PhD in systems engineering and computer science from the Federal University of Rio de Janeiro and is a former member of the John R. Yates III Laboratory at the Scripps Research Institute, California, EUA. Among his awards, we highlight the Google Award for Academic Excellence and the Young Biochemistry Scientist Award given by the Brazilian society for biochemistry and molecular biology (SBBq). In 2012 he earned a position as a research scientist at Carlos Chagas Institue, Fiocruz - Paraná, Brazil’s federal consortium of research institutes under the Ministry of Health, and later also become a professor at the Chemistry Institute of the Federal University of Rio de Janeiro. Carvalho teaches computational proteomics at the graduate level at both institutions. Briefly, his main interests are in applying statistical pattern recognition to mass spectrometry. Carvalho is currently accredited into the highly competitive group of researchers officially sponsored by Brazil’s Research Council (i.e., CNPq productivity) and is one

of the founding members of the Brazilian Society for Proteomics of which he is part of its scientific committee. Carvalho is also the Executive Editor for Computational Proteomics-Journal of Proteomics-Elsevier.

Rui Vitorino is an invited professor at Department of Medical Sciences (University of Aveiro) and Faculty of Medicine (University of Porto) and a proteomics investigator whose research interests are development of proteome and peptidome strategies for studying body fluids such as saliva and urine in different pathophysiological conditions. Currently, his research is focused in the area of therapeutic peptides for innovative medicines. Additionally, he use different bioinformatic tools for data revisiting and integration to extract the biological meaning.



Francisco M. Couto is currently an associate professor and vice-president of the Department of Informatics of FCUL, member of coordination board of the master in Bioinformatics and Computational Biology, and a member ofLASIGE coordinating the XLDB research group and the Biomedical Informatics research line. He graduated (2000) and has a master (2001) in Informatics and Computer Engineering from the IST. He concluded his doctorate (2006) in Informatics, specialization Bioinformatics, from the Universidade de Lisboa. He was on the faculty at IST from 1998 to 2001 and since 2001 at FCUL. He was an invited researcher at EBI, AFMB-CNRS, BioAlma during his doctoral studies. He received the Young Engineer Innovation Prize 2004 from the Portuguese

Deborah Penque, PhD graduated in Molecular Genetics from University of Lisbon, is currently the head of the Laboratory of Proteomics at Human Genetics Department, National Institute of Health Dr R Jorge (INSA), Lisbon, Portugal. Penque's lab dedicates to chronic lung disease biomarkers discovery and invention/development from clinical proteomics research to translational applications. Her research is also devoted to study the environmental impact, such s tobacco smoke and nanomaterials on human health (awarded with "2012-Arnold Sampaio Award for the best scientific work in Public Health"). Penque is currently president and main co-founder of Rede ProCura - The Portuguese Proteomics Association, which aimed at promoting an integration of expertise/facilities among Portuguese research institutions/universities for proteomics development. She actively collaborates as member of

Educational and Conference & Communication Committees of European Proteomics Association (EuPA). Penque is also a member of the Editorial Board of Journal of Proteomics-Elsevier and the Associated Editorial Board of Europe of Journal of Integrated OMICS .

General Preliminary Program

This is only preliminary general program and is subject to change. Detailed program will be provided very soon.

Lectures/Practical Tutorials start at 9.30 am each day and ends at 5.00 pm. Lunch time 12.30 am – 2.00 pm

Day1 (May31)

Morning (Lectures): Introduction to Clinical Proteomics: concepts, methodologies in general

Afternoon (Lectures): Introduction to mass spectrometry instrumentation and applications in proteomics.

Day 2 (June 1)

Morning (Lectures): Mass Spectrometry data analysis in proteomics

Afternoon (Practical Tutorial): Databases & Bioinformatics tools in proteomics.

Day 3 (June 2)

(Practical Tutorial) PathernaLab for Proteomics 4.0- Part I

Day 4 (June 3)

(Practical Tutorial) PathernaLab for Proteomics 4.0- Part II

Finishing and discussion.

Registration fee

General	250 €
EuPA Member# & FCUL Students''	100 €
Rede-ProCura Member*	40 €

Registration fee includes course documentation and coffee-breaks. Lunch in the university cantine is served for about 5€.

#EuPA membership number/FCUL student confirmation is required

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*Registration fee includes 2016-membership fee.

Application **(go back to the FrontPage http://www.redeprocura.com/)**