Sydney Summer School in Pathogen Genomics and Global Health Program

Program

12-16 February 2018
Venue: Nanoscience Hub, The University of Sydney (Camperdown Campus)

Monday, 12 February 2018

10.00-13.00 Registration – (Seminar Room 1.1)
13.00-13.30 Welcome and introduction to the course

Module One   Introduction to microbial genomics

13.30-15.00 Masterclass 1: Microbial genomes and genome sequencing  
Dr Rebecca Rockett and Dr Verlaine Timms (CIDM-PH, MBI, University of Sydney)
15.00-15.15 Afternoon Tea
15.15-16.00 Informatics Review1: CLC Genomics Workbench  
Dr Rebecca Rockett, Dr Elena Martinez (CIDM-PH, MBI, University of Sydney)
16.00-17.30 Exercise 1: Identification of the taxonomic position of viruses and bacteria from genomic data  
Dr Rebecca Rockett (CIDM-PH, MBI, University of Sydney)

Tuesday, 13 February 2018

Module Two   Genomics and evolution of drug resistance

9.00-10.00 Masterclass 2: Prediction of drug resistance and its clinical relevance  
Dr Grant Hill-Cawthorne (MBI, School of Public Health, University of Sydney)
10.00-11.00 Masterclass 3: Plasmid-mediated antibiotic resistance and emerging clones of drug resistant bacteria  
Dr Sally Partridge (WIMR, University of Sydney)
11.00-11.30 Morning coffee
11.30-12.30 Informatics Review 2: ABC of high performance computing  
Dr Ranjeeta Menon (CIDM-PH, MBI, University of Sydney)
12.30-13.30 Lunch
Dr Elena Martinez (CIDM-PH, MBI, University of Sydney)
15.00-15.30 Afternoon Tea
15.30-17.00 Exercise 3: Transcriptional profiling  
Dr Elena Martinez (CIDM-PH, MBI, University of Sydney)
18.30 Course Dinner and Guest Lecture: “Public health applications of bacterial genomics”  
Professor Ben Marais (MBI, University of Sydney and Children’s Hospital Westmead)
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**Wednesday, 14 February 2018**

<table>
<thead>
<tr>
<th>Module Three</th>
<th>Genomics-guided public health surveillance</th>
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| 9.00-11.00   | Masterclass 4: Phylogenomics of emerging pathogens  
              Prof Eddie Holmes (Sydney Medical School/Faculty of Science, University of Sydney) |
| 11.00-11.30  | Morning Coffee                            |
| 11.30-12.30  | Masterclass 5: International, national and regional surveillance networks  
              Dr Matthew O’Sullivan (NSW Health Pathology, Westmead Hospital, University of Sydney) |
| 12.30-13.30  | Lunch                                    |
| 13.30-14.30  | Informatics Review 3: Visualisation of multi-dimensional clinical and genomics data  
              Dr Rosie Sadsad (Sydney Informatics Hub, CIDM-PH, MBI, University of Sydney) |
| 14.30-15.30  | Exercise 4: Deciphering transmission pathways (Galaxy example)  
              Dr Rosie Sadsad (Sydney Informatics Hub, CIDM-PH, MBI, University of Sydney) |
| 15.30-16.00  | Afternoon Tea                             |
| 16.00-17.00  | Exercise 5: Detection of point source outbreaks  
              Dr Qinning Wang (CIDM-PH, Pathology West) |

**Thursday, 15 February 2018**

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<tr>
<th>Module Four</th>
<th>Genomic data in clinical and public health context</th>
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| 9.00-9.45    | Masterclass 6: Integration of genomic, clinical and epidemiological data  
              A/Prof Vitali Sintchenko (CIDM-PH, MBI, University of Sydney) |
| 9.45-10.30   | Masterclass 7: Evolution of genomes under vaccine pressure  
              Prof Ruiting Lan (University of New South Wales) |
| 10.30-11.00  | Morning Coffee                                    |
| 11.00-12.00  | Informatics Review 4: Analysis of core and accessory genomes  
              Dr Verlaine Timms (CIDM-PH, MBI, University of Sydney) |
| 12.00-13.00  | Exercise 6: Genome mapping, assembly and characterisations (in small groups)  
              Dr Verlaine Timms and Dr Rajat Dhakal (CIDM-PH, MBI, University of Sydney) |
| 13.00-14.00  | Lunch                                             |
| 14.00-15.00  | Transfer to Westmead                              |
| 15.00-17.00  | Visit to NSW Public Health Pathogen Genomics Unit at the Centre for Infectious Diseases and Microbiology, NSW Health Pathology and Westmead Hospital  
              Station 1: DNA Extraction and Quantification, Station 2: Library Preparation, Station 3: Sequencing, Station 4: FastQ files' handling and Quality Control procedures, Station 5: Synthesis with epidemiological data |
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<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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| 9.00-10.00 | **Masterclass 8: Metagenomics**  
**Dr Rohan Williams (National University of Singapore)** |
| 10.00-11.00 | **Exercise 7: Analysis of culture-independent metagenomic data**  
**Dr Rebecca Rockett (CIDM-PH, MBI, University of Sydney)** |
| 11.00-11.30 | **Morning coffee** |
| 11.30-12.00 | **Informatics Review 5: Genomic data analysis using R**  
**Dr Alex Outhred (Children’s Hospital Westmead and University of Sydney)** |
| 12.00-13.00 | **Informatics Review 6: Genome-wide association studies**  
**Dr Ranjeeta Menon (CIDM-PH, MBI, University of Sydney)** |
| 13.00-13.45 | **Lunch** |
| 13.45-16.00 | **Presentations from participants (Exercise 6 cont.)** |
| 16.00-16.30 | **Closing remarks and evaluation** |