



Workshop on Next Generation Sequencing of Viruses

Auditorium F Jacob, Institut Pasteur, Paris, France
20 & 21 May 2015

Programme

DAY 1 – WEDNESDAY 20TH MAY

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| 8:00 – 9:00 | Registration |
| 9:00 – 9:15 | Welcome/Objectives
Sylvie van der Werf and Alan Hay |
| SESSION 1: | Objectives of NGS/Deep Sequencing – Possibilities & Limitations
Chairs: John McCauley and Peter Walker |
| 9:15 – 9:40 | The Evolution and Epidemiology of Virus Epidemics from Genome Sequencing
Andrew Rambaut, Institute of Evolutionary Biology, Edinburgh, UK |
| 9:40 – 10:05 | Virus Discovery
Ron Fouchier, Erasmus MC, Rotterdam, The Netherlands |
| 10:05 – 10:30 | Outbreak Detection and Investigation with NGS
Martin Beer, Friedrich Loeffler Institute, Isle of Riems, Germany |
| 10:30 – 10:45 | Discussion |
| 10:45 – 11:15 | Tea/Coffee Break |
| SESSION 2: | Sequencing Technologies - Current & Future Developments
Chairs: David Wentworth and Nicholas Loman |
| 11:15 – 11:40 | Platforms and Pipelines (Now and in the Future)
David Wentworth, CDC, Atlanta, GA, USA |
| 11:40 – 11:55 | Respiratory Virus RNA Detection with RNA-Seq Using Capture Technology
Gary Schroth, Illumina, San Diego, CA, USA |
| 11:55 – 12:10 | Bacterial and Viral Sequencing with Ion Torrent NGS Technology
Mathieu Boimard, Thermo Fisher Scientific, Saint Aubin, France |
| 12:10 – 12:20 | From Sample to Sequence-Ready with the Access Array™ System and New Applications in Single-Cell Genomics
Cyprien Dulac, Fluidigm Europe B.V, France |
| 12:20 – 12:30 | Discussion |

- 12:30 – 13:30** **Lunch**
- SESSION 3:** **Sample Preparation, Data processing, Assembly, Analysis**
Chairs: Marco Vignuzzi and Elodie Ghedin
- 13:30 – 13:55** Sample Preparation & Analysis
Saskia Smits, Erasmus MC, Rotterdam, The Netherlands
- 13:55 – 14:20** Data Processing, Assembly, Analysis
Simon Watson, Sanger Institute, Hinxton, UK
- 14:20 – 14:35** Consensus Iterator: a Hybrid Algorithm for Consensus Sequence
Determination in the Presence of Noisy Short-Read Shotgun Sequence
Data
Robert Carter, St. Jude Children’s Research Hospital, Memphis, TN, USA
- 14:35 – 14:55** Optimising the Reconstruction of Whole Genomes, for HIV and Other
Diverse Viruses, from NGS Data
Chris Wymant, Imperial College London, UK
- 14:55 – 15:10** Discussion
- 15:10 – 15:30** **Tea/Coffee Break**
- SESSION 4:** **Examples of Different Virus Pipelines**
Chairs: Ron Fouchier and Martin Beer
- 15:30 – 15:50** RSV and Other viruses
Matthew Cotten, Sanger Institute, Hinxton, UK
- 15:50 – 16:10** MERS Coronavirus Sequences Detected in Dromedary Camels from a
Single Farm
Leo Poon, The University of Hong Kong, Hong Kong, SAR China
- 16:10 – 16:30** Intrinsic Genetic Diversity of Rabies Virus and Host Adaptation
Hervé Bourhy, Institut Pasteur, Paris, France
- 16:30 – 16:50** Prospective, Real-Time Nanopore Sequencing for Ebola Genomic
Epidemiology under Outbreak Conditions
Nicholas Loman, Birmingham University, Birmingham, UK
- 16:50 – 17:00** Discussion
- 17:00 – 17:30** **General Discussion**
Chairs: David Wentworth and Elodie Ghedin
- 19:30** **Dinner at Restaurant "L'entrepôt"**

DAY 2 - THURSDAY 21ST MAY

SESSION 4: **Examples of Different Virus Pipelines – Continued** **Chairs: Gavin Smith and Hervé Bourhy**

- 9:00 – 9:20** Are Arthropods at the Heart of Virus Evolution?
Yong-Zhen Zhang, China-CDC, Beijing, China
- 9:20 – 9:40** Virus Identification in Biological Samples by NGS: Validation and Examples of Use in Clinical Cases
Marc Eloit, Institut Pasteur, Paris, France
- 09:40 – 09:55** Full-Length HIV-1 env Deep Sequencing in a Donor with Broadly Neutralizing V1/V2 Antibodies
Melissa Laird, Pacific Biosciences, Menlo Park, CA, USA
- 09:55 – 10:10** European Mobile Lab NGS Pipeline
David Matthews, Bristol University, Bristol, UK
- 10:10 – 10:30** Discussion
- 10:30 – 11:00** **Tea/Coffee Break**

SESSION 5: **Advances in Understanding of Viral Infections from NGS data** **Chairs: Andrew Rambaut and Maria Zambon**

- 11:00 – 11:25** Going Viral: NGS Platform Integration for Analysis of Virus Diversity and Population Dynamics
Elodie Ghedin, New York University, New York, NY, USA
- 11:25 – 11:50** Data to Knowledge: Data Integration and Big Data
Maria Giovanni, NIAID, Rockville, MD, USA
- 11:50 – 12:05** Lessons from Developing a New Influenza Annotation Pipeline
Benjamin Turner, QIAGEN Custom Informatics Solutions, Hilden, Germany
- 12:05 – 12:20** Discussion
- 12:20 – 13:20** **Lunch**

SESSION 5: **Advances in Understanding of Viral Infections from NGS data – Continued** **Chairs: Monica Galiano and Nancy Cox**

- 13:20 – 13:40** Metagenomic Detection of Immunogenic Parasites in Bat Feces
Gavin Smith, Duke NUS, Singapore
- 13:40 – 13:55** Reconstruction of an Empirical Fitness Landscape Reveals the Mutational Robustness and Evolvability of RNA Viruses
Marco Vignuzzi, Institut Pasteur, Paris, France

- 13:55 – 14:10** The Intrinsic Heterogeneity of Human Influenza A Viruses Evaluated by Deep Sequencing the Virus Directly in Nasal Swabs
Cyril Barbezange, Institut Pasteur, Paris, France
- 14:10 – 14:25** Testing for Drug Resistance in Influenza: Taking It to Another Level?
Larisa Gubareva, Influenza Division, CDC, Atlanta, GA, USA
- 14:25 – 14:35** Use of Next Generation Sequencing for the Detection of Antiviral Resistant Influenza Viruses
Aeron Hurt, WHO CC, Melbourne, Australia
- 14:35 – 14:55** Whole-Genome Deep Sequencing of Longitudinal Samples from HIV-1 Patients Followed from Early into Chronic Infection
Richard Neher, Max-Planck-Institute for Developmental Biology, Tübingen, Germany
- 14:55 – 15:10** Discussion
- 15:10 – 15:30** **Tea/Coffee Break**
- SESSION 6:** **Significance and Communication of Information**
Chairs: Sylvie van der Werf and Maria Giovanni
- 15:30 – 15:55** The Public Health Importance of Timely Sharing of Sequence Data
Nancy Cox, GISAID Scientific Advisory Council
- 15:55 – 16:20** Public Health Perspective (Surveillance; Zoonotic Risk)
Maria Zambon, Public Health England, London, UK
- 16:20 – 16:45** Applications of NGS in Animal Health
Peter Walker, CSIRO, Geelong, Victoria, Australia
- 16:45 – 17:00** Discussion
- 17:00 – 17:30** **General Discussion (Conclusions)**
Chairs: Andrew Rambaut and Maria Giovanni
- 17:30** **Close of Workshop**