
IntroNGS Documentation

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This is the website that contains the slides for the Intro to NGS lecture taught in NTNU and NTU. All the information relevant to this module will be posted here.

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CHAPTER 1

Course Introduction

This module aims to cover the backgrounds of next generation sequencing (NGS), and what you can do with it in research. This module will also provides hands-on exercises from real-world scenarios.

The lectures are jointly taught by [Isheng Jason Tsai](#), [Meiyeh Lu](#), [John Wang](#) of Biodiversity Research Center, Academia Sinica and [JiaMing Chang](#) of NCCU.

Assessment

There will be one paper review and presentation (7+3 min) for your exercise proposal. You will also have a written proposal and in-class final exam.

This page contains all the slides that I taught.

2.1 TIGP Introduction to NGS

1. Introductory lecture [v2018] [Download](#)
2. Introduction II Linux, R, and other-Tools [v2018] [Download](#)
3. Genome Assembly and case studies [v2018] [Download](#)
4. Read Mappings [v2018] [Download](#)
5. From Alignment to phylogenetic tree (Jiang Ming Chang) [v2018] [Download](#)
6. DNA/RNA preparation and different sequencing technologies (Meiyeh Lu) [Download](#)
7. RNAseq and Genome annotation [v2018] [Download](#)
8. Comparative Genomics [v2018] [Download](#)
9. Population Genomics (John Wang)
10. Amplicon / Metagenomics [v2018] [Download](#)
11. Practical one: Linux and R
12. Practical two: RNAseq mapping and EdgeR
13. Discussion
14. Final Report

2.2 Example Dataset

1. `myoviridae_healthy.txt` (taken from R into with GGPLOT).

2. worms.txt (Example taken from R exercises and examples).
3. Survey2.csv (questionnaire survey).
4. R examples in Lecture 2.

2.3 TIGP B2

1. NGS Analytics [v2019] Download
2. Comparative Genomics Download

2.4 TIGP Microbial Diversity and Ecology

1. Fungal Diversity [v2019] Download

2.5 GSB 2018

1. Comparative Genomics Download
2. Introduction to Transcriptome Download

Homework: Choose a paper that combines both comparative genomics and RNAseq to address a biological question. The paper has to be published from 2015-2018. Please write a review, be critique on the techniques used and assess the strength and weaknesses of the paper. Please hand in before 12/29 (one month's time to write the homework). Late or no hand in of your work will be marked 0.

2.6 2019

1. NGS Introduction Download

Note: Email ijtsai@sinica.edu.tw if you have any problems/suggestions/want to use the slides

CHAPTER 3

Statistics

In 2015, the final students who registered this course were 12 (=5 (BIODIV/NTNU) + 7 (NTU)) and 29 further participating students/PIs.

This page contains all the goodies on the internet also relevant to this course.

4.1 Lecture slides

1. Workshop on all kinds of genomics¹ [link](#)
2. Introduction to differential gene expression analysis using RNA-seq [link](#)
3. Konrad Paszkiewicz. History of DNA and modern approaches to sequencing (2017) [link](#)
4. Introduction to bioinformatics using NGS [link](#)
5. Introduction to genome annotation [link](#)
6. EMBL predocs python course [link](#)

4.2 Good reviews / papers / videos

Genome assembly

1. Jang-il Sohn and Jin-Wu Nam (2016) The present and future of de novo whole-genome assembly

Metgenomics

1. Jovel *et al.*, Characterization of the Gut Microbiome Using 16S or Shotgun Metagenomics

RNAseq

1. Van Den Berge *et al* (2018)., RNA sequencing data: hitchhiker's guide to expression analysis

Population genomics

¹ This is led by a small group of faculty at various institutions around the world. I strongly recommend any students to study the materials in here.

1. Sònia Casillas and Antonio Barbadilla (March 2017) [Molecular Population Genetics](#) [#f2]
2. [The 100,000 Genomes Project - How We Get Results](#)

Note: This module will be taught in English
