

Tin sinh học ứng dụng

(Applied Bioinformatics)

Phuc Loi Luu, PhD

Luu.p.loi@gmail.com

Nov 02 2024

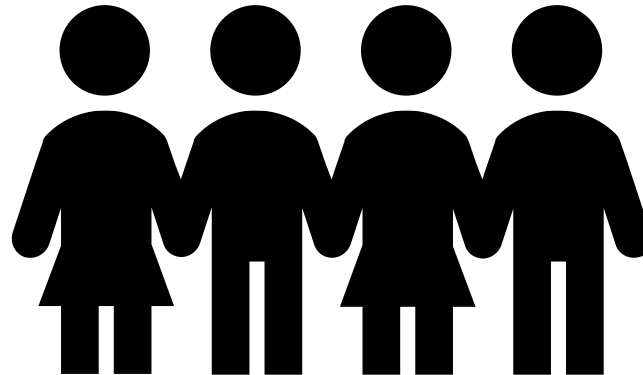
Content

- Class member introduction
- Curriculum of Applied Bioinformatics 2024
- Projects and important dates
- Evaluation for the course
- How my lecture work?
- Linux OS, Google Colab and Linux Command Lines

Class member introduction

Bạn phê
không?

Phê! Cảm
ơn bạn. Còn
bạn?



EDUCATION AND PROFESSION

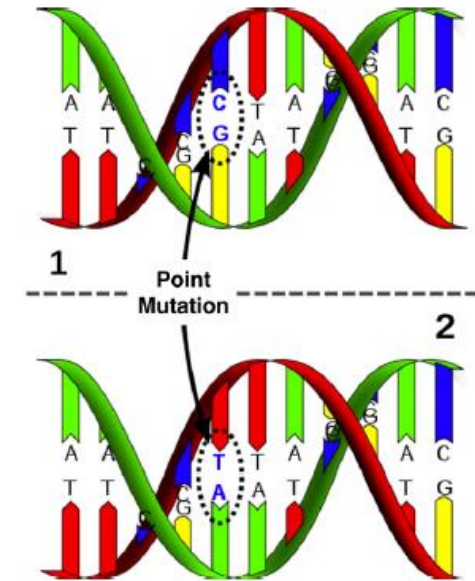
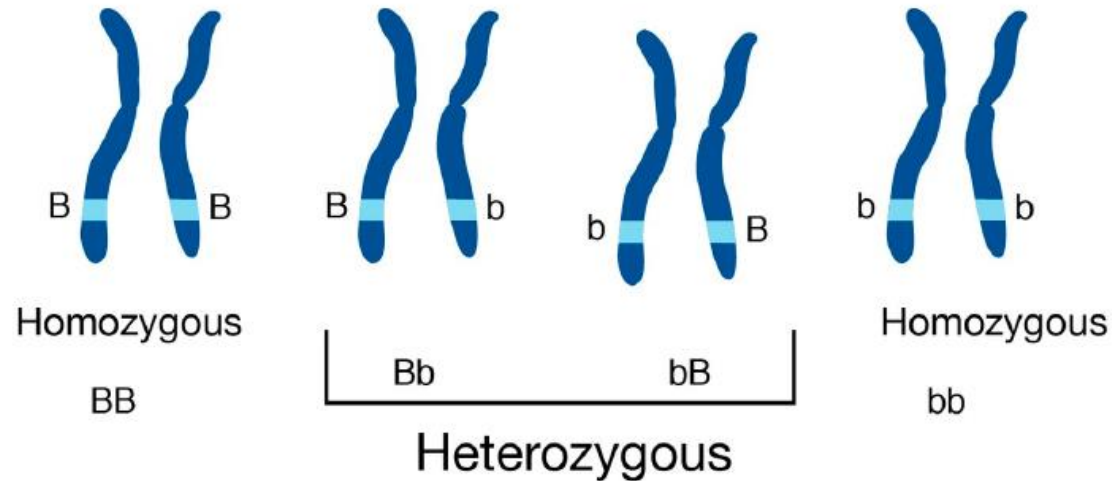
2014 – 2022	Garvan Institute of Medical Research, UNSW Sydney	<i>Bioinformatics researcher in Computational Epigenomics under the supervision of Prof. Susan Clark</i> <i>Conjoint Senior Lecturer</i>	Sydney, Australia
2011 - 2014	Max Planck Institute for Molecular Biomedicine, University of Muenster	<i>PhD student in stem cell computational biology under the supervision of Prof. Hans R. Schöler</i>	Muenster, Germany
2010 – 2011	KIST–Europe	<i>Data Scientist</i>	Saarbruecken, Germany
2008 – 2010	Max Planck Institute for Informatics, University of Saarland	<i>Bioinformatics Post-graduate student under the supervision of Prof. Thomas Langauer</i>	Saarbruecken, Germany
2005 – 2008	Nong Lam University - Ho Chi Minh City	<i>Lecturer</i>	Ho Chi Minh City, Vietnam
2000 – 2005	University of Science - Ho Chi Minh City National University	<i>Bioinformatics undergraduate student under the supervision of Prof. Ho Huynh Thuy Duong</i>	Ho Chi Minh City, Vietnam

Curriculum of Applied Bioinformatics 2024

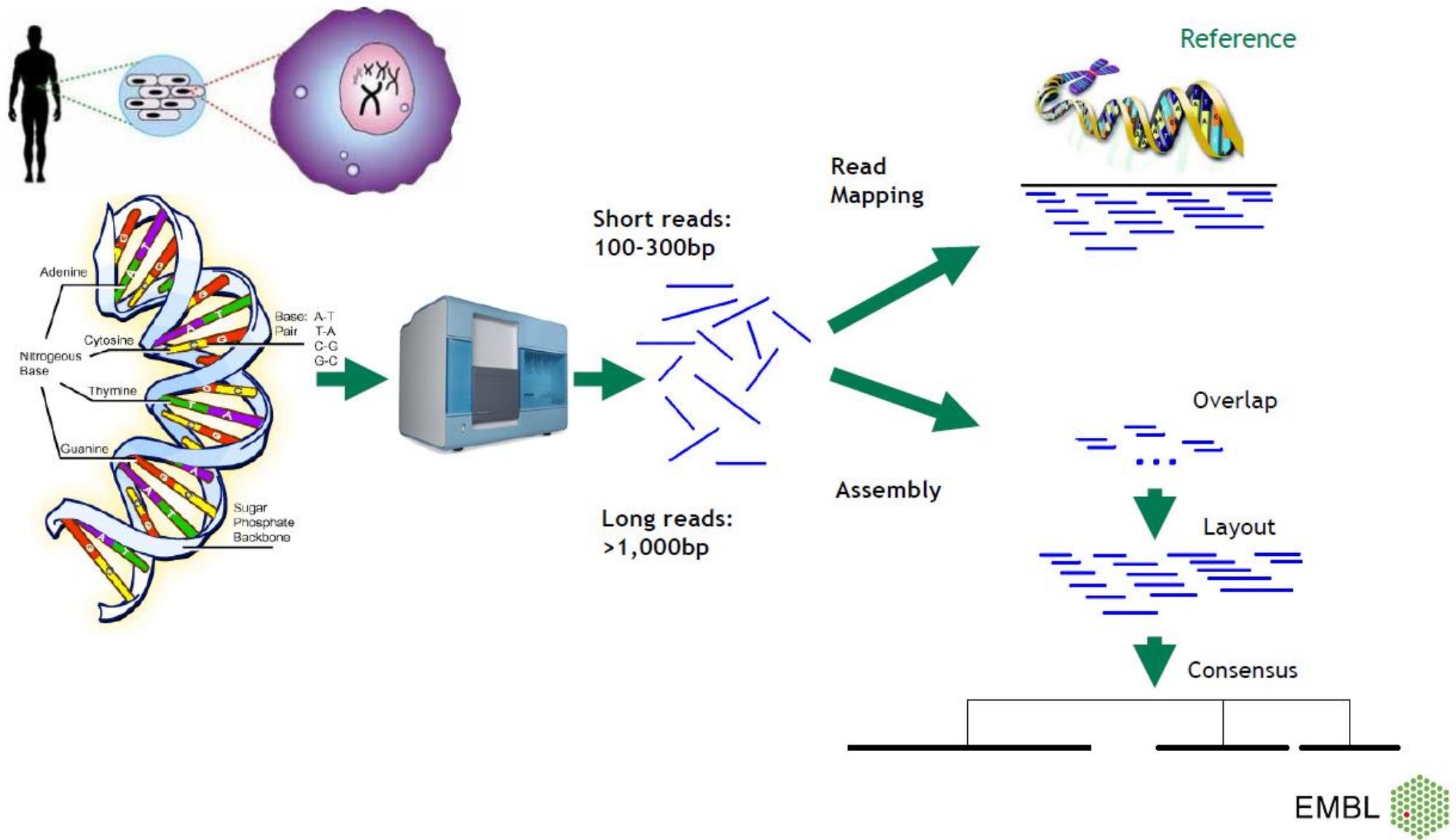
1. Linux OS, Google Colab and Linux Command Lines (02 Nov)
2. Basic Bash script and Awk (09 Nov)
3. Basic R (16 Nov)
4. Statistics with R (23 Nov)
5. Data visualization with R (30 Nov)
6. Review basic molecular biology and the human genome (09 Nov)
7. Introduction to Next Generation Sequencing (NGS), Gene annotation and the related databases (23 Nov)
8. Next Generation Sequencing (NGS) and its applications in clinic and agriculture (30 Nov)
9. Short read sequencing and upstream analysis for DNA-seq (7 Dec)
10. Short read sequencing and downstream analysis (variant calling and variant annotation) for DNA-seq (14 Dec)
11. A brief introduction to clinical genomics and precision medicine (21 Dec)
12. Long read sequencing introduction and upstream analysis for DNA-seq (28 Dec)
13. Long read sequencing and downstream analysis (denovo assembly and genome annotation) for DNA-seq (4 Jan 2025)
14. Presenting group projects (11 Jan 2025)

Human Genome Variation

- Humans genomes are >99% similar by sequence
- A typical human genome has ~5 million variants with 3-4 million single-nucleotide variants
- Humans are diploid



Sequencing DNA

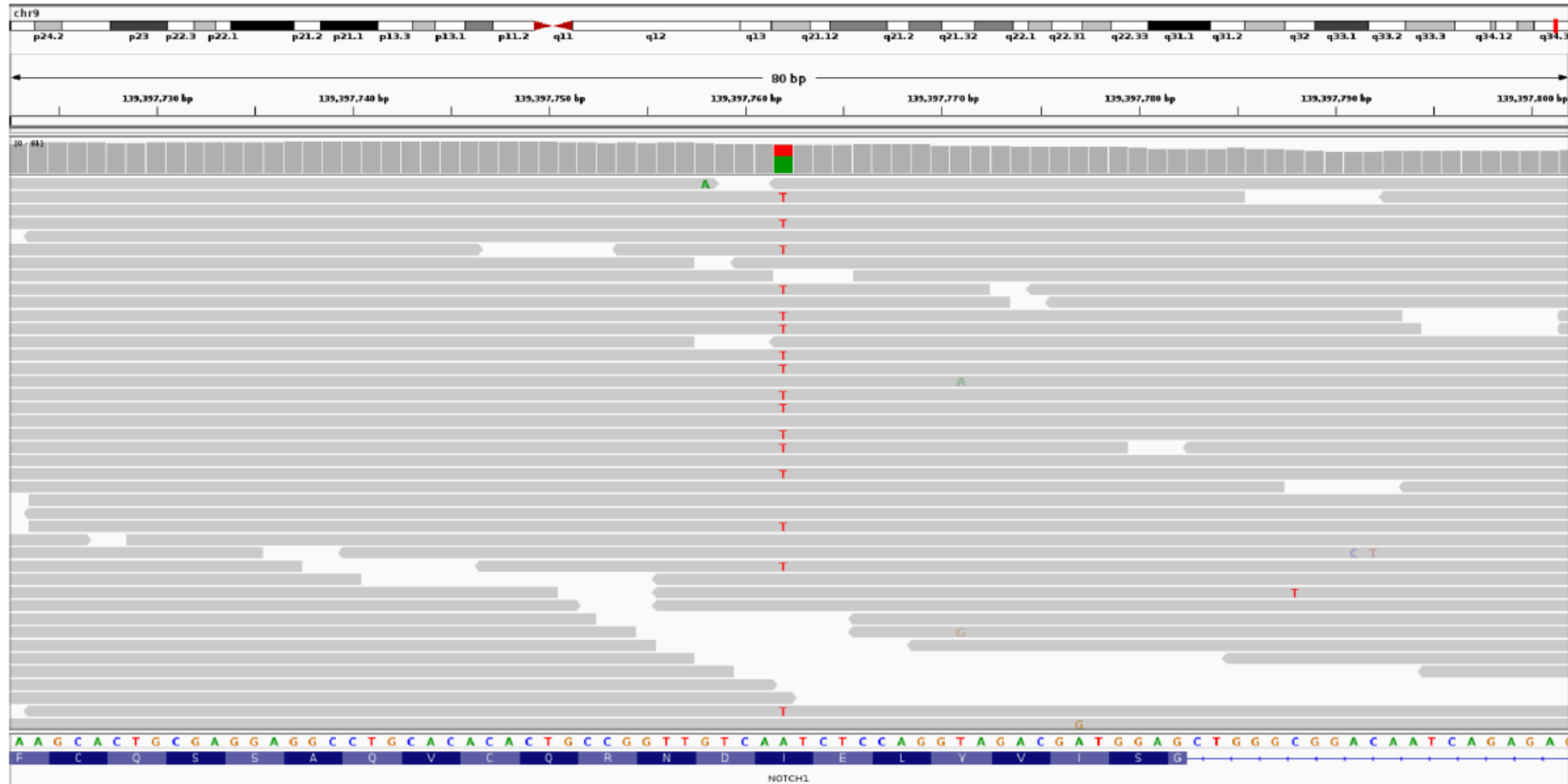


Read Alignment

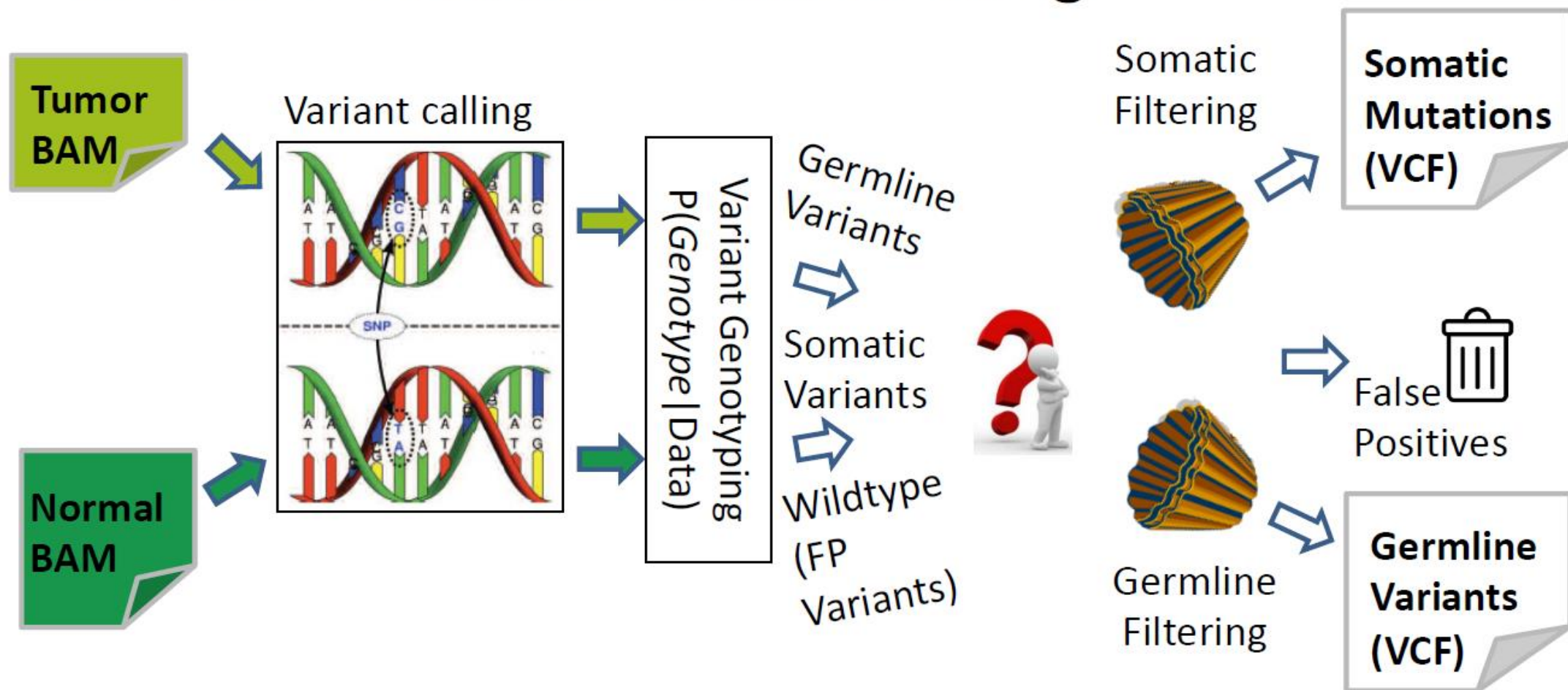
	0	10	20																						
Reference	AGATTTCGATTGAGACTGTAA-CTGATCAGGT																								
read1	▶	AGATTCTGA																							
read2	◀	TTCGATT																							
read3	◀											ATTGAGACTGTAA-CT					-	ATC							
read4	▶											TGAG-CTGCA					T	CTGATCA							
read7	◀											GAGACTGTAA-CT													
read5	◀											AG-CTGCA-CTGA					A	ACAG							
read8	▶											GACTGTAA-CTGA													
read6	▶											G-CTGCA-CTGATC					A	AGGT							

Set of reads

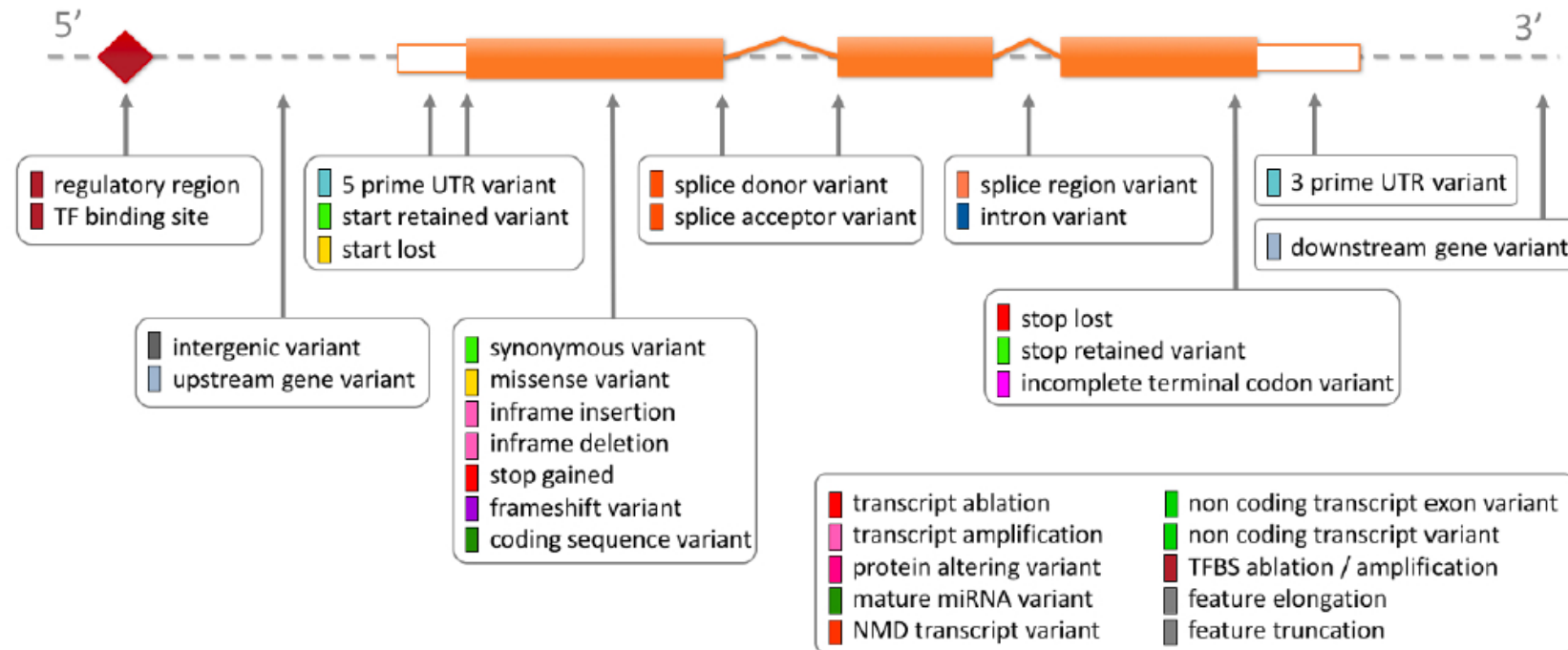
Alignment and variant viewers



Cancer Genomics Variant Calling



Interpreting Genomic Variants



Popular Tools: VEP, Annovar, snpEff

Source: https://m.ensembl.org/info/genome/variation/prediction/predicted_data.html

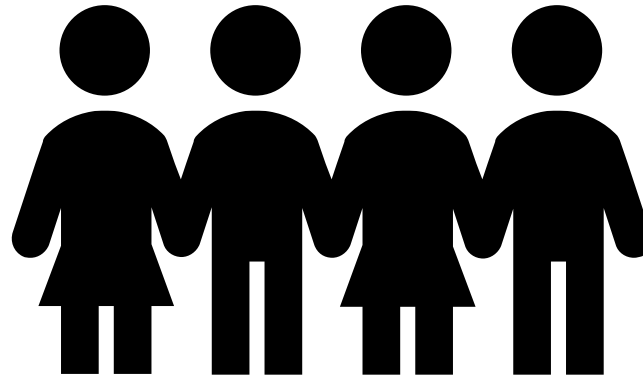
Projects and important dates

No	Project	Aim	Requirement	Group
1	A breast cancer gene panel (BRCA1 and BRCA2)	Processing a dataset of 10 samples	<ul style="list-style-type: none">- Programming bash- Human Molecular biology- Clinical background	
2	A gene panel sequencing dataset of a cancer	Processing a dataset of 2 samples	<ul style="list-style-type: none">- Programming bash- Human Molecular biology- Clinical background	
3	Whole Exome sequencing (WES) dataset of a cancer	Processing WES and interpretation of the result	<ul style="list-style-type: none">- Programming bash- Human Molecular biology- Clinical background	
4	Whole Exome sequencing (WES) dataset of a genetic disease	Processing WES and interpretation of the result	<ul style="list-style-type: none">- Programming bash- Human Molecular biology- Clinical background	
5	Denovo assembly of a viral genome ONT/PacBio	Understanding processing and interpretation of the result	<ul style="list-style-type: none">- Programming bash- Molecular microbiology- Clinical background	
6	Variant calling and subtyping of bacteria Whole Genome Sequencing	Understanding the artical and interpretation of the result	<ul style="list-style-type: none">- Programming bash- Molecular microbiology- Clinical background	

Do we need to install and learn Ubuntu and programming?

Không học
Ubuntu và lập
trình được
không?

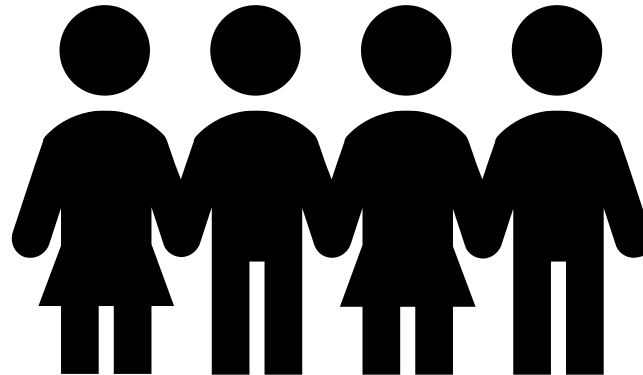
Được nhé!



Do we need to install and learn Ubuntu and programming?

Không học
Ubuntu và lập
trình được
không?

Được, nhưng
như có chân mà
ngồi xe lăn!



Evaluation for the course

- Presentation date (final exam): **11 Jan 2025**
- Max 30 min each group
- 5-10 questions each student
- Report (20) +
 - Presentation (20) +
 - Slide (10) +
 - Questions for the presentation (25) +
 - Questions for the all of lectures (25)

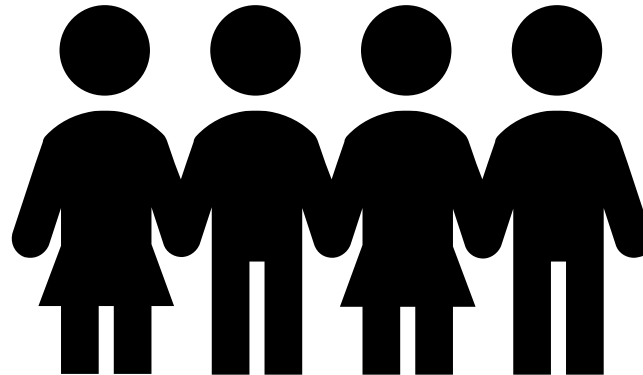
How does my lecture work?

- Start at 1:30 PM every Saturday from **02 Nov 2024** to **12 Jan 2025** (14 weeks)
- 15 min oral test at the begin of the lecture
- Time breaks in a lecture (**2:45-3:00 PM** and **4:00-4:15 PM**)
- Lecture end at **5 PM**
- No attendance checking

No attendance checking

Nghỉ học
được không
bạn?

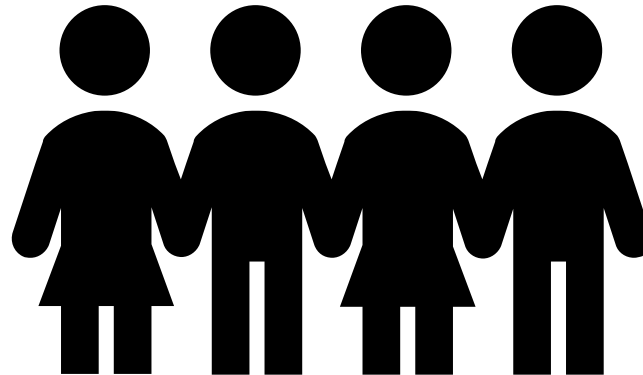
Được nhé!



No attendance checking

Nghỉ học
được không
bạn?

Nhưng khó
đậu nhe!



https://github.com/luuloi/AppliedBioinformatics2024/tree/main

→ ↺ 🏠

github.com/luuloi/AppliedBioinformatics2024/tree/main

📄 ⭐

MPL_Mail 📁 Garvan 📧 Arraylog - Google S... 📁 Machine_Learning 🗨️ Slack 🌐 Welcome - Sapphire ➡️ How do you know if... 🔄 Garvan Intranet 📧 NSWU Mail - Phuc L...

📖 README

Applied Bioinformatics 2024

"Applied bioinformatics" is a course for Genetics Master Program at Genetics Department, University of Science - VNUHCM

Curriculum of Applied Bioinformatics 2024

1. Linux OS, Google Colab and Linux Command Lines (02 Nov)
2. Basic Bash script and Awk (09 Nov)
3. Basic R (16 Nov)
4. Statistics with R (23 Nov)
5. Data visualization with R (30 Nov)
6. Review basic molecular biology and the human genome (09 Nov)
7. Introduction to Next Generation Sequencing (NGS), Gene annotation and the related databases (23 Nov)
8. Next Generation Sequencing (NGS) and its applications in clinic and agriculture (30 Nov)
9. Short read sequencing and upstream analysis for DNA-seq (7 Dec)
10. Short read sequencing and downstream analysis (variant calling and variant annotation) for DNA-seq (14 Dec)
11. A brief introduction to clinical genomics and precision medicine (21 Dec)
12. Long read sequencing introduction and upstream analysis for DNA-seq (28 Dec)
13. Long read sequencing and downstream analysis (denovo assembly and genome annotation) for DNA-seq (4 Jan 2025)
14. Presenting group projects (11 Jan 2025)

☆ 0 stars

👁 1 watching

🍴 0 forks

Releases

No releases published


[Create a new release](#)


Packages

No packages published

[Publish your first package](#)

Contributors 2

 **luuloi** Luu Phuc Loi

 **GiauLee**

youtube.com/@vpivnpathoinformatics8930/playlists

MPL_Mail Garvan Arraylog - Google S... Machine_Learning Slack Welcome - Sapphire How do you know i... Garvan Intranet NSWU Mail - Phuc... Bioinformatics_tuto... UW SISG 2021: Ass... NCI COVID-19 TweetDeck Mail - Phuc Loi Luu...

vnpatho informatics

Kênh chia sẻ kiến thức Giải Phẫu bệnh hiện đại, Tin sinh học và Khoa học Y sinh. Bao gồm các bài giảng về:

- Chuyên ngành Giải Phẫu bệnh cơ bản, chuyên sâu
- Các chuyên ngành y khoa và Khoa học Y sinh khác
- Kỹ thuật labo (giải phẫu bệnh, sinh học tế bào và phân tử)
- Xử lý và phân tích dữ liệu giải trình tự thông lượng cao (DNA-seq, RNA-seq, ATAC-seq, etc.)
- Khoa học dữ liệu khác: Data Visualization, Machine Learning
- Điểm báo (journal club): đọc và review các bài báo khoa học y sinh

Advanced VnPathoinformatics
@vpivnpathoinformatics8930 2.24K subscribers 506 videos
Giải phẫu bệnh hiện đại, Tin sinh học và Khoa học Y sinh

Subscriptions

- Kênh TVB tiếng ...
- ABC Learning En...
- GTU Systems Biolo...
- Applied_Bayesian...
- European Bioinfor...
- Taylor Sparks
- Advanced VnPatho...

Explore

- Trending
- Music

HOME VIDEOS LIVE PLAYLISTS COMMUNITY CHANNELS ABOUT

Created playlists

Sort by

Kỹ thuật labo 14 videos View full playlist

Bulk RNA-seq course 16 videos Updated 3 days ago View full playlist

DNA-seq course 18 videos Updated 3 days ago View full playlist

Cells and tissues of Immune system 10 videos IMMUNOLOGY SEMINAR View full playlist

Microbiology (Phylogenomics) 21 videos JCS 2023 View full playlist

WGS-1: INTRODUCTION TO THE COURSE AND BASIC COMMAND LINE 1 34 videos Bioinformatics course 2023 Updated 2 days ago View full playlist

Single Cell RNA-seq course 24 videos

Lý do xây dựng chương trình giảng dạy 36 videos

Tế bào học và các chuyên đề mở 16 videos

Giải phẫu bệnh cơ bản 2022 22 videos

JCS 2022 60 videos

Data Visualization 2022 40 videos

<https://www.youtube.com/@vpivnpathoinformatics8930/playlists>

Thank you for your attention!

