**CS4330: Combinatorial Methods in Bioinformatics**
# Course Briefing

Wong Limsoon

# Pre-requisites

Completed modules on

***Programming***

***Algorithms***

*Basic molecular biology*
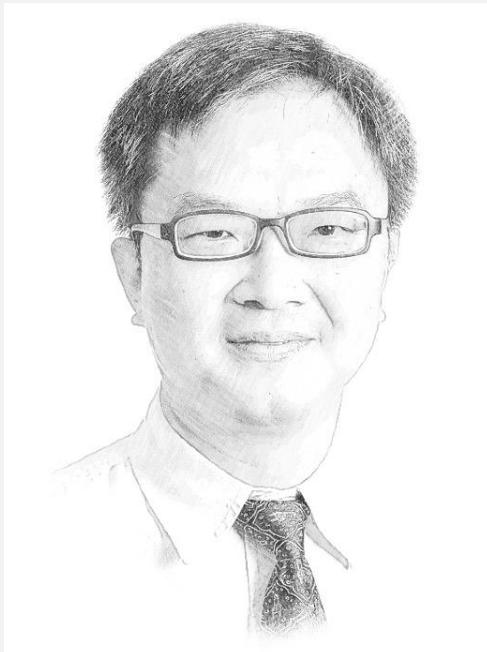
*ST2334 Probability & Statistics*

***CS2220 Introduction to Computational Biology***

# Objective

Exposure to computational methods for genome sequencing, assembly, and analysis

# About me

## Wong Limsoon



Professor in Computing & Medicine

Fellow of ACM & Singapore National Academy of Science

Research interests

*Database theory:* *Intensional expressive power*

*Computational biology:* *Batch effects*

*Data science:* *Justifiability, mistakes*

# Time Table

Lecture-cum-tutorial
*Thursday @ 2-5pm*
*SR @ LT19*

Office hours
*Friday @ 2-3.30pm*
*COM2-03-57*

Email
*dcswls@nus.edu.sg*

# Course Syllabus

Overview of genome sequencing & assembly

Read mapping

Reference-based genome assembly

De novo genome assembly

Quality of genome assembly

Polyploid genome assembly

Long-read & hybrid genome assembly

Variant calling

# Teaching Style

Need to learn a lot of material by yourself

*Read papers*

*Consult "AI" … beware that AI is mostly mechanical recall*

*Try exercises*

*Practise on your own*

Don't expect to be told everything

*Real-life bioinformaticians often work with biologists and clinicians. They can't tell the bioinformaticians much on how to analyse their data or solve their problems*

# **Tutorials**

Tutorials are integrated into lectures

*Lectures are divided into ~20 minutes chunks, interspersed with exercises*

No "answer" slides are provided to exercises

*Reading solutions gives a false sense of understanding*
*You learn far more by trying, failing, and then discussing*
*I am happy to go through your attempt with you*

# Assignments, Project, & Exam

Assignments (30-40% of marks)

*2-3 assignments*

Project (20-30% of marks)

*Based on a case study in the class*

*8-10 pages of report / ppt slides expected*

Exam (40-50% of marks)

*1 final open-book exam*

# Be Honest

Exam

*Absence w/o good cause results in ZERO mark*

*Cheating results in ZERO mark*

Discussion on assignments & project is allowed

Blatant plagiarism is not allowed

*Offenders get ZERO mark for assignment or exam, for those who copied AND those who were copied*

SOC's academic honesty guidelines
https://www.comp.nus.edu.sg/cug/plagiarism/

# Background Readings

Every lecture will be accompanied by a small set of "good-to-read" articles

The articles are considered lecture notes