BIO-467

SCIENTIFIC LITERATURE ANALYSIS IN BIOENGINEERING

- Module 2 -

Aleksandar Antanasijevic
Global Health Institute
EPFL

Wed 8h15-10h00 (Default time unless otherwise noted) / classroom: INM 203

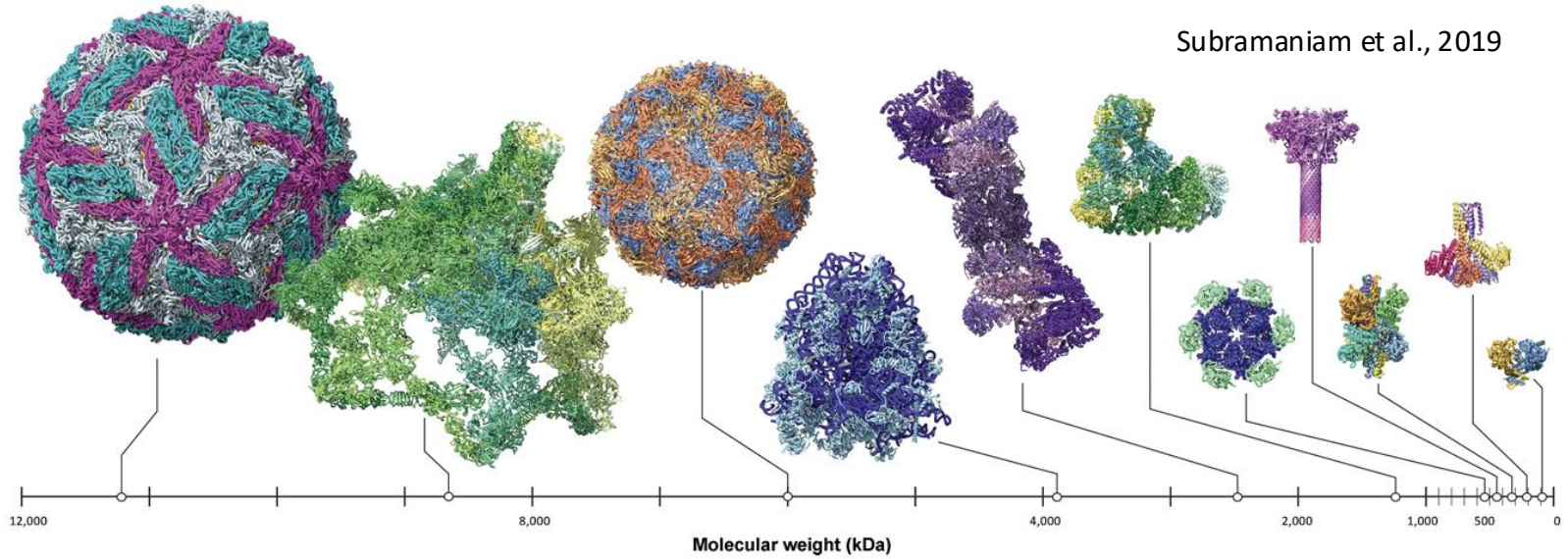
Your TAs
- Kiruthika Kumar (kiruthika.kumar@epfl.ch)
- Yash Garodia (yash.garodia@epfl.ch)

BIO 467 Fall 2024

#	DATE		TOPIC	WHO
1	Sept	11	General Introduction **(all students join)**	**Aleks Antanasijevic**
2	Sept	18	Librarian lecture on scientific literature search Intro Module 1 (**all students join starting at 10:00 am-Christoph)**	**EPFL Library Team**
			Module 1	
3	Sep	25	Groups ABC DEF will be assigned on Monday of the week Prep Module 1 (TA's available in classroom)	**Christoph Merten**
4	Oct	02	Module 1 group **ABC** only	
5	Oct	09	Module 1 group **DEF** only Introduce Module 2 (**all students join starting at 10am-Aleks**)	
			Module 2	
6	Oct	16	Prep Module 2 (TA's available in classroom)	**Aleks Antanasijevic**
	Oct	23	**Holidays!**	
7	Oct	30	Module 2 group **DEF** only	
8	Nov	6	Module 2 group **ABC** only Intro Module 3 and Intro individual topics (**all students join starting at 10am-Hatice**)	
			Module 3	
9	Nov	13	Prep Module 3 (TA's available in classroom)	**Hatice Altug**
10	Nov	20	Module 3 group **ABC** only	
11	Nov	27	Module 3 group **DEF** only	
			Individual efforts	
12	Dec	4	Preparation for individual report and presentation	**ALL**
13	Dec	11	Preparation for individual report and presentation	
14	Dec	18	Hand in reports (due 23:59 Dec 17th); **8.15am - noon** Individual presentations (**all students**)	

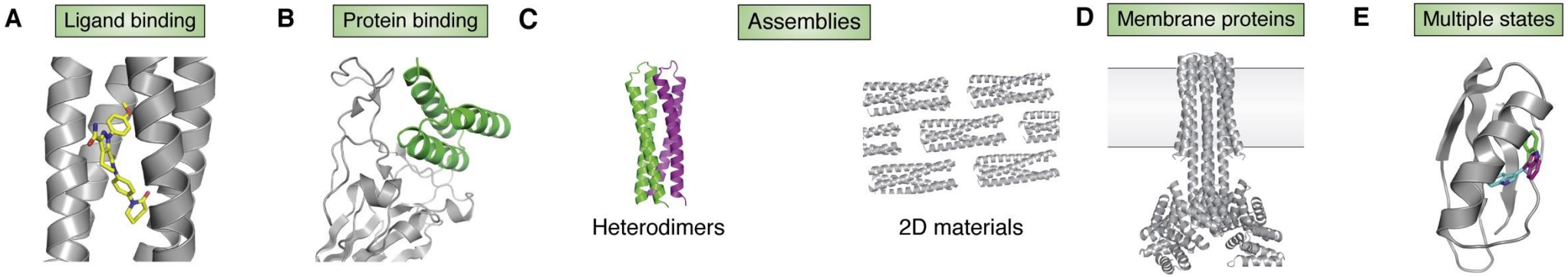
Topic: Structural Biology and Protein Engineering

- Studying how biomolecules assemble in 3D space allows to understand their molecular and biological roles



Subramaniam et al., 2019

- Learning from existing 3D structures and redesigning them to achieve desired function



Pan et al., 2021

Groups A and D: High resolution analysis of heterogeneous biological samples

nature methods

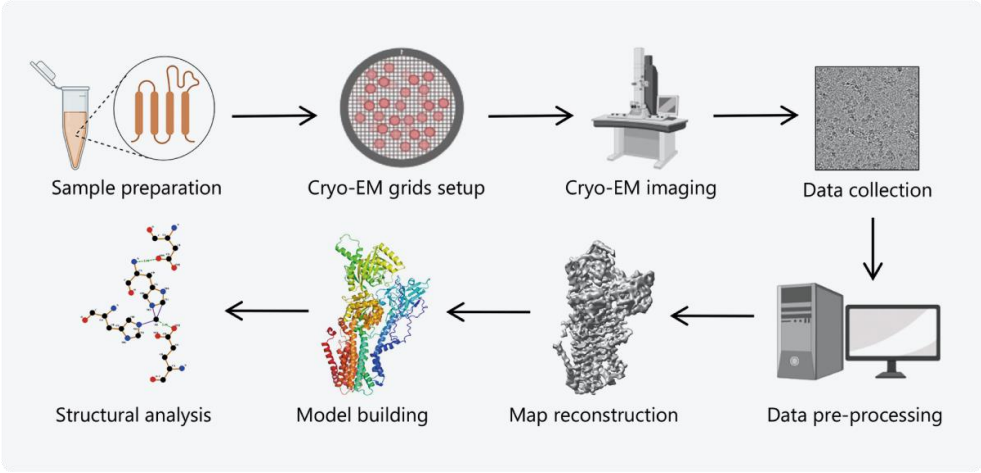
ARTICLES

https://doi.org/10.1038/s41592-019-0637-y

Bottom-up structural proteomics: cryoEM of protein complexes enriched from the cellular milieu

Chi-Min Ho[1,2,3,10], Xiaorun Li[3,4,10], Mason Lai[2,3], Thomas C. Terwilliger[5], Josh R. Beck[6,7], James Wohlschlegel[8], Daniel E. Goldberg[6], Anthony W. P. Fitzpatrick[9] and Z. Hong Zhou[1,2,3]*

Standard structural biology workflow



cryoID workflow

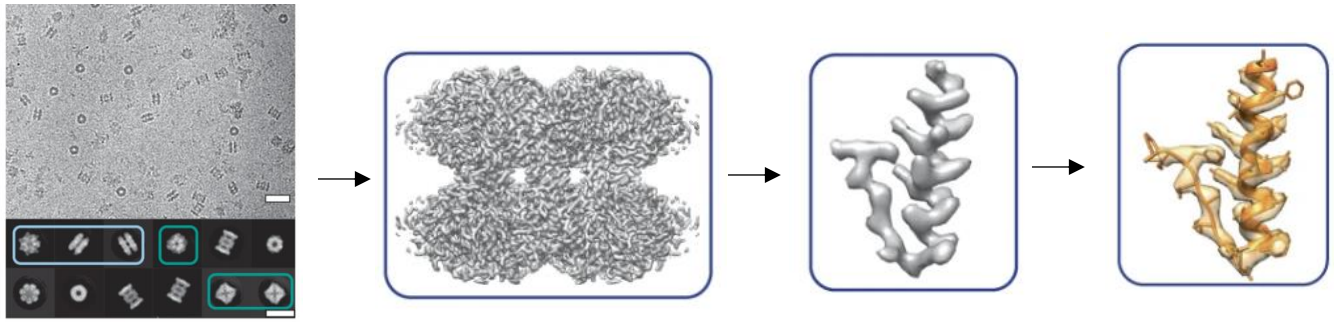
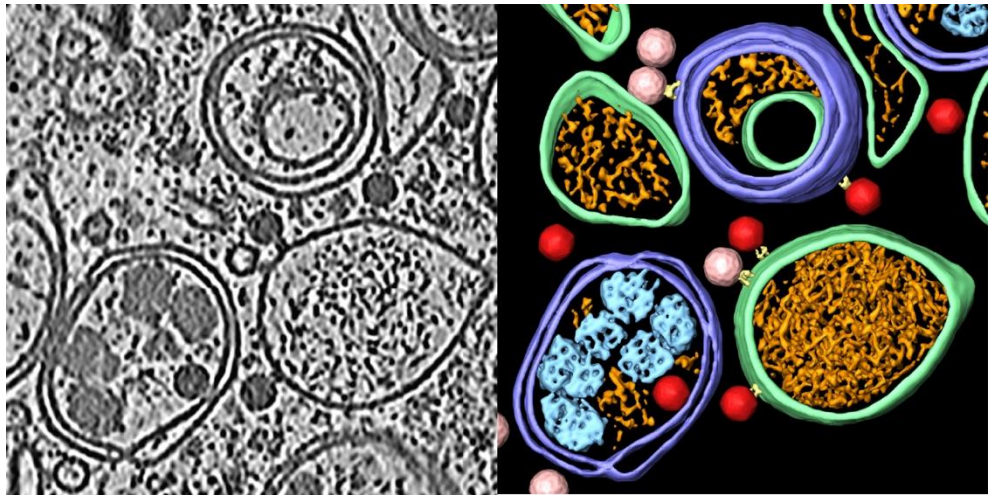


Image cell lysate

Reconstruct maps

Identify protein based on map

Poliovirus-infected HeLa cells



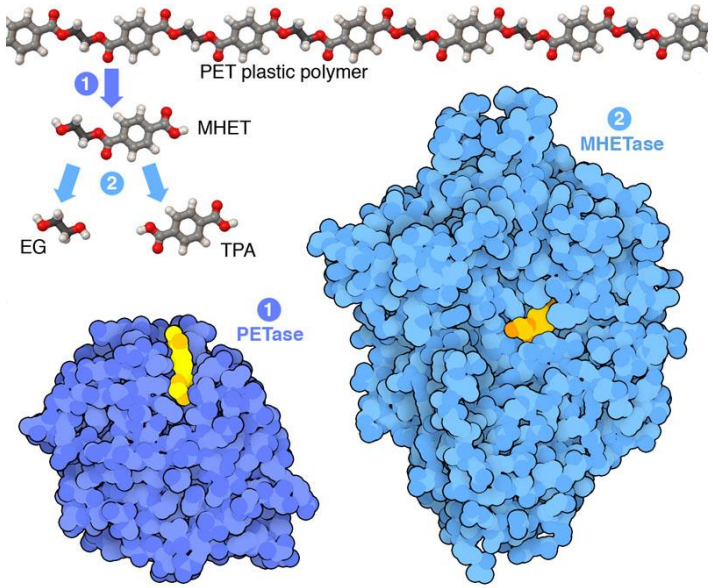
Groups B and E: Structure-guided engineering of plastic-degrading enzymes

Article | Open access | Published: 13 July 2023

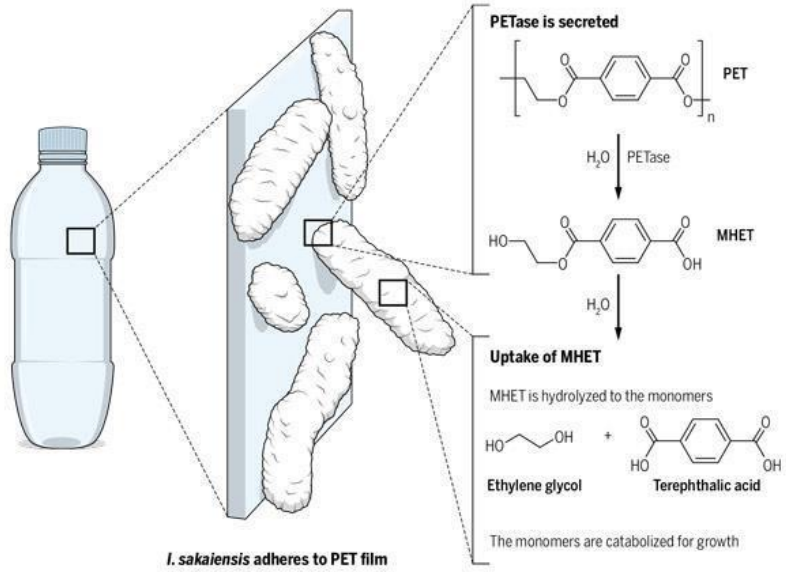
Discovery and mechanism-guided engineering of BHET hydrolases for improved PET recycling and upcycling

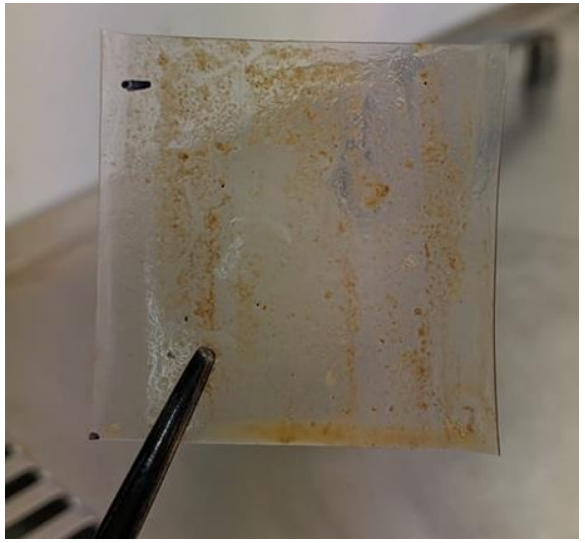
Anni Li, Yijie Sheng, Haiyang Cui, Minghui Wang, Luxuan Wu, Yibo Song, Rongrong Yang, Xiujuan Li ✉ & He Huang ✉

Nature Communications **14**, Article number: 4169 (2023) | Cite this article



www.rcsb.org





Bacteria on a plastic sheet

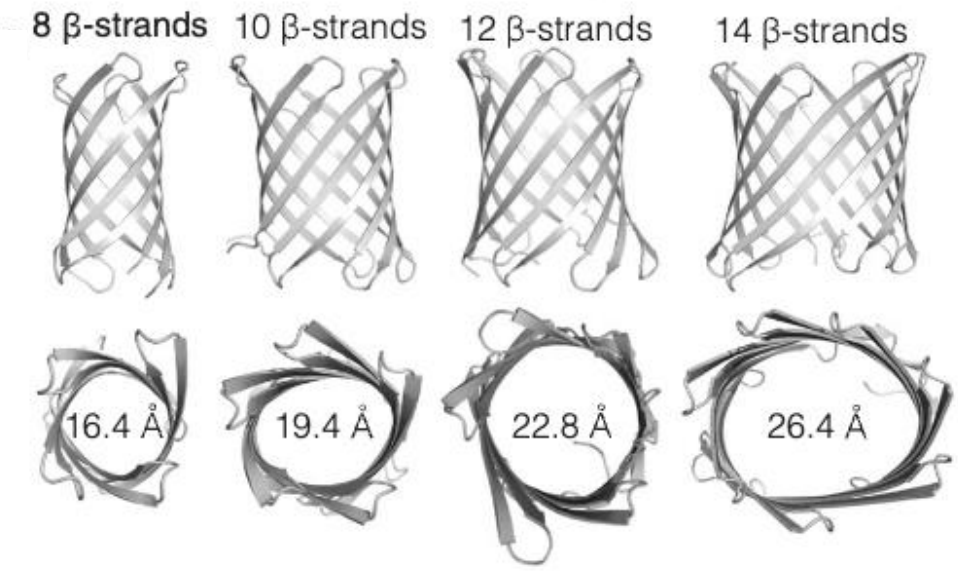
Groups C and F: De novo design of custom nanopores for biosensor applications

RESEARCH ARTICLE | PROTEIN DESIGN

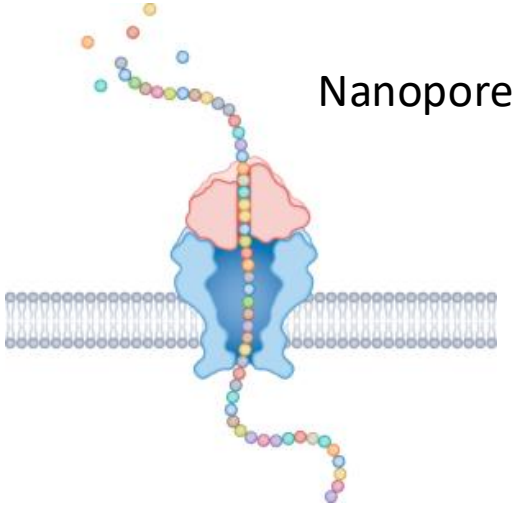
Sculpting conducting nanopore size and shape through de novo protein design

SAMUEL BERHANU, SAGARDIP MAJUMDER, THOMAS MÜNTENER, JAMES WHITEHOUSE, CAROLIN BERNER, ASIM K. BERA, ALEX KANG, BINYONG LIANG, NASIR KHAN, [...], AND ANASTASSIA A. VOROBIEVA +6 authors Authors Info & Affiliations

SCIENCE • 18 Jul 2024 • Vol 385, Issue 6706 • pp. 282-288 • DOI: 10.1126/science.adn3796



Nanopore



Nucleic acid sequencing technology