Metodi Numerici dell'Informatica

Introduzione

Emanuele Rodolà
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SAPIENZA
UNIVERSITÀ DI ROMA

2nd semester a.y. 2022/2023 · February 28, 2023

Logistics

- **Docenti:** Prof. Emanuele Rodolà
- **Assistenti:** Dr. Emilian Postolache e TBD

  Codice, esercitazioni, supporto tecnico

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- **Ricevimento:** Inviare una mail al docente o agli assistenti
- **Sito del corso:** https://erodola.github.io/NumMeth-s2-2023/
  Controllare giornalmente per informazioni e materiale

Disclaimer

This is a new course (just at the second edition).

- All the material is new

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- We may change the balance depending on your feedback

Recipe for success

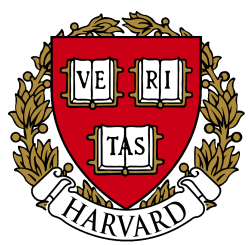
Try to enjoy the course!

Take this as an opportunity to learn in depth.

Ask questions when in doubt.

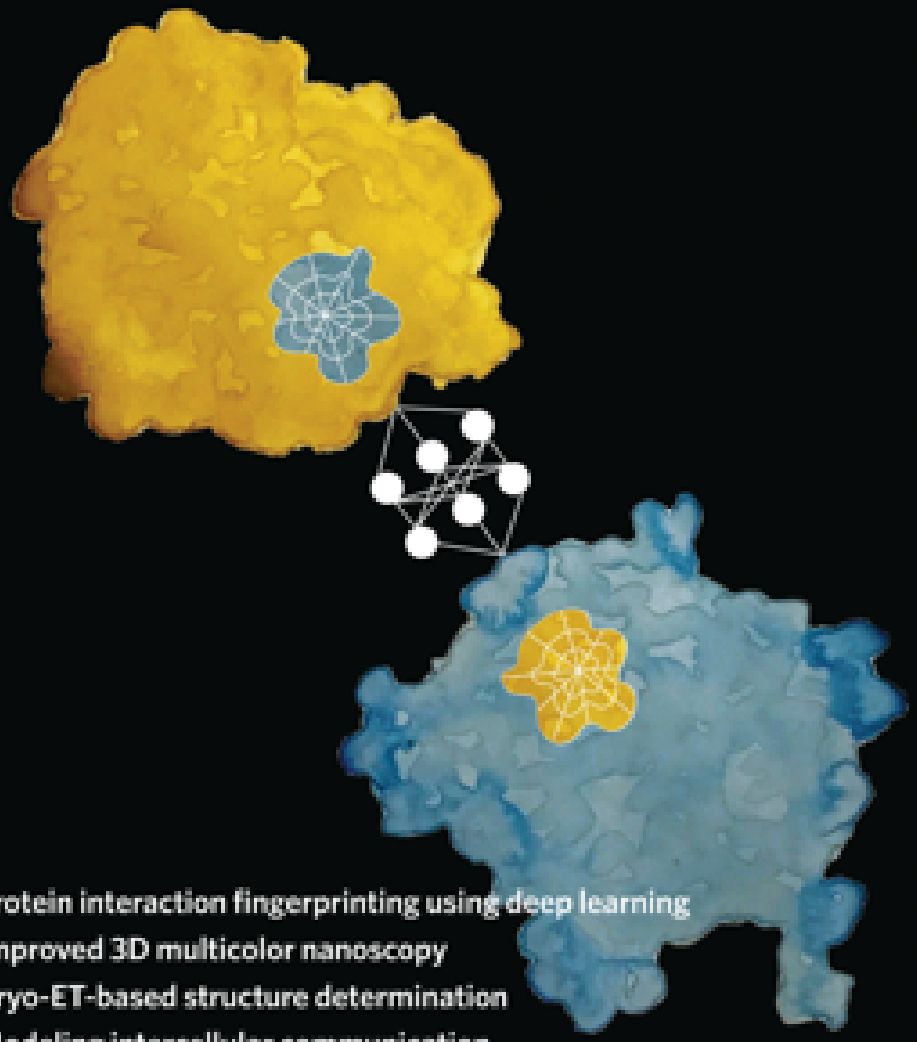
Who am I?

- Had research positions at U Tokyo, TU Munich, U Lugano and visiting positions at Harvard, Stanford, Ecole polytechnique, Technion among others
- Fellow of ELLIS and the Young Academy of Europe
- Research: geometric and graph learning, ML for audio, applied AI
- Team: ∼25 members from physics, engineering, computer science **GLADIA** group of Geometry, Audio, Learning and AI
- If you have ideas, approach us for projects / theses!




nature.com/nmeth February 2020 Vol. 17 No. 2

nature methods



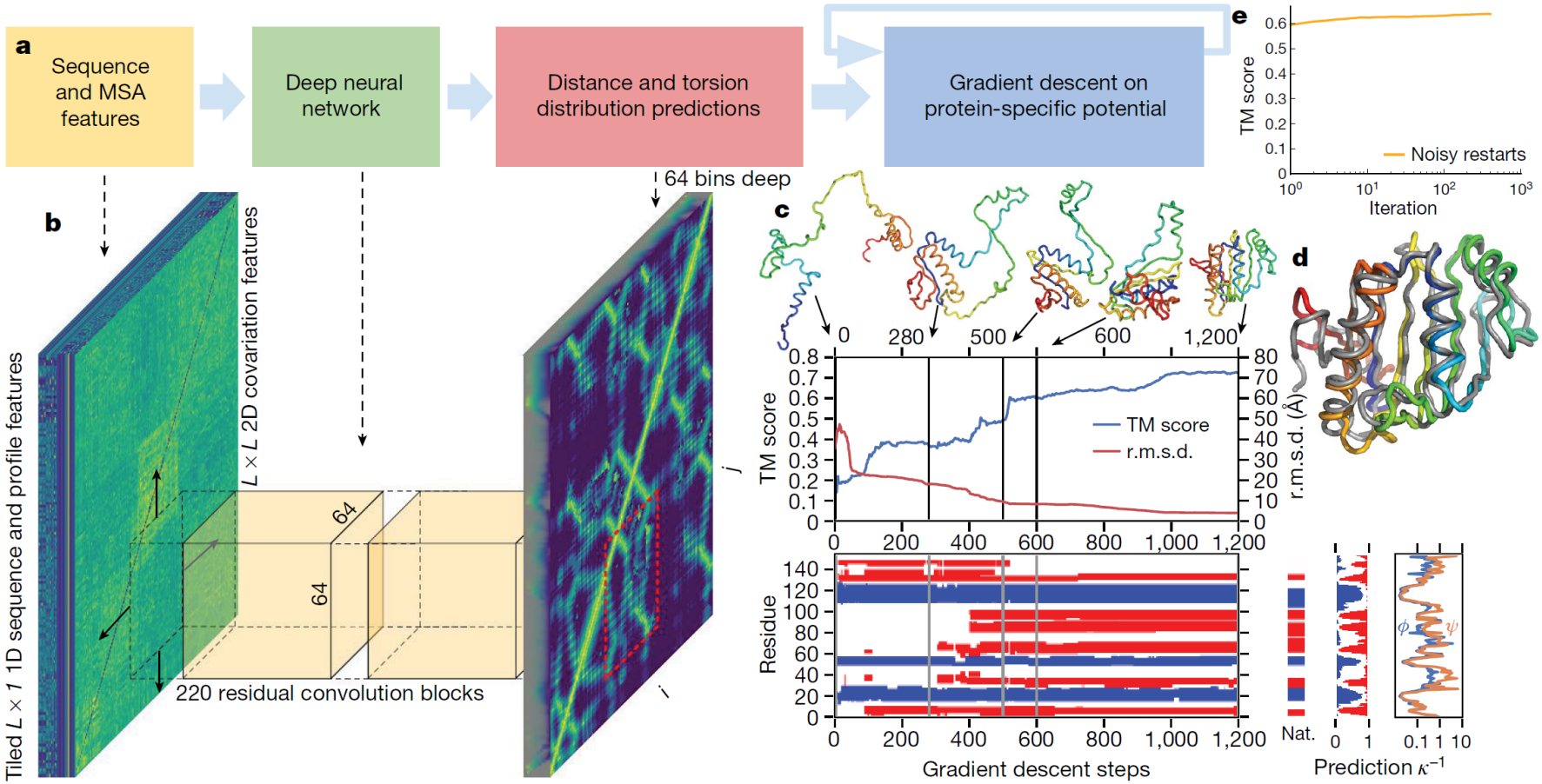
Protein interaction fingerprinting using deep learning

Improved 3D multicolor nanoscopy

Cryo-ET-based structure determination

Modeling intercellular communication

The Bioconductor project for single-cell analysis



https://deepmind.com/research/case-studies/alphafold

Pre-requisites and reading material

"Numerical Algorithms" by Justin Solomon, CRC Press 2015.

Specific references will be given throughout the course in the form of book chapters and scientific articles.

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- Programming fundamentals. We will use Python
- Welcome (not mandatory): linear algebra, calculus

Grading

1. Midterm self-evaluation (*not graded*)
   When: first half of April

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In class, be prepared:

- Download/print the slides beforehand
- Take notes: not everything will be on the slides
- Bring your laptop: we'll do live coding sessions

Overall objective

What will you get out of this course?
(if you study)

- You will acquire solid fundamental skills for understanding, analyzing, and applying numerical methods and algorithms in diverse application scenarios

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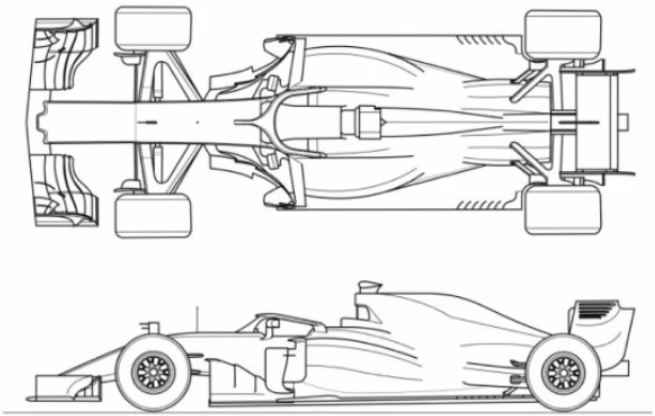
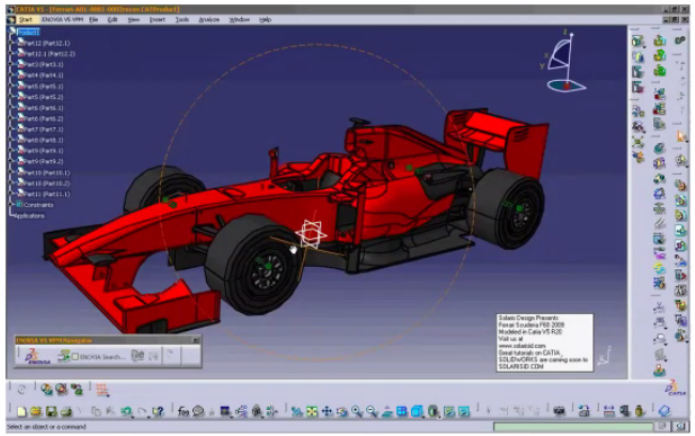
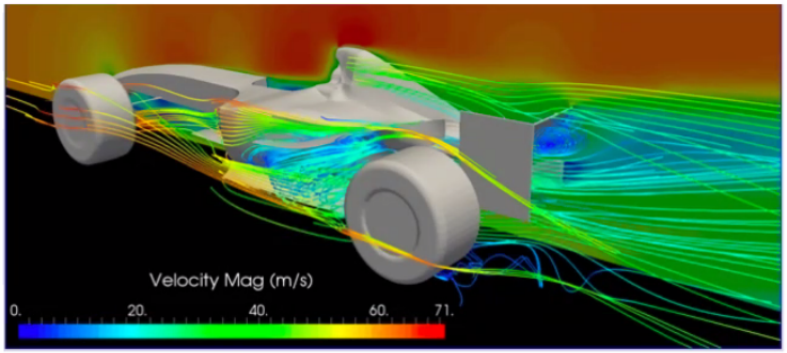
- You will be able to grasp and elaborate on more advanced topics in several other applied disciplines and scientific areas
- You will get practical development expertise on applied problems



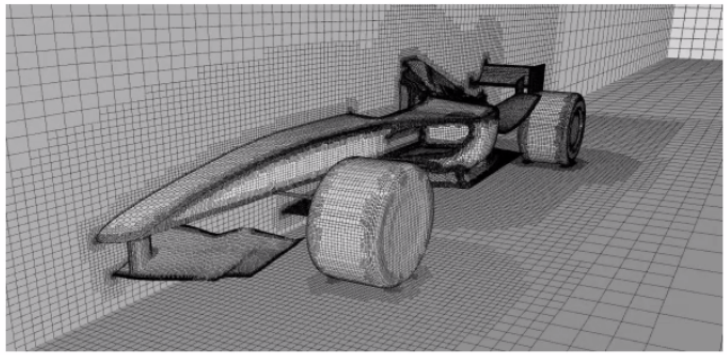
Sketch



3d model



Aerodynamic simulation



Volumetric mesh

Image: Edoardo Remelli, EPFL