



Samueli
Bioengineering



Artificial intelligence for Hemodynamic Analysis of Cardiovascular Medicine

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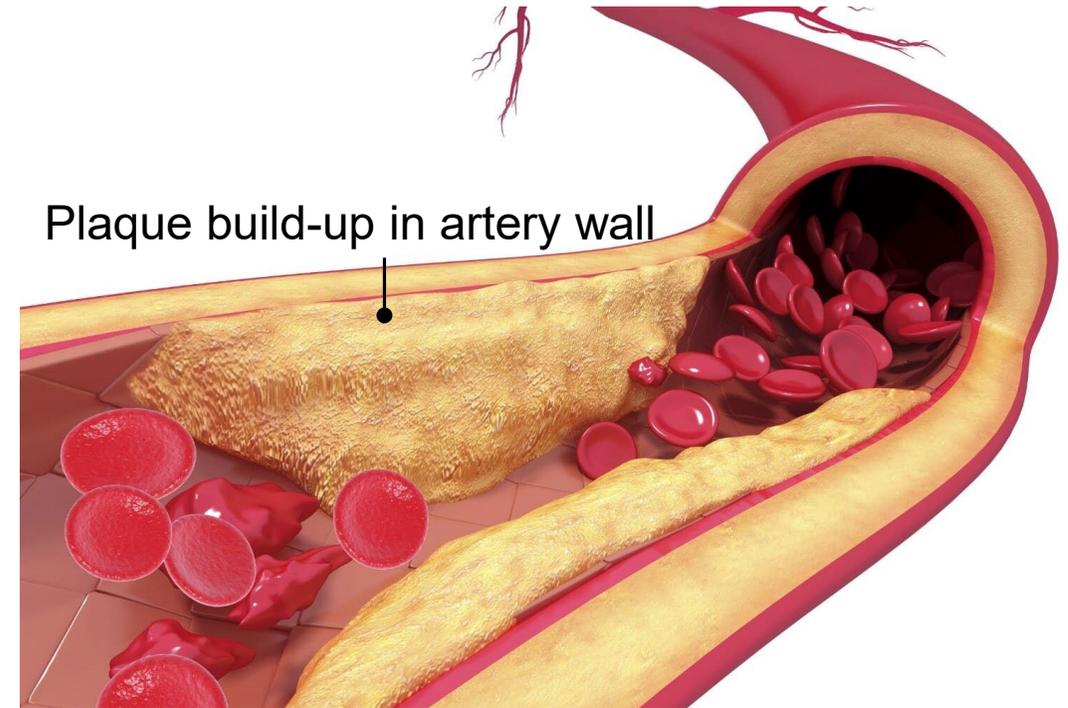
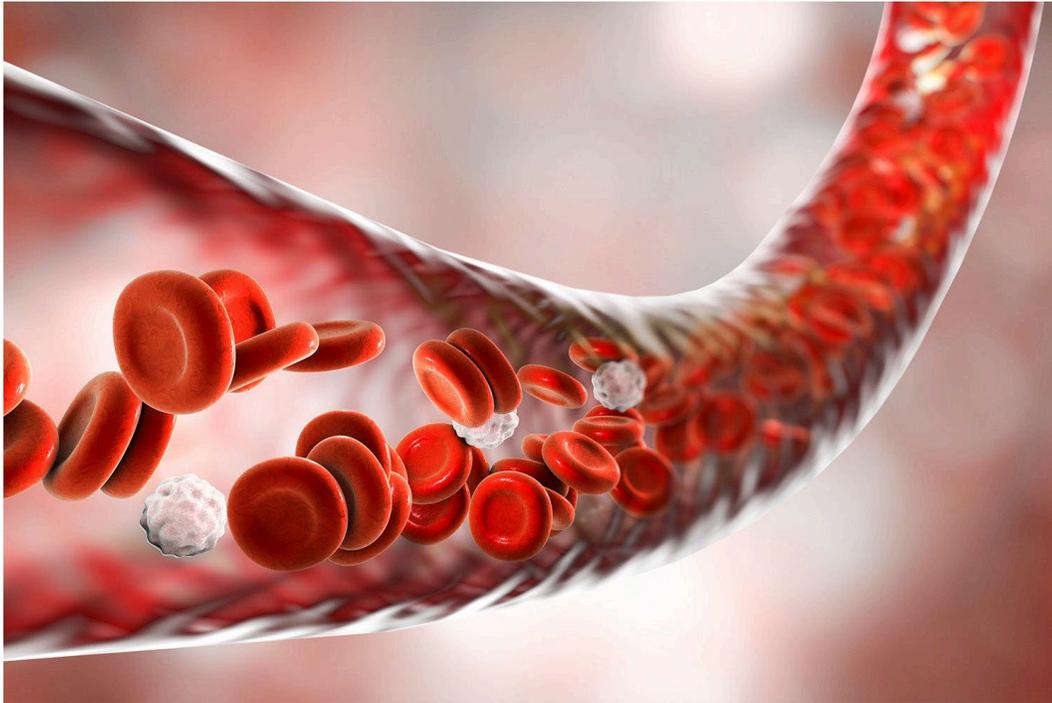
Department of Bioengineering, UCLA

Amazon Fellows Lightning Talks

Jan. 25, 2024

What is Hemodynamics?

Hemodynamic analysis is vital for the **understanding** and **management** of CVDs



Hemodynamics:
how **blood** flows through blood **vessels**

- Heart rate
- Flow velocity
- Blood pressure

Atherosclerosis (18.3 million people)

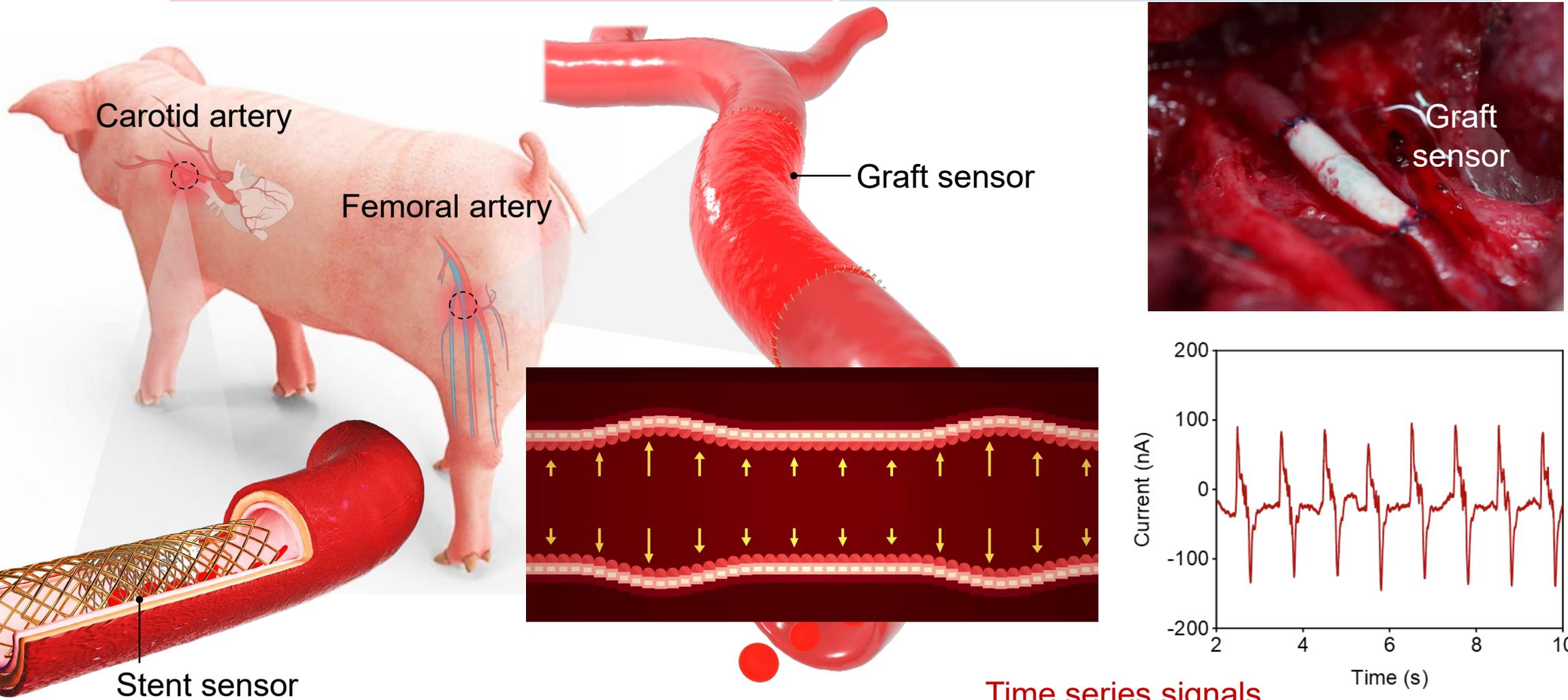
- Higher blood pressure
- Lower flow velocity

Abnormal hemodynamics



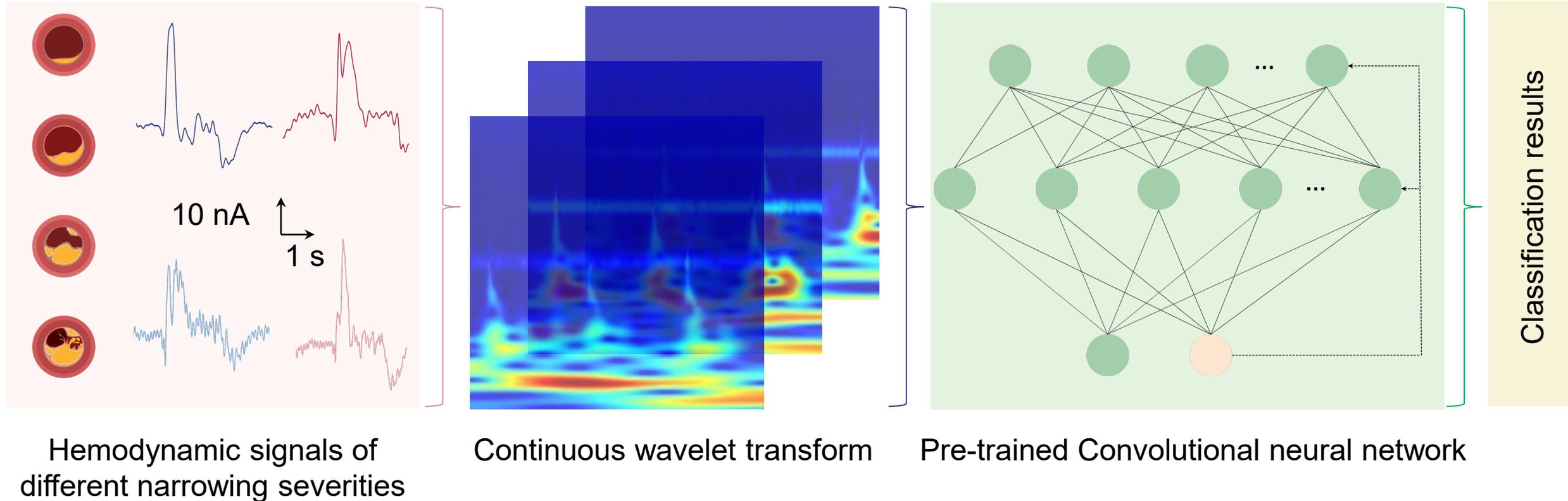
Cardiovascular diseases (CVDs)

How to Implement Hemodynamic Analysis?



Can AI Facilitate Hemodynamics Interpretation?

Case 1: Diagnose artery narrowing severities through CNN



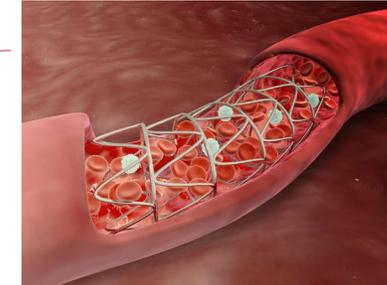
Algorithms: the engines of AI

Pinpoint critical areas of concern

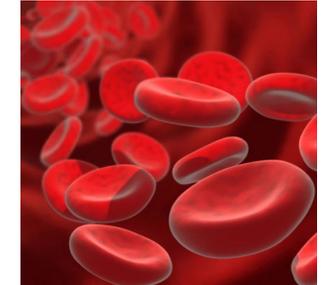
Advanced algorithms (e.g., Transformer)

Acquire extensive *in situ* data

AI for medicine



Treatment development



Pathology understanding



CVDs management

Various CVD models to ensure robust AI performance and avoid bias

Hemodynamic database construction

***In situ* hemodynamic data: the fuel powering medical AI transformation**



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Thank you!

Question Time