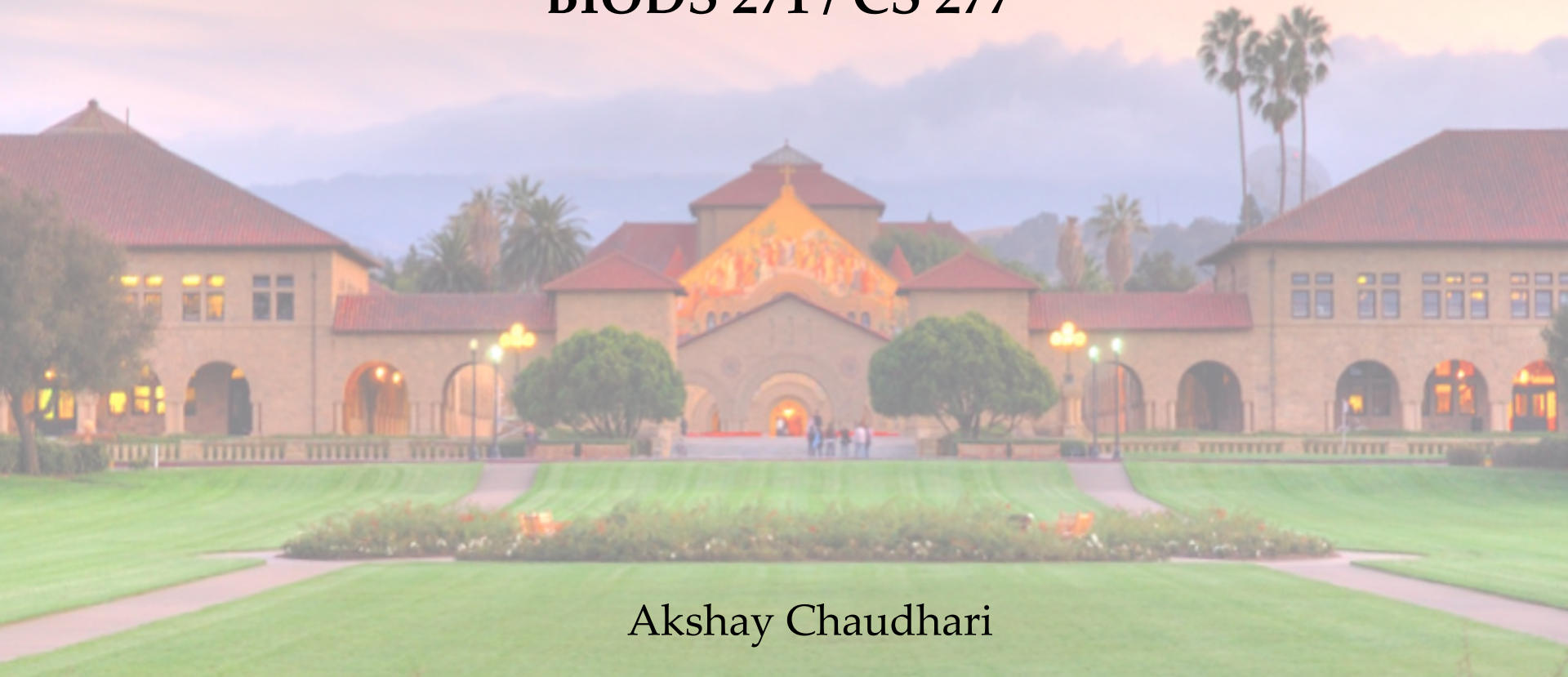


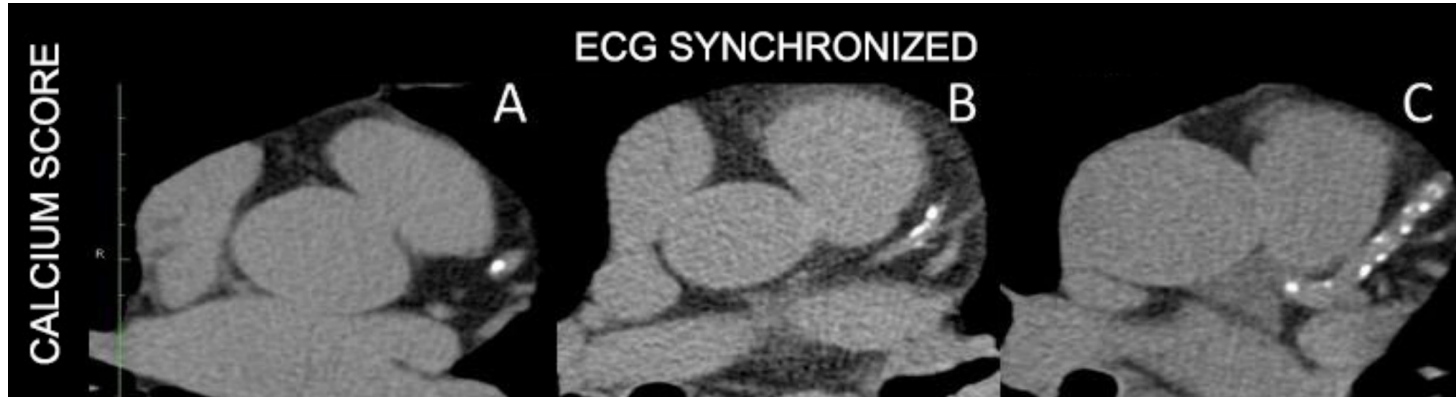
Clinical Needs

BIODS 271 / CS 277



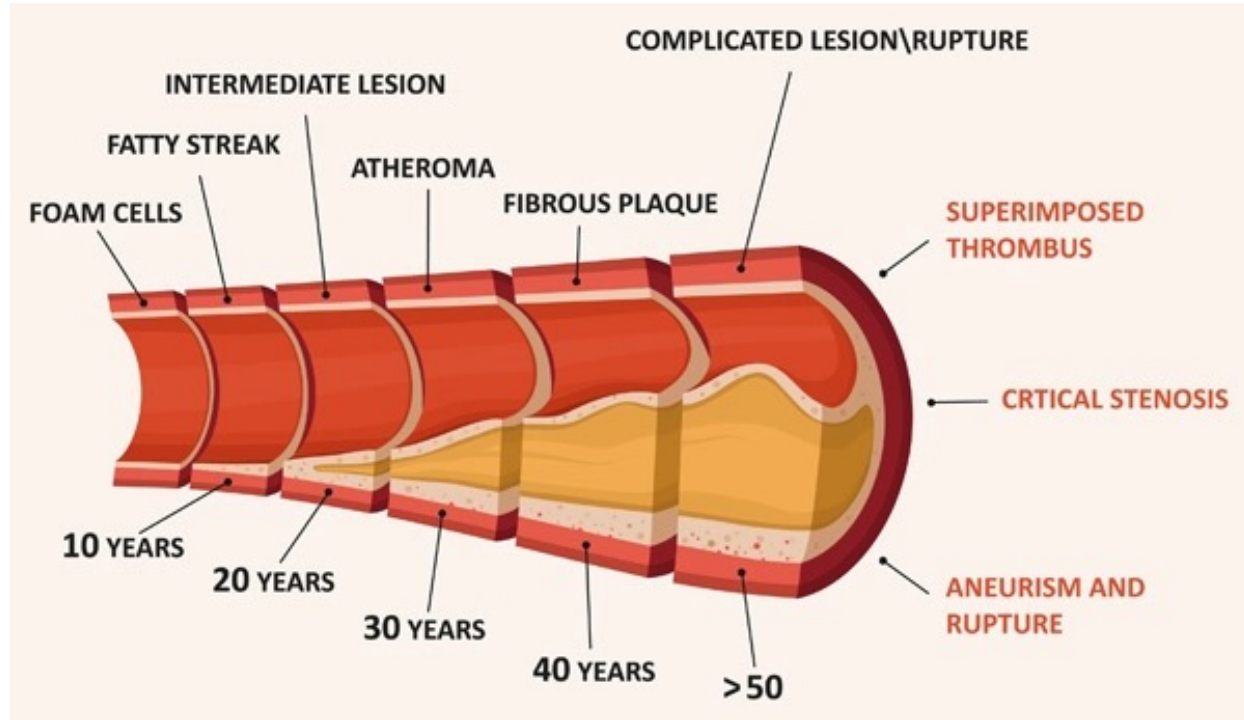
Akshay Chaudhari

Calcification Detection



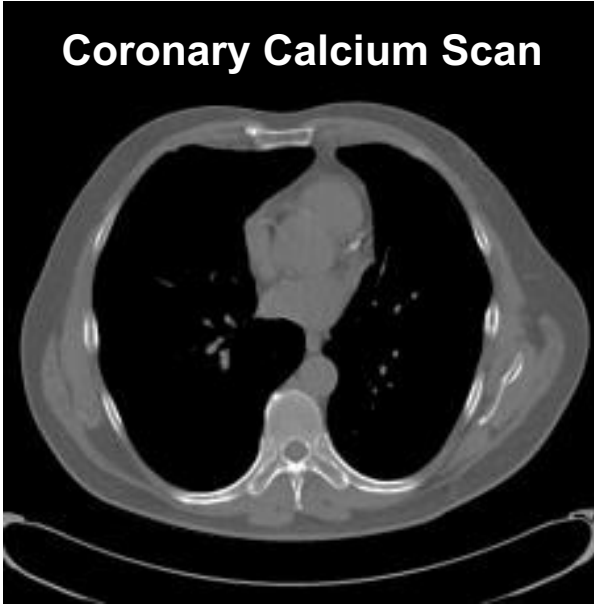
Atherosclerosis

- Plaque build up in arteries
- Associated with myriad harmful events

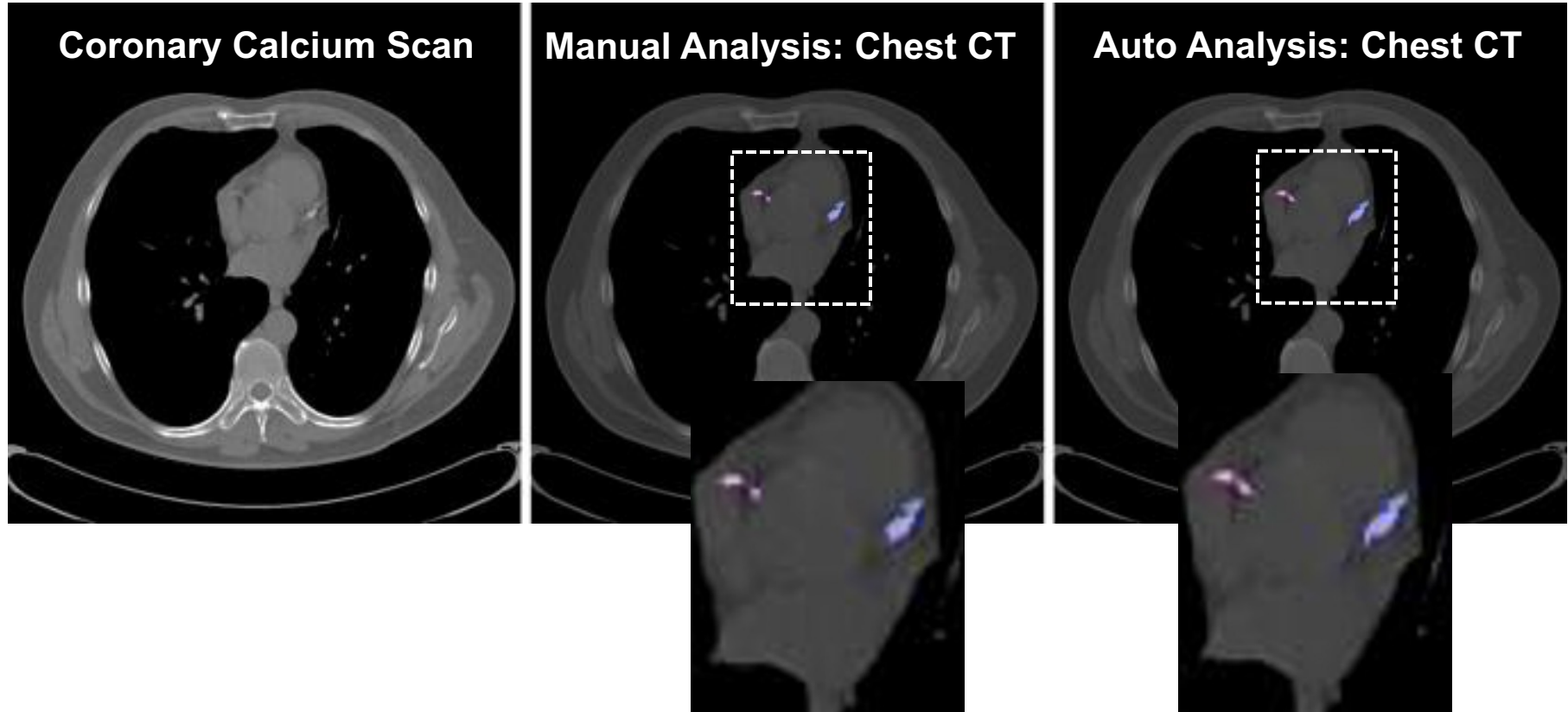


Calcification Detection

Coronary Calcium Scan



Calcification Detection

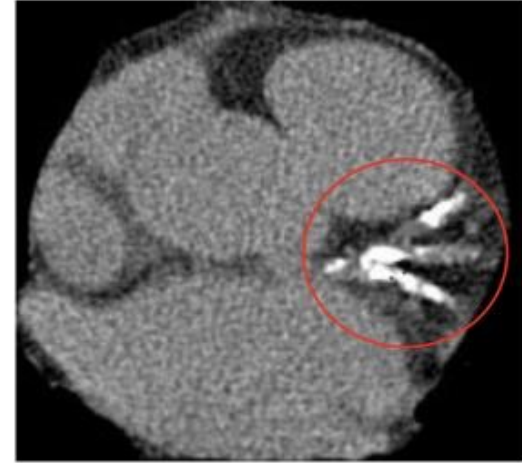


Outcome Measures

- Agatston score = (Calcium Size)*(Calcium intensity)
- Clinical scores in buckets:
 - Score = 0
 - $1 < \text{Score} < 100$
 - $100 < \text{Score} < 400$
 - Score > 400

Clinical Action

- High coronary calcium → initiation of statins
- Patients with no prior CVD risk and CAC sent notifications along with PCP
- In a matched study with 173 patients, **51%** of notified patients **initiated statins** vs only 7% in control arm!



Model Development and Evaluation

- Predicting Agatston score from ungated chest CT
- ML Task = ??
- Evaluation Metric = ??

Model Development and Evaluation

- Visualizing calcium deposits to have confidence
- ML Task = ??
- Evaluation Metric = ??

Model Development and Evaluation

- Clinical decision making on statin prescription
- ML Task = ??
- Evaluation Metric = ??

Model Development and Evaluation

- How to find the best patients who would benefit?
 - Patients on statins already?
 - Patients who cannot tolerate statins?
 - Patients with other co-morbidities?
- Who to quantify benefits on?

Implementation

- What is the infrastructure to run inference with algorithms?
- Where to provide the information?
- Who pays for algorithms?

Assessing Downstream Impact

- How do patients benefit? What metrics to track?
 - Visits to clinician?
 - Statin usage?
 - Cardiovascular events reduced?
- How about other costs to the healthcare system?

General Guidelines

- Why does your innovation matter?
- Who benefits from your benefit? Can you quantify it?
- How does your innovation get implemented?
- How does your innovation get used in a care pathway?
- Can you show a benefit from using your innovation?
- Do all patients equally benefit from your innovation?

Questions?

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