

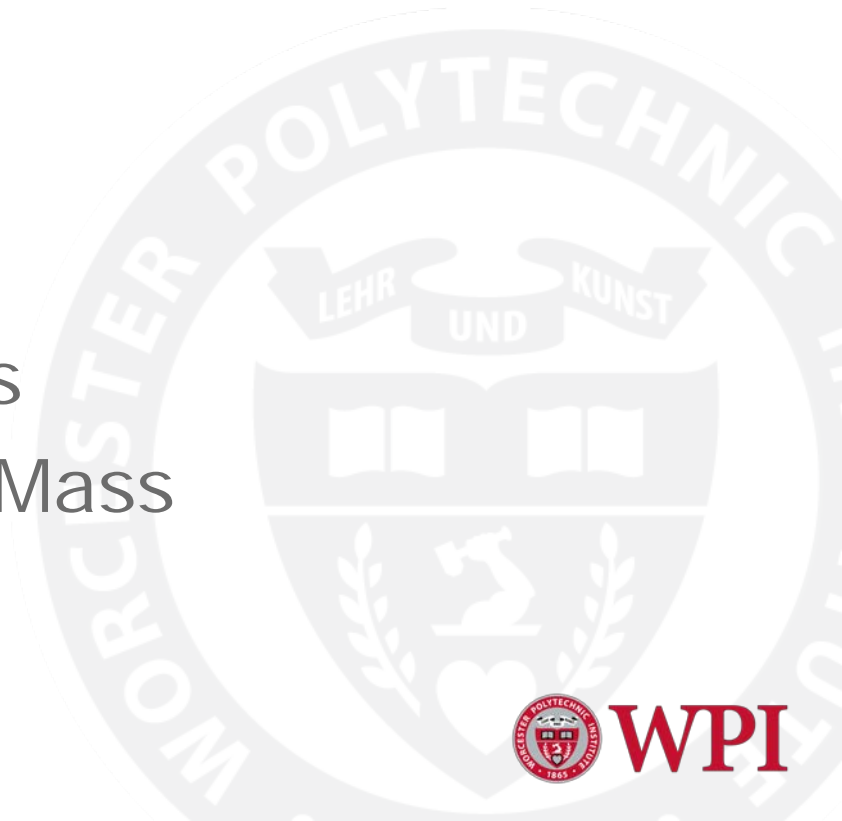
Football Concussion Study at WPI

Songbai Ji, BME/ME

Dana Harmon, PHYS ED

Constance Moore, UMass

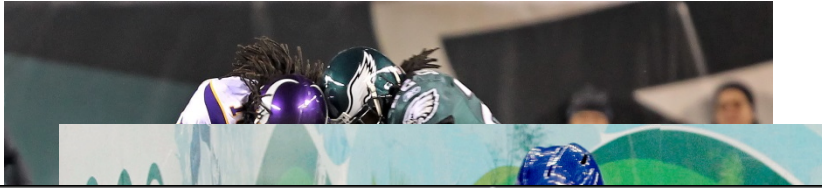
John Herb Stevenson, UMass



Objectives/Value Proposition

To find a more effective approach to detecting concussion and monitoring neural health in contact sports.

Motivation



Youth Sports	Concussions per 100,000 athletic events
Football	64
Boys' ice hockey	54
Girl's soccer	33
Boys' lacrosse	40
Girls' lacrosse	31
Boys' soccer	19
Boys' wrestling	22
Girls' basketball	18.6
Girls' softball	16
Boys' basketball	16
Girls' field hockey	22
Cheerleading	11.5
Girls' volleyball	6
Girls' gymnastics	7
Boys' baseball	4.6

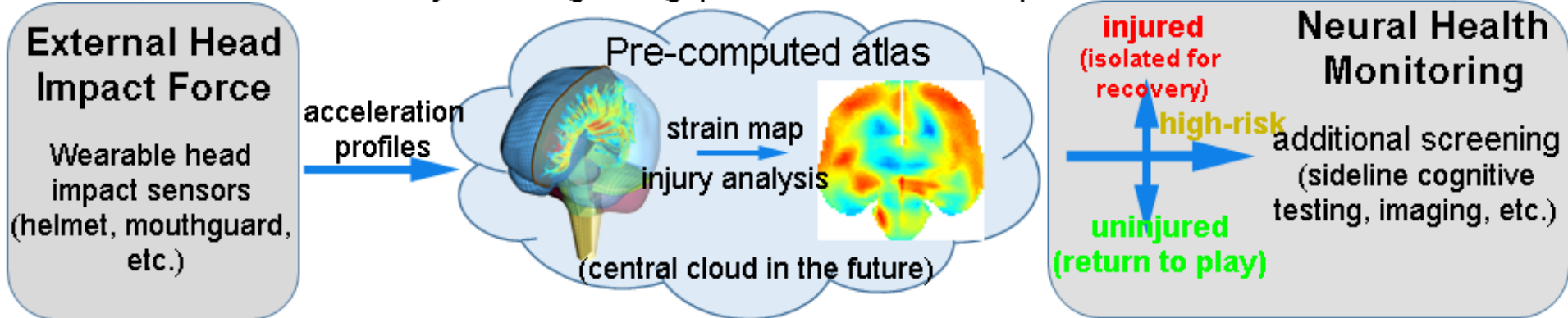
Rogena Johnson, M.D.

- 1.7 – 3.8 million sustains concussions each year, US alone
- \$60 billion cost
- 4 million American football players
- 250 million soccer players world-wide

Approach

Current state-of-the-art does not consider tissue responses in neural health monitoring.

We will rectify and bridge the gap via detailed strain maps estimated in real-time.



- We know concussion is caused by brain tissue stretches
- Current state-of-the-art techniques do not use brain strain map for concussion detection because the computational cost is too high. They use head impact forces directly to detect concussion risk.
- We will develop a large library of brain strain maps to enable more objective, real-time neural health monitoring.

Seed Grant Activities

- Purchased specialized mouthguards
- Worked through IRB approval and other logistics to recruit athletes
- Data collection anticipated to start in Fall season

