

Introductions!

Monday, January 6, 2025 4:24 PM

Welcome to MSE 1050 The Science Behind Sports Gear!

What will you learn?

Discover the secrets of your favorite sports gear! In MSE 1050, "The Science Behind Sports Gear," you'll explore how materials science enhances athletic performance. From carbon fiber bikes to high-tech running shoes, learn about the atomic structures, mechanical properties, and innovative materials that make sports equipment safer and more effective. This engaging course combines case studies, hands-on experiments, and interactive lectures, making it perfect for students of all backgrounds. Join us to see how science and sports intersect, and gain a unique perspective on the materials that athletes rely on every day. We will cover key physics and materials concepts of gear for climbing, cycling, skiing, snowboarding, running, swimming, and many others.

Who are your instructors?

Dmitry Bedrov	Jeff Bates	Taylor Sparks
		

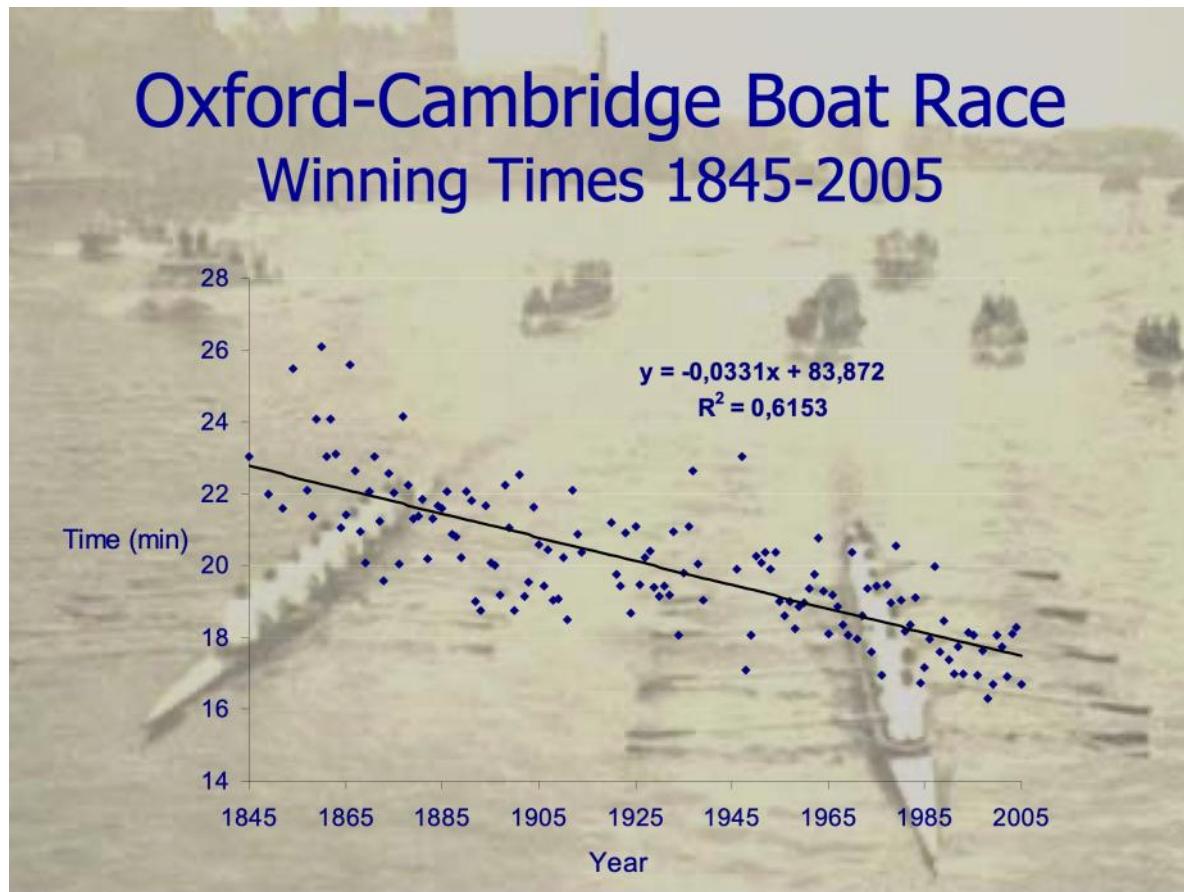
What sports will this course cover?

- Cycling
- Climbing
- Swimming
- Skiing/snowboarding
- Surfing/Skating
- Sailing/Rowing
- Running
- Ball sports
- And many others!

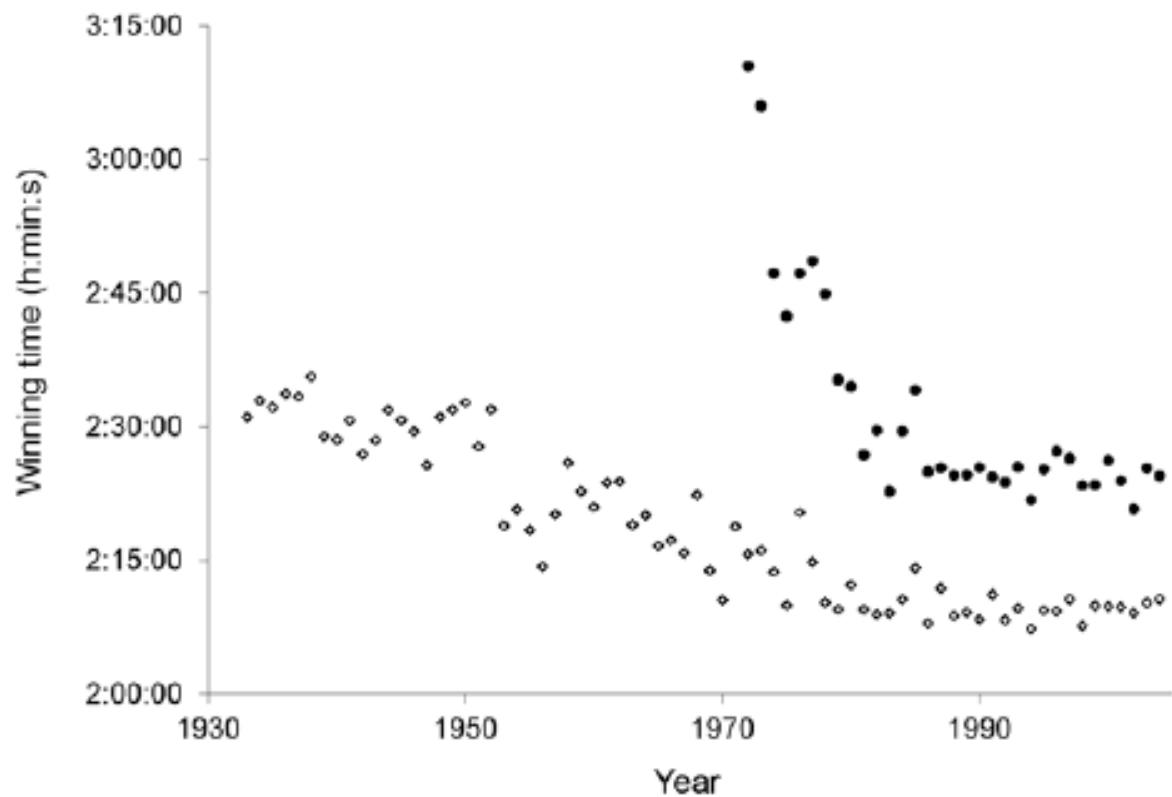
Tell us a bit about you!

- What are you studying at the University of Utah
- How did you hear about this course?
- Do you have a favorite sport?

Do materials really give sports a competitive edge?



Boston Marathon



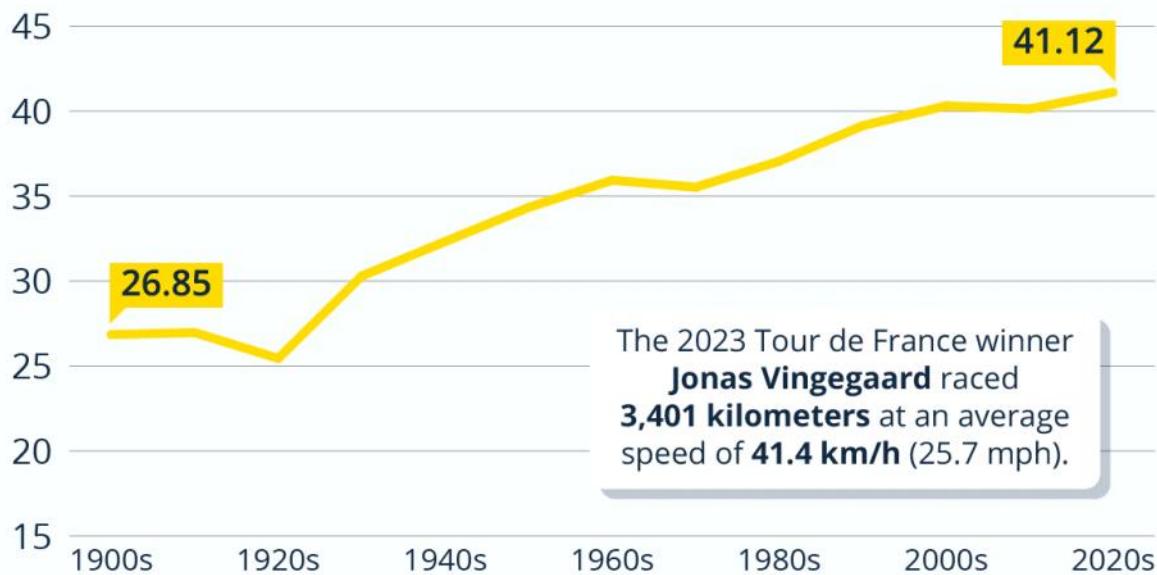
Miller-Rushing et al. PLOS One 2012 doi: [10.1371/journal.pone.0043579](https://doi.org/10.1371/journal.pone.0043579)

Tour de France

Tour de France: Too Fast To Be Clean?



Winner's average speed in the Tour de France since 1903, by decade (in kilometers per hour)*



* no Tours were held from 1915-1918 and 1940-1946

Source: BikeRacelInfo



statista

<https://cdn.statcdn.com/Infographic/images/normal/22981.jpeg>

LZR Racer suits as "technological doping"

Swimming Bans High-Tech Suits, Ending an Era

 Share full article



Dara Torres wore a swimsuit made by Jaked, an Italian-based manufacturer, at the U.S. Nationals in July.
Darron Cummings/Associated Press

By **Karen Crouse**

July 24, 2009

<https://www.nytimes.com/2009/07/25/sports/25swim.html>

Compare old vs new gear and you can see just how far we've come!



<https://www.bigwallgear.com/p/climbing-tools-and-techniques1908-8c5>



Is this Gen Ed course just a sneaky way to learn about physical sciences?

- Of course!
- Friction, atomic structure, density, metals, composites, stress/strain, microstructure, thermal conductivity, hydrophobicity/hydrophilicity, kinetics and phase transformations, energy storage, fracture, corrosion, materials processing, capillary effect, viscoelasticity, biocompatibility, glassy transition, and more!