Zoom lectures will be recorded and posted for viewing only by members of this class. By joining the live lectures you consent to being a part of this recording. To avoid appearing in lecture recordings, you may take any of the following actions:

- Disable your video
- Mute your microphone; you may still ask questions via chat.
- Do not join the zoom calls and watch the videos asynchronously.
About Me

Scott Wehrwein
My research interests

Research interests:

- **Computer vision** and graphics
- Computational photography and videography
- Photo and video enhancement
- Visualization
The short-term plan

**Today:**

1. What is computer vision?
2. Course logistics

**Tomorrow:**

1. Course overview: What will we cover?
2. Jumping in: images, filtering and convolution
Questions?

• Using the "Raise Hand" feature:
  • At the bottom of Zoom, click "Participants"
  • At the bottom of the pane on the right side, click "Raise hand"
  • Hold spacebar to temporarily unmute your mic ("push to talk")

• Using Chat:
  • At the bottom of Zoom, click "Chat" and enter your question.
What is computer vision?

• A goal-oriented field.

https://www.youtube.com/watch?v=9MeaaCwBW28
3D Shape Understanding
Object and Person Recognition

Terminator 2, 1991
Zoom and Enhance
Zoom and Enhance

Source: Nayar and Nishino, “Eyes for Relighting”
Face Detection
Face Recognition, Biometrics

“How the Afghan Girl was Identified by Her Iris Patterns”
Graphics, Movies, Games
Sports; Augmented Reality

Sportvision first down line
Nice explanation on www.howstuffworks.com

Tracking
Scene understanding
Medical imaging

MRI, CT Reconstruction

Skin cancer classification with deep learning: https://cs.stanford.edu/people/esteva/nature
Robotics

Mars Curiosity Rover

Amazon Picking Challenge
Smart and Self-Driving Cars

Mobileye
Tesla Autopilot
Safety features in many newer cars
And so on...

- You just saw some examples of recent systems, many new in the past few years.
- Computer vision is a highly active research area
  - Deep learning has revolutionized the field in the past decade
- Lots of work going on in industry, both at Big Tech and startups.
Attendees at CVPR, the flagship computer vision research conference:
My work: Video Segmentation
My work: Illumination Estimation
My work: Illumination Estimation
My work: Timelapse Visualization
Some current work...
Questions?

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What to expect from this course

• We will not (cannot) cover everything you just saw.

• There will be more **math** than the shiny pictures let on. We will use lots of Linear algebra and some calculus.

  • I'll try to give reminders/primers as we go.

  • I don't always know what you don't know - please **tell me** if I'm using stuff you haven't seen.

• Whiteboard-style presentation coming soon - my new iPad arrives later this week.
Course Logistics

- Course website is the syllabus:
  https://facultyweb.cs.wwu.edu/~wehrwes/courses/csci497p_20s/

- Remote logistics:
  - Lecture: Synchronous Zoom lectures plus recordings.
  - In-class exercises: break-out groups and Socrative polls
  - Office hours: Zoom meeting with waiting room
Course Logistics

• Course website is the syllabus:
  https://facultyweb.cs.wwu.edu/~wehrwes/courses/csci497p_20s/

• Assessment:
  • Programming projects (50%)
  • Written homeworks (15%)
  • Take-home midterm (15%)
  • Take-home final (20%)
Policies

• Late work: 3 free slip days; after that, get in touch ahead of time and I'm often flexible.

• I want your feedback - email, office hours, or via anonymous Google Form linked from the syllabus.

• Inclusive classroom