ITAL 0100: Elementary Italian

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CIT 477
1.1 Around the home

**Nouns**

Classroom -> aula (le)
Bathroom -> bagno (il)
Living room -> soggiorno (il)
Dining room -> sala da pranzo (la)

*Let’s generalize!*  
Room -> camera (la)
Synonyms of camera

noun
vano, camera da letto
4 more synonyms

See also
camera da letto, camera doppia, camera singola, servizio in camera, camera d'aria, camera oscura, camera libera, camera mortuaria, camera dei bambini, camera con colazione

Translations of camera

noun
room
camera, stanza, sala, ambiente, spazio, locale
camera, cavità, aula
casa, abitazione, edificio, dimora, camera, albergo
appartamento, alloggio, camera, stanza
alloggio, alloggiamento, appartamento, camera
1.1 Around the home

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Classroom -> aula
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Let’s generalize!
Room -> camera
Dark room ->
Camera obscura: dark room

- Known during classical period in China and Greece (e.g., Mo-Ti, China, 470BC to 390BC)

Illustration of Camera Obscura

Freestanding camera obscura at UNC Chapel Hill

Photo by Seth Illys
Camera obscura / lucida used for tracing

Lens Based Camera Obscera, 1568

Camera lucida
James, San Francisco, Aug. 2017
1.1 Around the home

Nouns
Classroom -> aula
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Let’s generalize!
Room -> camera
Dark room -> camera oscura
Camera -> fotocamera
OK, so now you know what a camera is...

WHAT IS COMPUTATIONAL PHOTOGRAPHY?
Creating Realistic Imagery

**Computer Graphics**

- Great creative possibilities
- Easy to manipulate objects/viewpoint
- Tremendous expertise and work for realism

**Computational Photography**

- Realism
- Manipulation
- Ease of capture

**Photography**

- “Photoreal”
- Easy to acquire
- Very hard to manipulate objects/viewpoint

[Hays]
Computational Photography

How can I use computational techniques to capture light in new ways?

How can I use computational techniques to breathe new life into the photograph?

How can I use computational techniques to synthesize and organize photo collections?
Comp Photo and Related Fields

• Computer Graphics: Models to Images

• Computer Vision: Images to Models

• Computational Photography: Images to Images
Google Pixel phones

Burst of raw frames

Merged raw image

Final high-quality result
Lytro refocusing
Portrait mode iOS
Course objectives

1. You will have new abilities for visual creation.
Course objectives

2. You will get a foundation in image processing (+ some low-level computer vision).

Safety  
Health  
Security  
Comfort  
Fun  
Access
Course objectives

3. You’ll better appreciate your own visual ability.

Why can’t I focus on both my pieces and my opponents?
Cameras? ML?

ABOUT YOU
I work in here.
Super resolution

Interactive Multi-perspective Imagery
Warp and composite
Input video

Reflectance – ‘object color’  Shading from illumination
Naive editing

Illumination-aware editing
BORING COURSE DETAILS
We are here to help you learn!
CS 129 – James Hays

• Using some of the course materials from him + previous staff – serious thanks!
• New lectures, labs, and questions

Prerequisites

• Linear algebra, basic calculus, and probability.
• Programming, data structures.
• Love of pretty pictures
Textbook

Computer Vision: Algorithms and Applications

© 2010 Richard Szeliski, Microsoft Research

http://szeliski.org/Book/
Contact

• Course runs *quiet hours* – 9pm to 9am.
  – We will ignore you (temporarily).
  – We won’t ask you to submit work late (or early).

• CampusWire for content
  – TAs have set hours for this; they are not on all the time. Please help each other out.

• [cs1430tas@lists.brown.edu](mailto:cs1430tas@lists.brown.edu) for admin

• Google calendar for all TA hours
CampusWire is Piazza with Slack and GIFs

Well, kinda. It’s new; we’re trying it out.

Flexible room system for student/TA discussion.

Sign-up info removed.
Zern Endowment for curricular innovation in STEM

• Thank you!

• We have a camera equipment pool.
• Everyone can borrow, but preference is given to those without equipment already.

• I trust you all to take good care of this equipment
• We wish to use it for future courses and let future students have the same opportunity.
Equipment (check out via me)

5x Canon t7i DSLR
  2x 18-55mm lenses
  2x 18-135mm lenses
  2x 55-250mm lenses
  1x 6.5mm fish-eye lens
2x 360 cameras
1x Lytro Illum light field camera
1x BigShot camera
3x Kinect v2 depth camera
2x AndroidThings platforms with cameras

+ polarizing filters, neutral density filters, gradient filters
+ smartphone lenses + filters

5x Manfrotto tripods
5x cheapo monopods
10x smartphone tripods
1x self-stabilizing smartphone mount

1x i1 Display Pro monitor colour calibrator
1x x-rite colour checker chart
Green screen + experiment space
Projects / Grading

100% projects + labs

Project 0: MATLAB intro (2%)

Projects 1-5: Structured conceptual / code (13%)

Project 6: Final project (25%)

Labs: 8% combined

Grads: 10pts extra credit per project
Hand-in via gradescope

• Projects released as zip on course webpage
• You complete the coursework in MATLAB/LaTeX
• Run ‘createSubmissionZip.m’ in MATLAB
• Upload this to Gradescope : )

Sign-up info removed.
Labs

- Noisy lab (space-time sampling)
- RAW lab
- Crime lab (digital camera fingerprinting)
- Calibration lab
- Bilateral filtering lab
- Night lab (Halloween)
- Light field lab
- Fast lab (Halide domain-specific language for image processing)
Project 1: Image alignment to Colorize the Prokudin-Gorskii photo collection
Project 2: High Dynamic Range Imaging
Project 3: Poisson Blending
Project 3: Poisson Blending
Project 4: Graph Cuts and Applications

1D: Image Retargeting

2D: Texture Synthesis
Project 5: Automatic Panorama Construction
Project 5: Automatic Panorama Construction
Project 5: Automatic Panorama Construction
Final Project: Your Choice

Valay Shah (2012): Natural Image Matting
Final Project: Your Choice

Ian Strickman (2012): Separation of Global and Direct Illumination using a Structure Light Projector

Input  Direct Illumination  Global Illumination
Final Project: Your Choice

Yan Li (2012): Non-photorealistic Rendering
Final Project: your choice

You (2018): Probably some deep learning thing
Final Project: your choice

You (2018): Probably some deep learning thing

(a) Input image with detected face
(b) Person segmentation mask
(c) Mask + disparity from DP
(d) Our output synthetic shallow depth-of-field image

[Wadhwa et al. 2018]
Final project: your choice

Take inspiration from research!
What to do now?

• Waitlist on course webpage
  – Yes, we will give you override codes on time

• Install MATLAB + Image Processing toolkit

• Complete MATLAB tutorial
  – You can complete it at home, and use CampusWire for discussion

• Project 0 out tonight; due Tuesday 11th

• BRING YOUR CAMERA TO LABS!
Any questions so far?
Arts and Crafts time:
Let’s make camera obscura!
Camera obscura: dark room

- Known during classical period in China and Greece (e.g., Mo-Ti, China, 470BC to 390BC)

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Freestanding camera obscura at UNC Chapel Hill

Photo by Seth Ilys
Here’s mine
Version 2: With optics
Camera obscura / lucida used for tracing

Lens Based Camera Obscera, 1568

Camera lucida

[drawingchamber.wordpress.com]
Arts and Crafts time

• Make a camera obscura
  – Teams of 2 (preferred) or 3 (max).

• Resource constrained (only so many pairs of scissors):
  – Ice breaker to meet your classmates
  – Every time you need to borrow something, introduce yourself by name, where you are from, and describe what motivates you to take this course.
  – You might need things from me; come and say hello.
Sharing images with the class

• Shared Google Drive with Brown-only credentials
• Not a listed link

https://tinyurl.com/csci1290

• Upload your photos and we will share as a class
• Rename the file with your name
Balcony

• Use it!

• Please be quiet and respectful while out there; it is right next to faculty offices.
Recap:

• Get into small groups
• Design a pinhole camera obscura
• Upload a photo - https://tinyurl.com/csci1290

• Design V2
• Upload a photo - https://tinyurl.com/csci1290

• Beat my attempt!
• We’ll look at them all at the end of class.