Lecture 0: How This Course Works

ECE 60141 / BME 66100 — Foundations of Computational Imaging

Charles A. Bouman

Purdue University

Fall 2026

What this deck is

- Where things are, how grading and labs work, what to do this week.
- Keep it as a reference — it stays posted on the course page.
- The science starts in Lecture 1.

Course information

- **Lectures:** MWF 1:30–2:20 pm, Brown Family Hall (BHEE) 226.
- **Course web page:** `https://engineering.purdue.edu/~bouman/ece60141/`
- **Labs:** `https://cabouman.github.io/grad_labs/`
- **Brightspace:** lab and homework submission, grades.
- **Piazza** (questions and discussion) — sign up at: `https://piazza.com/purdue/fall2026/ece60141`

The two to remember

Course information lives on the course web page. Questions go to Piazza.

Textbook

- C. A. Bouman, *Foundations of Computational Imaging: A Model-Based Approach*, SIAM, 2022.
- **Chapter 1 is this week's reading.** All reading is on the schedule.
- Discounts on the SIAM site:
  - 20% off with coupon code `BKCABAD`.
  - 30% off for SIAM members (free for Purdue students). Better deal.

People

- **Instructor:** Charles A. Bouman
  Consultation: immediately after class (MWF) — come find me.
- **Teaching assistant:** Jingsong Lin
  `lin1311@purdue.edu`

- Use Piazza when you can: others probably have the same question.

Grading

The predictable path

Homework is assigned and due on the schedule, and it is the best preparation for the exams. Do the homework as it comes and the exams will hold no surprises.

Homework and laboratories	30%
Midterm	30%
Final exam	40%

- Grades are curved.

The labs are new this year

You will not write the code yourself.

That does not mean the labs are easier.

- You direct an AI (Claude recommended) to build code from a spec.
- Your job: specify, inspect, run experiments, and interpret results.
- Much of engineering now works this way; doing it well is a skill.
- Each lab is submitted as a single file through Brightspace.

Lab 1: The Thingy Competition — due Friday

- Build a **Thingy**: any app you think is fun. A game, tool, or toy.
- You direct an AI to build it; you do not write it yourself.
- In class, everyone demos. Audience applause is the scoring.
- Everyone who builds, demos, and hands in gets 100%.
- Details: `https://cabouman.github.io/grad_labs/labs/lab1/`

Why this is Lab 1

It is deliberately low stakes. You are learning how to specify work for an AI and judge what comes back — exactly the skill the technical labs will need.

Policy on AI tools

- AI is allowed in coursework *except* in-class closed-book exams.
- Any use of AI must be disclosed.
- In the labs, using AI is not just permitted — it is the point.

Three rules. That is the whole policy.

Topics this semester

1. Probability and random processes
2. Causal and noncausal Gaussian image models
3. MAP reconstruction with Gaussian priors
4. Non-Gaussian priors and surrogate optimization
5. Constrained optimization
6. Plug-and-play reconstruction
7. The EM algorithm and mixture models
8. General Markov random fields and stochastic simulation

If half the words on this list are unfamiliar, that is exactly why you are here. Every one of them will make sense by December.

To do this week

- Read Chapter 1.
- Sign up for Piazza.
- Install the Claude desktop app and a Markdown editor (instructions on the Lab 1 page).
- Build your Thingy — due Friday, August 28.