Lessons about PhD Applications and Research during PhD

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Targeted Audience

Master

Undergraduate

Junior Ph.D.

Agenda

- Lessons learned prior to PhD

  - Tips for PhD applications

- Lessons learned during my PhD

  - Managing multiple projects

Documents for PhD Applications

- Recommendation letters

- Statement of Purpose (research statement)

- Publication records

- Resume

- Grades (transcript and English proficiency)

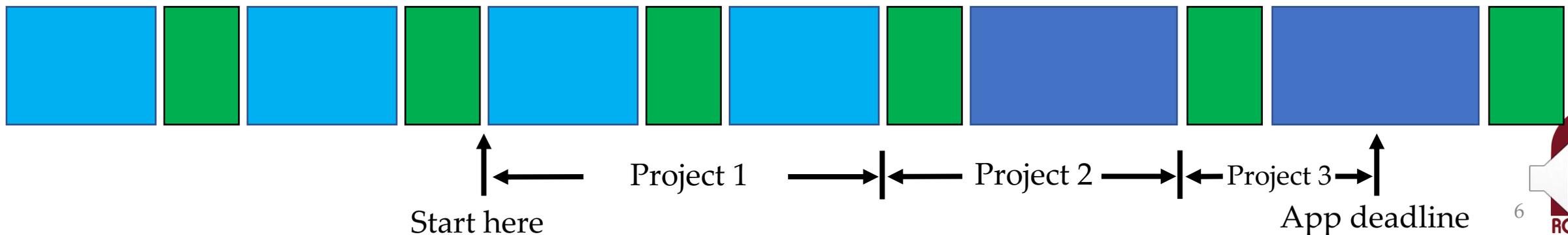# Tip No. 1: Build Research and Connections Early

- Why?

  - Get strong recommendation letters by putting sufficient efforts

- What?

  - Research assistant or visiting students/researchers at a university lab

  - Summer internship at a company

- How?

  - Send well-prepared emails to professors / research scientists

  - Ask your current advisor to help

  - Ask your seniors for an internal reference at companies

  - Reach out to your course instructors

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Tip No. 1: Build Research and Connections Early

- Suggested timeline (for reference only)
  - Project 1: Research at your undergraduate university: 2 years, i.e., 4 semesters
    - First research project might take some time
  - Project 2: Research at your graduate university: summer + the 1st year
  - Project 3: Summer visiting/internship + extension into the fall
- Outcome:
  - Sufficient time for 3 successful 1st-author projects
  - 3 strong letters (~3 needed for applications)

Undergraduate

Summer

Master

Start here ← Project 1 → | ← Project 2 → | ← Project 3 → App deadline

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Tip No. 1: Build Research and Connections Early

- "Good" scenarios

  - The first project does not take two years

    - E.g., research gives credits to reduce course load, good at programming, etc

  - Finish up the summer project quickly (no extension needed)

    - Possible, but really in a rush for a strong paper

  - More collaborative projects

    - Can be a bonus, but really need to put sufficient time to build your representative work
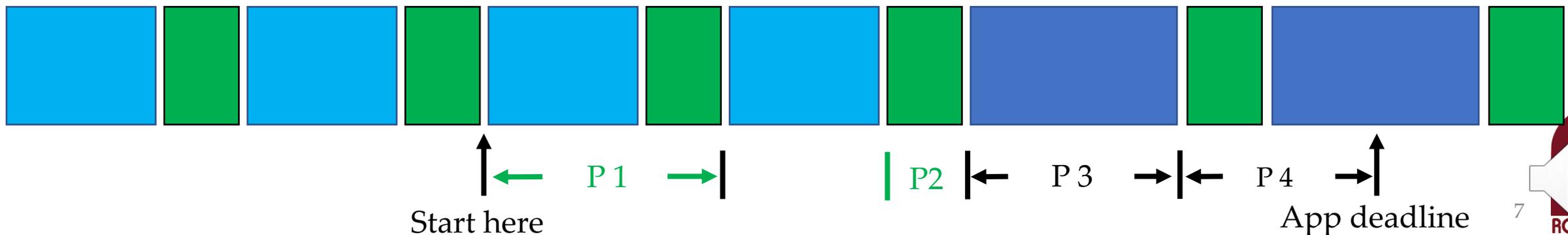
Undergraduate

Summer

Master

Start here

P 1   P2   P 3   P 4

App deadline

Tip No. 1: Build Research and Connections Early

- "Bad" scenarios

  - What about I have no opportunity for research?

  - What about I fail in a project?

  - What about I start late?

- Calm down!

Tip No. 1: Build Research and Connections Early

- My story and difficulties

  - Started late to prepare

  - Almost "no" research opportunity

  - No strong publication (failed in some sense?)

Entered CV via a small project

First research project ever in CV

First paper published in CV

Strong letters obtained for the application

No clear goal of PhD study

Limited research resources for my master program

Double research projects with extreme pressure

Pressure relieved and focus on the 2nd project
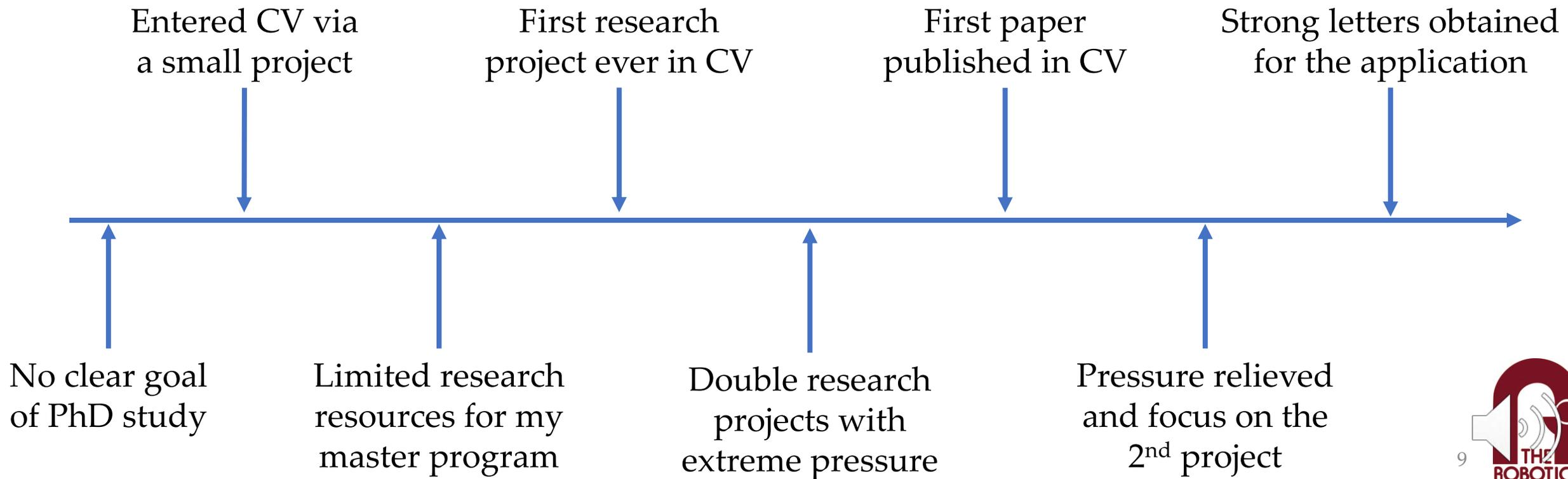
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Tip No. 1: Build Research and Connections Early

- "Bad" scenarios
  - What about I have no opportunity for research?
  - What about I failed in a project?
  - What about I am a master student and haven't started?
- Still possible to succeed
- Key
  - Find opportunities even if it looks like there is no opportunity
  - Really need to put sufficient time into it (show what you can do, even no strong papers)
  - Start early if possible, to avoid extreme pressure
  - Need some luck and meet the right advisors for you (Thanks Kris and Yaser!)

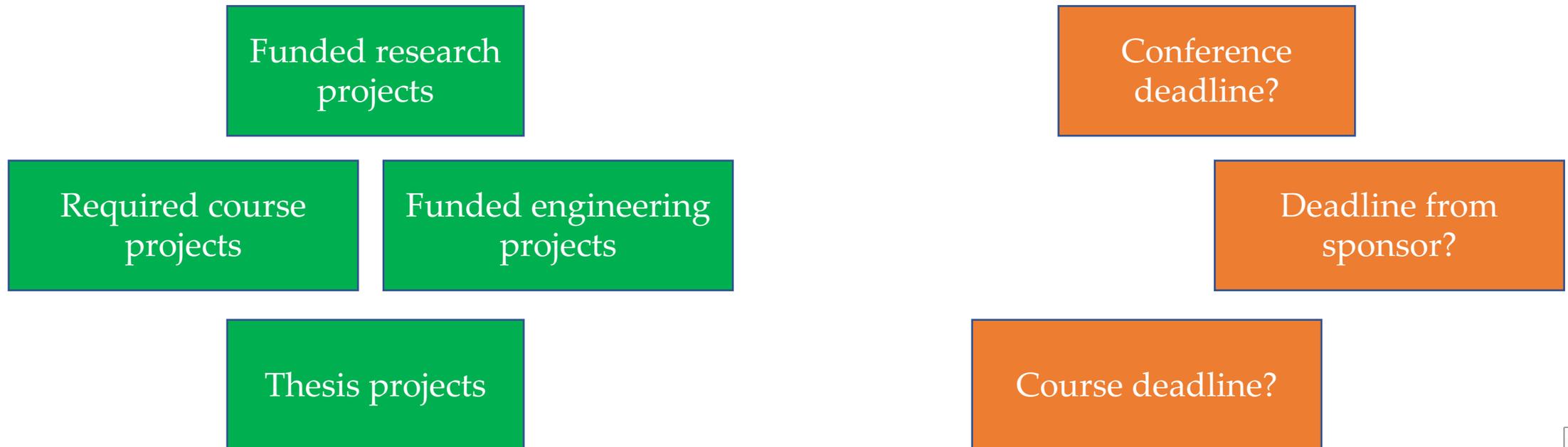THE ROBOTICS INSTITUTE

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- Lessons learned prior to PhD

  - PhD applications and tips

- Lessons learned during my PhD

  - Managing multiple projects

Managing Multiple Projects

- Common even for junior students

- Different from the perspective of professors/company leaders

- What?

  - Funded engineering project requiring code delivery to a sponsor

  - Funded research project supervised by a company scientist

  - Thesis project

  - Course or capstone project

  - Side research project with your advisor

  - Independent research project

  - Collaborative project with other researchers sharing similar interests

- Goal: do not want to mess up any project we are involved

Managing Multiple Projects

- Suggested strategies
  - Focus on 1 (≤ 2) project at a time so you can put sufficient efforts into it
    - Prioritize projects based on responsibility and deadlines
    - Only fulfill basic requirements for non-urgent projects, push later if possible

Funded research projects	Conference deadline?
Required course projects / Funded engineering projects	Deadline from sponsor?
Thesis projects	Course deadline?

Managing Multiple Projects

- Still many deadlines and responsibility to fulfill and have no time?
  - Learn to connect and reuse projects
    - Save efforts for doing an additional project
    - Let your advisor know what you are doing

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┌──────────────────┐          ┌──────────────────┐
│ Funded research  │  ──────> │ Thesis projects  │
│    projects      │          │                  │
└──────────────────┘          └──────────────────┘

┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│   Independent    │─> │ Side projects with│─> │  Couse projects  │
│ research projects│   │   your advisor   │   │                  │
└──────────────────┘   └──────────────────┘   └──────────────────┘

┌──────────────────┐          ┌──────────────────┐
│Open collaborative│  ──────> │Side projects with│
│    projects      │          │   your advisor   │
└──────────────────┘          └──────────────────┘
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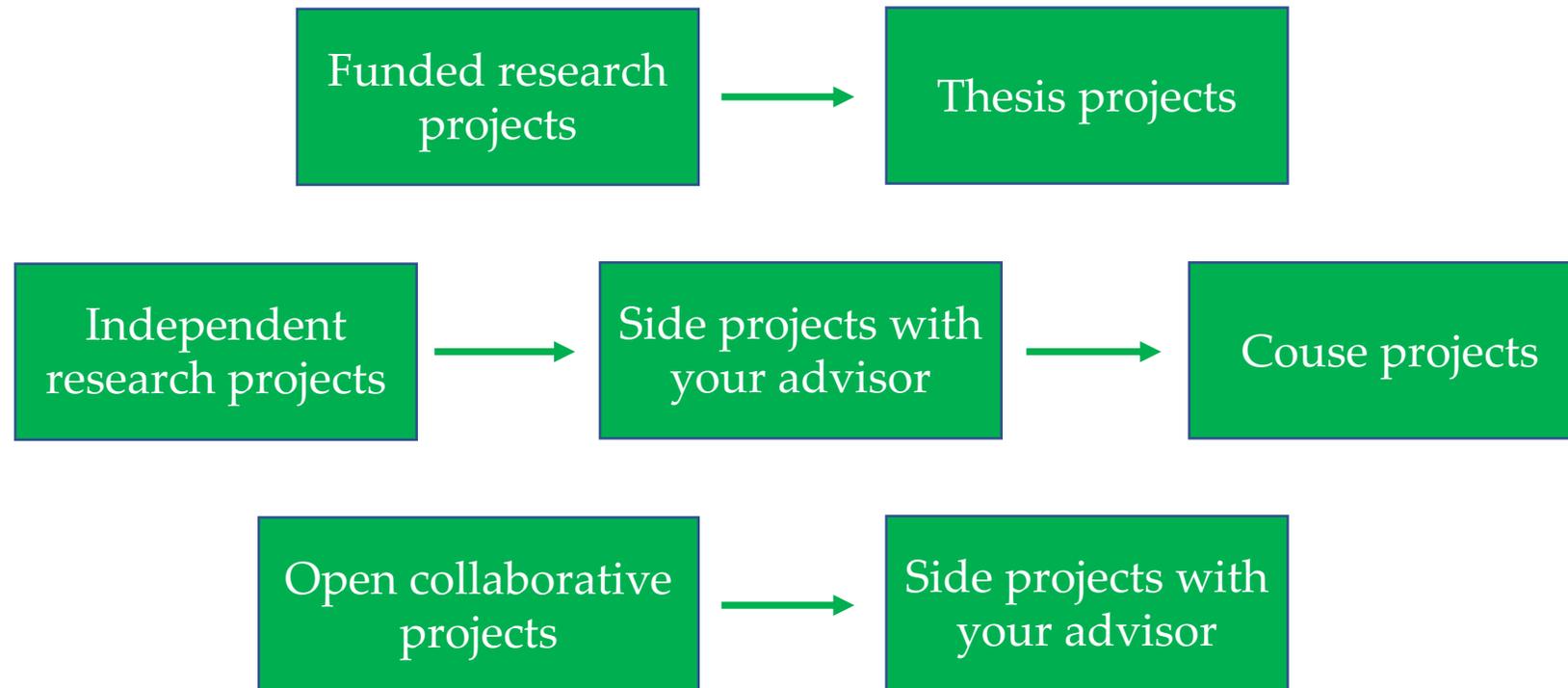
Managing Multiple Projects

- Still cannot handle
  - Reject or avoid creating too many projects
    - Open collaborative projects
    - Independent research projects
    - Side research projects with your advisor
  - Be clear about your capacity at the beginning
    - E.g., Can only provide comments/feedback, no time for implementation

Managing Multiple Projects

- My story
  - Tried to work on projects in parallel
    - Mon, Tue: Project 1; Wed: Project 2; Thu: Project 3; etc
    - Move too slow on the urgent project
    - Easy to feel that no obvious progress on any project
  - Saved time for many course projects
    - Computer vision, deep learning, 3D geometry, etc
    - Use my preliminary research paper as the course project report
    - Leave more time for research with my advisor

Managing Multiple Projects

- Take away

  - Spend sufficient time on a main project during a period of time

    - Turn down other new projects

    - Reuse projects to save time

    - Push later for other non-urgent projects

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More to discuss (for Junior Students)

- Think about connections between projects

- Deal with pressures from advisors/supervisors

- Ramp up for the first project in CV/ML

- Experiences to organize workshops

- Research for developing algorithms vs. new problems vs. datasets

- etc

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