

Work Experience as an Engineering Postdoctoral Researcher (Postdoc) (With Some Advice)

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Presented to Prof. Shaefer's MAE 162 Class as Guest Lecturer

UCLA ENGINEERING
Mechatronics and Controls Laboratory

Mechanical and Aerospace Engineering Department, UCLA

UCLA Stein Eye Institute

Advanced Robotic Eye Surgery (ARES) Laboratory

About Me (Matt)



Main Lesson:

- Do things that make you different and stand out
 - My (strange) background was largely responsible for my acceptance into UCLA PhD

Background:

- After high school, went to art school (Dayton, Ohio) for 1 year
- Transferred to The Ohio State University (Columbus, Ohio)
 - Graduated in Visual Communication Design (“graphic design”) and Japanese
- Moved to Tokyo, Japan
 - Worked as a web developer (“making websites”) for 2 years
- Returned to The Ohio State University for 4+1 years
 - Graduated with a BS in Mechanical Engineering, then a MS (combined degree)
- Came to UCLA for PhD in Mechanical Engineering for 5 years
 - TA for MAE162 for 4 years
 - Now work as engineering postdoc in ophthalmology (eye surgery)

Advice for Graduating Seniors

Coursework for the “real [academic] world”

- **Alternatively: “Which classes should I have paid more attention to?”**
 - **Or: Which classes should I save the notes from?**
 - *Disclaimer: This applies mostly to those with a future in robotics/mechatronics*
- MAE 162: MyRIO (code and notes), simple circuits (Darlington transistor pair), driver board circuit
- Sensors — Resolution, how to calibrate, reading datasheets, etc.
- Statistical analysis — This really helps set you apart, especially in graduate school
 - Examples: How to choose sample size; how to design an experiment (DOE); p-values, etc.
 - Most engineers have no idea and ignore this; NIH and healthcare take this very seriously
- Hands-on fabrication experience — CAM, CNC mill (and lathe)
 - Nothing says “amateur” louder than a non-manufacturable part!
- On the side: Learn LaTeX and create an Overleaf account
 - Takes half a day and benefits *you* tremendously (writing homework assignments and reports)
 - Necessary in academia
- Related: 100% recommend Professor Hopkin’s “Compliant Mechanisms” class here at UCLA
- Your classmates have identical coursework and a resume that looks 80% the same as yours — *what sets YOU apart?*

Graduate School?

- First: If it's not too painful, get a Masters
 - Small amount of extra work (1 year of school), can lead to a substantial pay boost post-graduation
 - Can be more challenging to find a job, but the job you *do* get is more worthwhile (and pays better)
 - Depending on the lab/professor, may give you some idea of what a PhD would be like → Easy to stay into PhD
- Second: A PhD is a serious life choice
 - Depends entirely on *you* (as a person)
- PhD is NOT:
 - “More school” — It has little to do with taking classes or continuing coursework
 - About “finding employment afterwards”
- PhD is more about:
 - Learning technical skills (as you go, on your own)
 - Your (or your advisor's) passion/interest — goal is to invent/discover/accomplish something no human being has ever invented/discovered/accomplished before
 - If that's inspiring to you, then PhD may be for you!

More about PhD...

Important questions:

- Do you learn things on your own?
 - Note: This is not asking if you *can*—it's asking if you do, already—by yourself—*learn things on your own*
 - If yes, PhD may be for you — all (most) instruction is self-instruction (your advisor is *not* your teacher)
- Hypothetical: Say you are assigned work (by a professor/boss) and you complete that task. Do you (a) do nothing until provided further instructions or (b) find new work, on your own, and look for new problems to solve?
 - If (b), then PhD may be for you...

The reality:

- The lab/professor dictates the answer to “what is getting a PhD like?”
- Important to interview around the schools you're accepted to — Talk directly to the students and look specifically for “red flags” (unpaid students, a professor who doesn't want you talking to their students, students who don't “have time,” etc.)
- Most of your time is spent doing things outside of research
 - Learning new skills (outside of your discipline and research)
 - For engineers with machining experience: fabrication (“making parts”)
 - Advising students (undergraduate researchers, new graduate students)
 - Attending classes, doing homework... Teaching!
 - Side “stuff”: Fixing the printer, ordering parts, filling out forms, looking for missing tools, fixing the printer...

Contact Info

- Looking for researchers (option for pay in future)
- Benefits:
 - Learn new skills (electronics, controls, mechanical design, fabrication, circuit design, simulation, eye prep...)
 - Strong bullet point on a resume (research experience) — Important for graduate school
 - Letter of recommendation / Reference for jobs
 - Possible patent(s) and/or publication(s) — Goes far in guaranteeing admittance to graduate school

Contact Info

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Lab Location:

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Acknowledgments / Current Team



Tsu-chin Tsao, Professor (PI)

Jacob Rosen, Professor (PI)

Yu-Hsiu (Martin) Lee (Postdoc)

Ji Ma (Research Associate)

Yu-ting (Kevin) Lai (PhD Student)

Haoran Wang (PhD Student)

Mia Reyes (PhD Student)



Jean-Pierre Hubschman, Surgeon (PI)

Mercedes Rodriguez (Medical Fellow)

Matthew J. Gerber (Postdoc)

Undergraduate Researchers:

- Jonathan Huang
 - Mechanical design of intraocular robotic systems
- Conor McGartoll
 - Mechanical design and prototype development
- Shreyas Bharadwaj
 - Automated image-segmentation of retinal vein images
- Lily Takahari, Hanna Co, and Daphne Raigrodski
 - Deep-learning model training of surgical images
- Persiana Saffari
 - iOCT use in cataract surgery
- Nathan Kim — Project TBD
- Zhantao Song — Project TBD
- Phillip Ko — Project TBD

Thank you for your attention.
