Intro to Undergraduate Research

ECE section

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SJTU

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Something about myself...

Basic information:

- Tang Wenda, Senior student in JI, major in ECE

Research experience:

- SJTU ACA Lab during fall term in junior year
- JI Wang Lab for senior year

Internship and some other stuff:

- R&D intern in Marvel Medic in Spring term of junior year
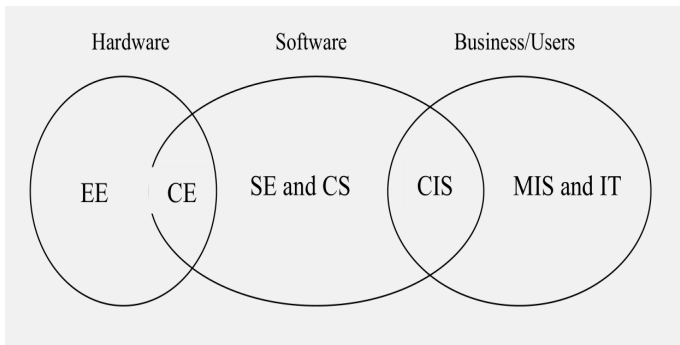- Volunteer teaching in Eryuan, Yunnan Province

Why do you need research experiences?

- Simply get to know the specific field of research
- Prepare necessary skills for an internship
- Pursue for a PHD degree?
  Usually to get the entrance ticket for top US PHD opportunities, paper publication during undergraduate period is a must.

For ECE student in JI, there are three research directions in general:

- **CS**: Computer Science
- **CE**: Computer Engineering
- **EE**: Electrical Engineering

Before we go any further...

Learn your math courses well enough!
Math is really the base for all of these things.

VV155	大学基础数学		VE401	工程概率方法
VV156	高等数学A1		VV286	线性代数和微分方程B
VV186	高等数学B1		VV371	数值计算A
VV214	线性代数		VV450	工程数学A
VV215	微积分 (3)		VV454	工程数学B
VV216	微分方程		VV471	数值计算B
VV255	高等数学A2		VV556	应用数学方法 (1)
VV256	线性代数和微分方程A		VV557	应用数学方法 (2)
VV285	高等数学B2		VE203	离散数学

Some other class you might be interested in...

- **CS:**

VE280	程序设计与数据结构	VE484	数据挖掘
VE281	数据结构与算法	VE487	交互式计算机图形学
VE475	密码学导论	VE489	计算机网络
VE477	算法导论		

- **CE:**

| VE270 | 逻辑设计导论 | VE373 | 基于微处理器的系统设 |
| VE370 | 计算机组成件导论 | VE482 | 操作系统导论 |

- **EE:**

VE215	电路设计导论	VE451	数字信号处理与分析
VE216	信号与系统处理	VE455	数字通信信号与系统
VE311	电子电路	VE320	半导体器件导论

CS part

General directions for CS:

- **Computer Vision**
- **Algorithm**
- **Database**
- **Privacy and Security**
- **Artificial Intelligence and Robotics**
- **Human Computer Interaction**
- **Software Engineering**

EE part

General directions for EE:

- **Telecommunications:** Focus on things like Wireless Communication Systems
- **Electronic Design and Applications:** Digital and Mixed Signal Systems, Analog IC
- **Electrical Energy:** Power electronics
- **Digital Signal Processing:** Play with signals (some times images and videos)

CE part

The case for CE is a little bit special:

- If put under EE department, then called ECE
- Under CS department, called CSE
- Under EECS department, well... it depends

Related Laboratories in JI

- Prof Wang, focus on communication part of EE (5G for example) and data mining
- Prof Paul, focus on AI
- Prof Han, focus on communication and sensing (more emphasis on physical layer)
- Prof Long, image processing
- Prof Qian, Algorithm

An additional approach for research

Find research opportunities abroad during summer holiday

- Sadly, JI student only enjoy summer holiday for a month
- maybe consider doing similar things during exchange or winter & spring semester

Thanks for listening!