



ECE 310

Digital Signal Processing



Spring, 2021, ZJUI Campus

Topics of Today

- ✓ **Introduction**
- ✓ **What is ECE310?**
- ✓ **Why to take ECE310?**
- ✓ **How to do well and have fun in ECE310?**
- ✓ **Logistics**

Introduction

Zhi-Pei Liang

Franklin W. Woeltge Professor, ECE Department

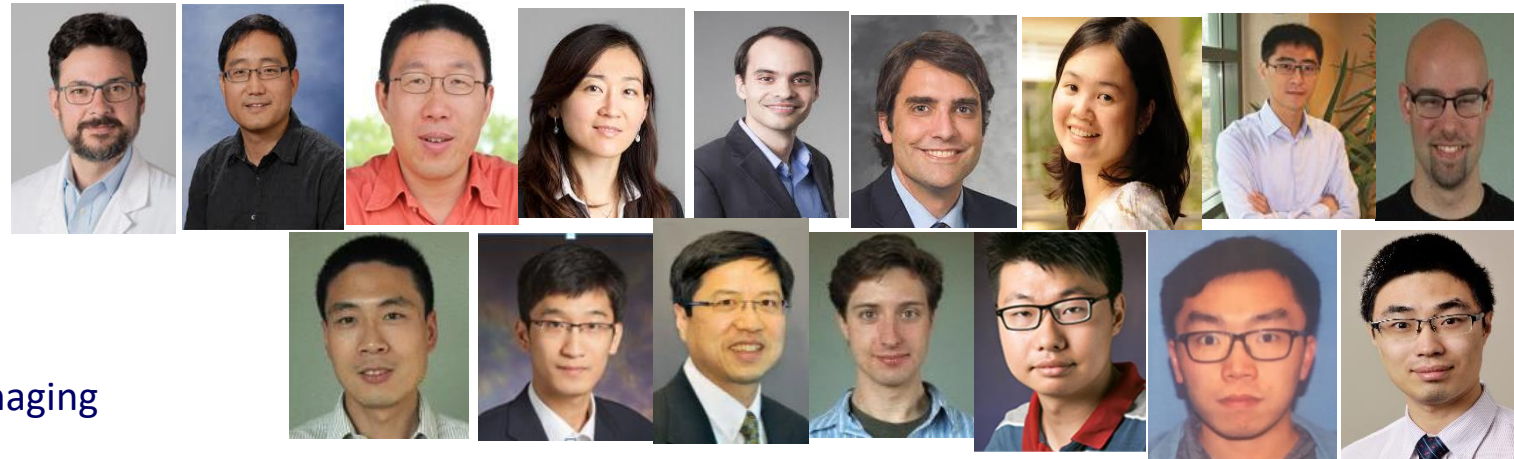
Co-chair, Integrative Imaging Theme, Beckman Institute

Office: 4257 Beckman

Phone: 217-721-5925

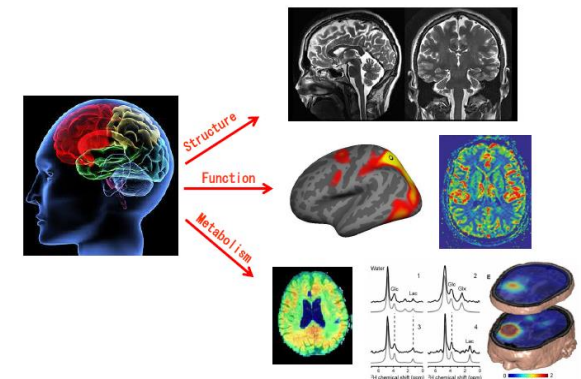
Email: z-liang@illinois.edu

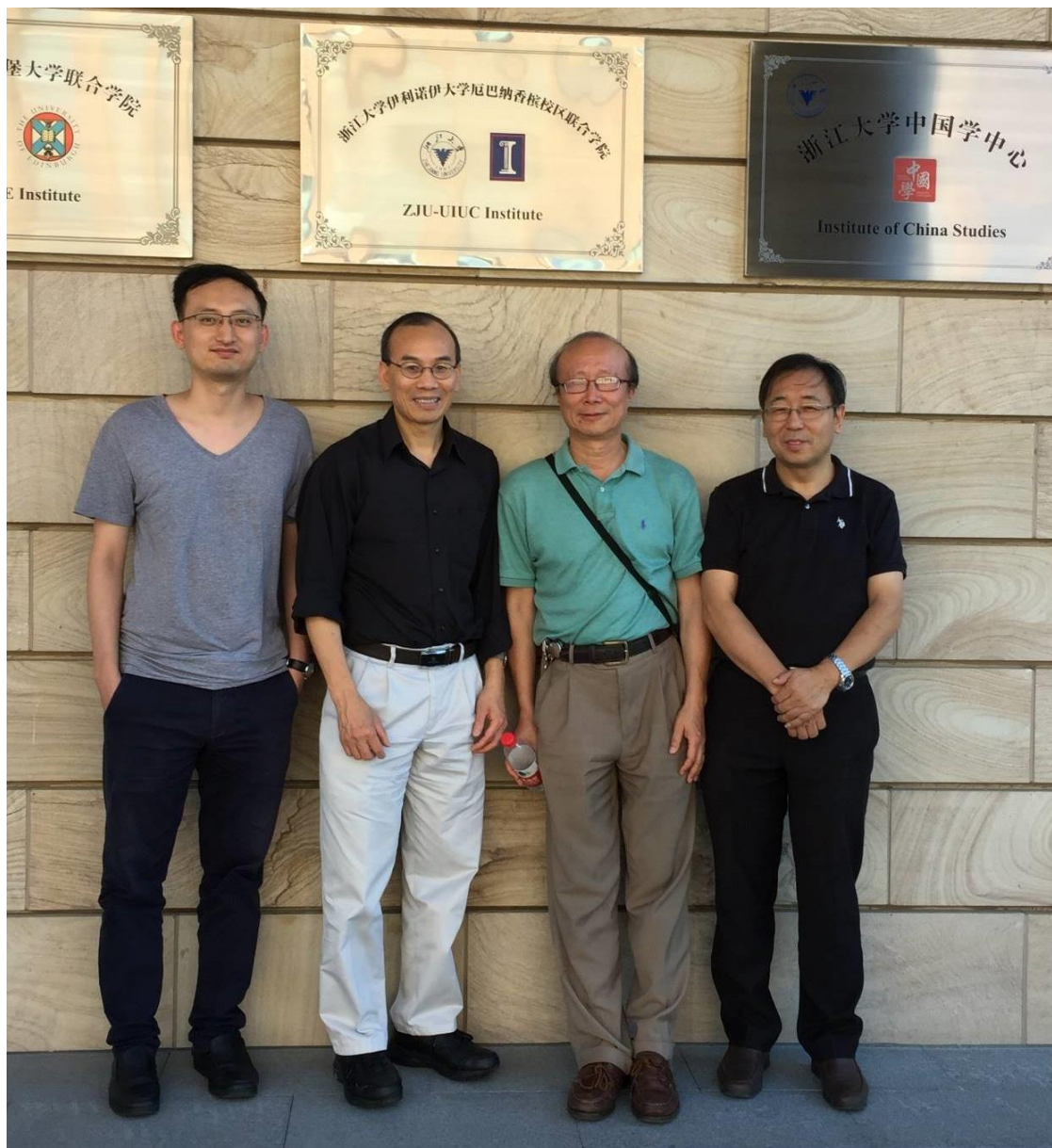
<http://mri.Beckman.uiuc.edu/>



Courses taught at UIUC:

- ECE/BIOE280: Introduction to Biomedical Imaging
- ECE309: Signals and Systems
- ECE310/311: Digital Signal Processing
- ECE313: Probability with Engineering Applications
- ECE329: Electromagnetic Fields and Waves
- ECE/BIOE480: Magnetic Resonance Imaging
- ECE497ZPL: Neural Networks for Signal Processing
- ECE497ZPL: Learning in Signal Processing
- ECE551: Advanced Digital Signal Processing
- ECE598ZPL: Quantum Mechanical Treatment of MRI







Xinyi Lai

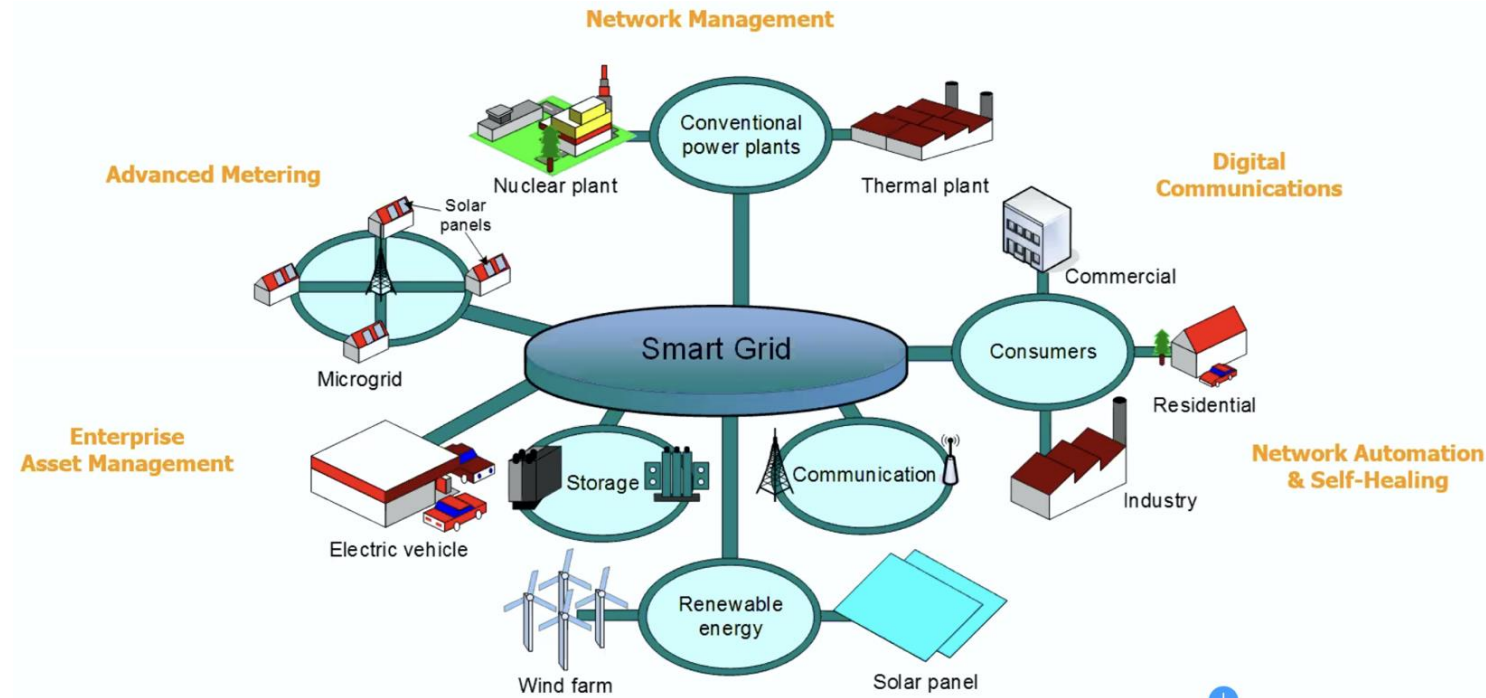
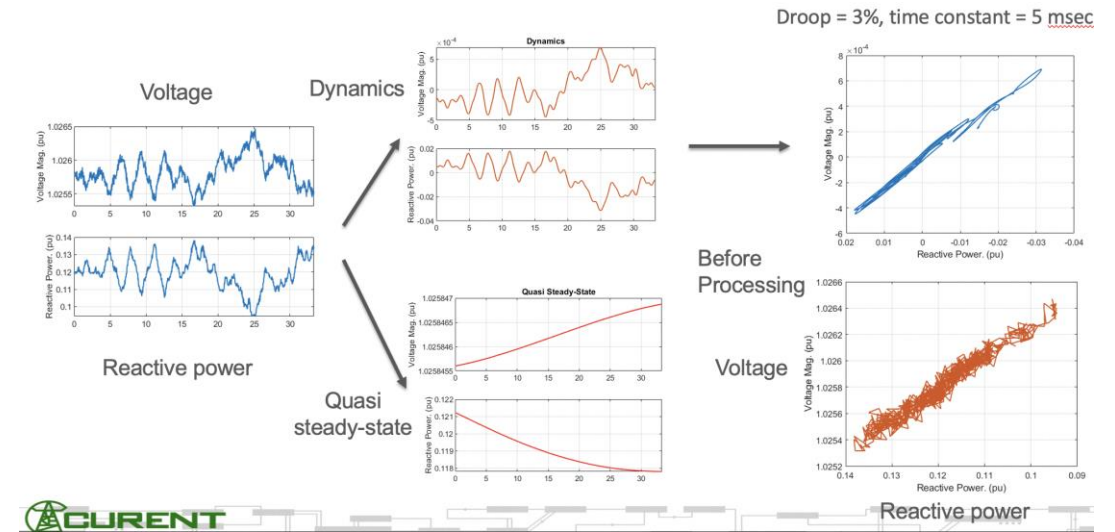
Electrical Engineering

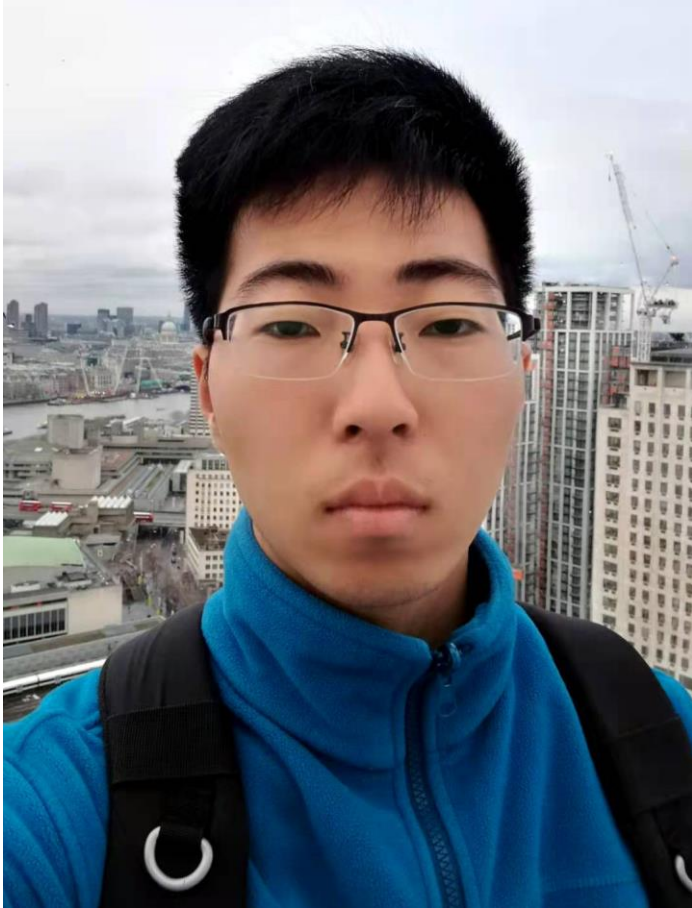
Senior Student, ZJU-UIUC Institute

Email: xinyi.17@intl.zju.edu.cn

Research interest:

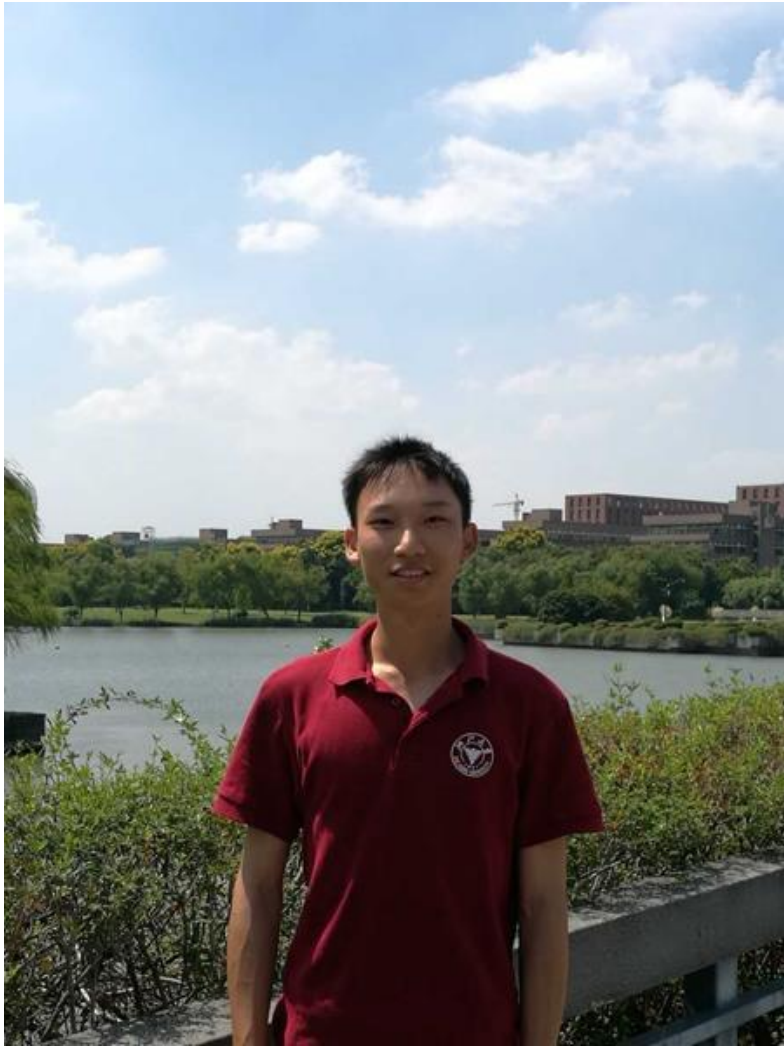
- Smart grids and electric vehicles
- Power system fault diagnosis





Lu, Haofan

- ZJU-UIUC Institute
- Electrical Engineering
- Email: Haofan.17@intl.zju.edu.cn
- Area of Interest: wireless communication, mobile computing, indoor localization

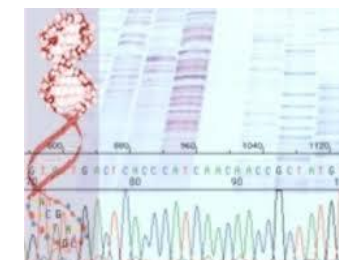
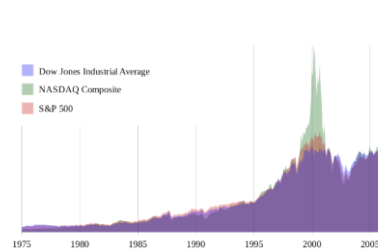
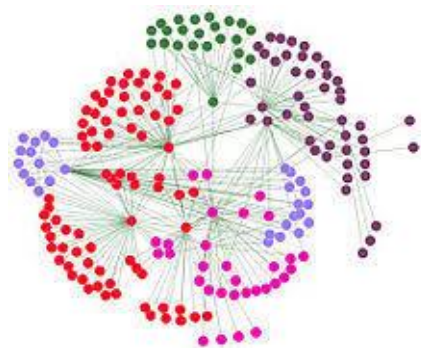
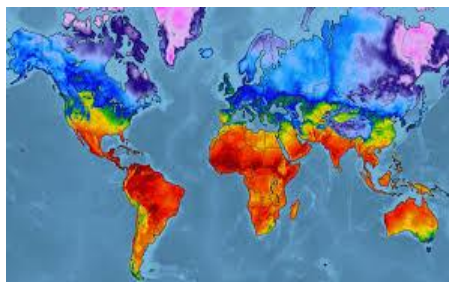
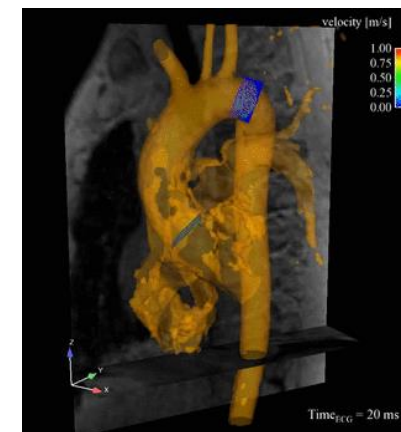
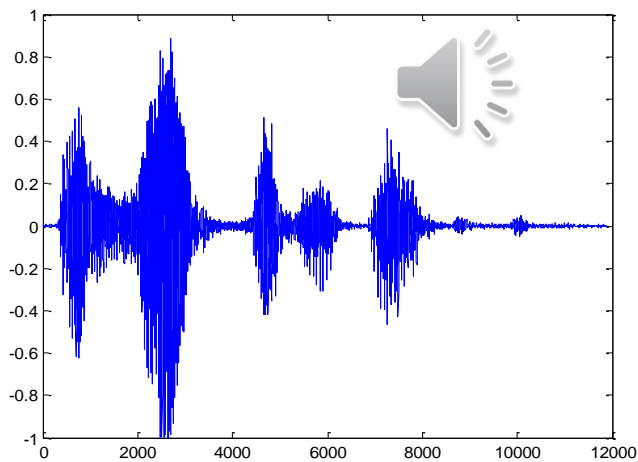


Feng, Chuhao

- Senior, ZJU-UIUC Institute
- Electrical Engineering
- Email: Chuhao.17@intl.zju.edu.cn

What is DSP ?

What is a signal ?



What is DSP ?

Image Denoising



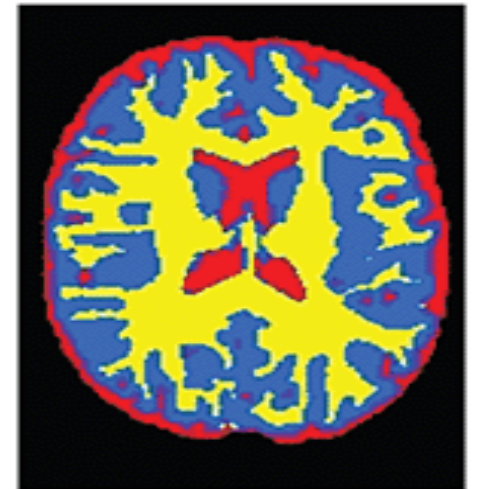
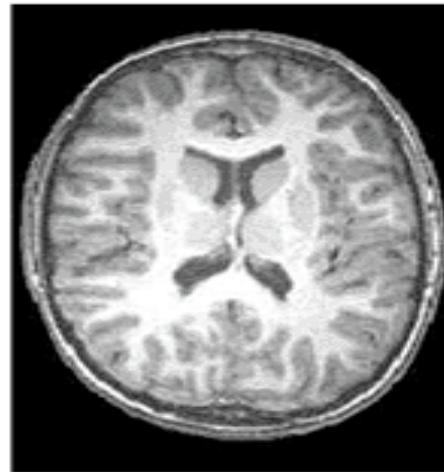
What is DSP ?

Image Impainting



What is DSP ?

Image Segmentation



What is DSP ?

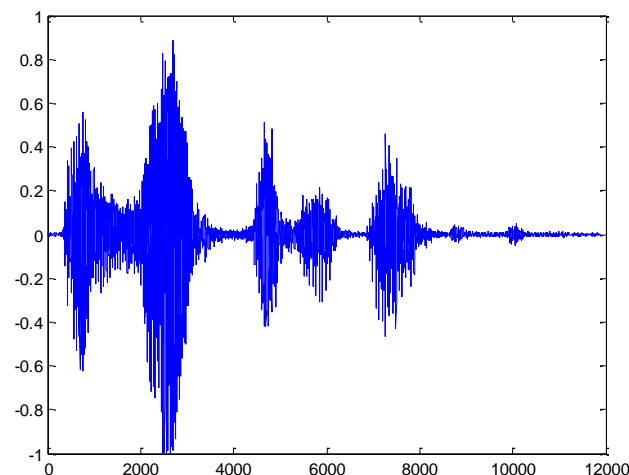
Image Translation



What is DSP ?

Speech Synthesis/Generation

**The avocado is a pear-shaped fruit
with leathery skin, smooth,
eatble flesh and a large stone**



Audio 1



Audio 2



Audio 3



Audio 4

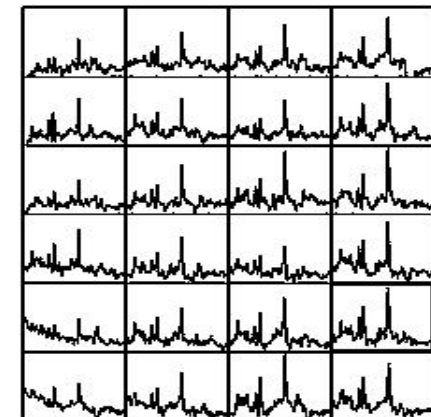
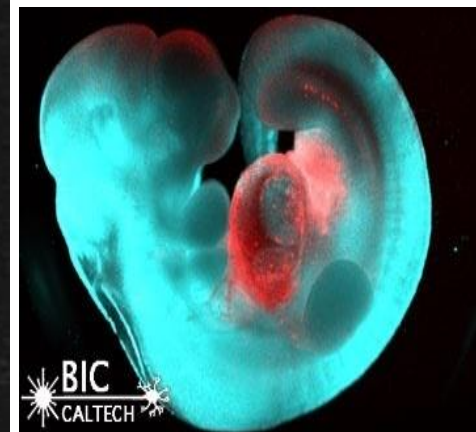
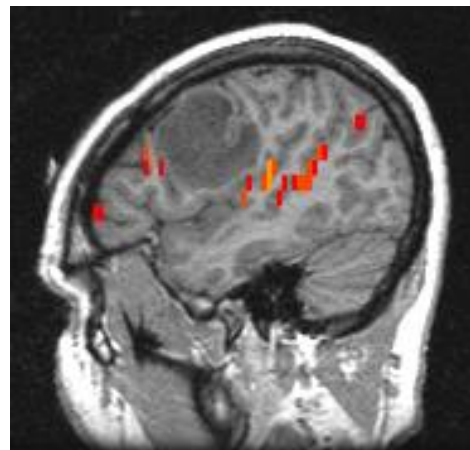
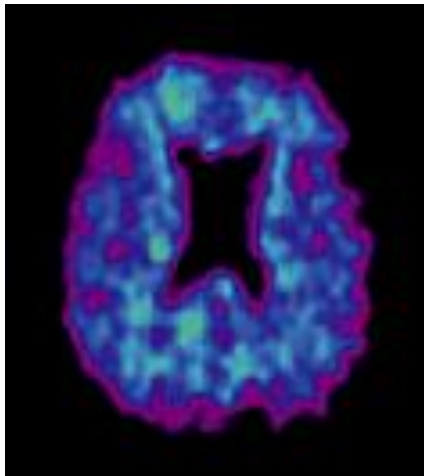
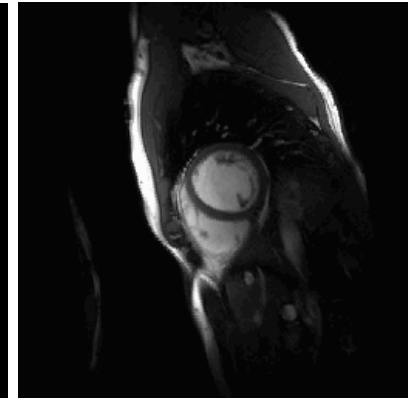
What is DSP ?

Image and Video Synthesis



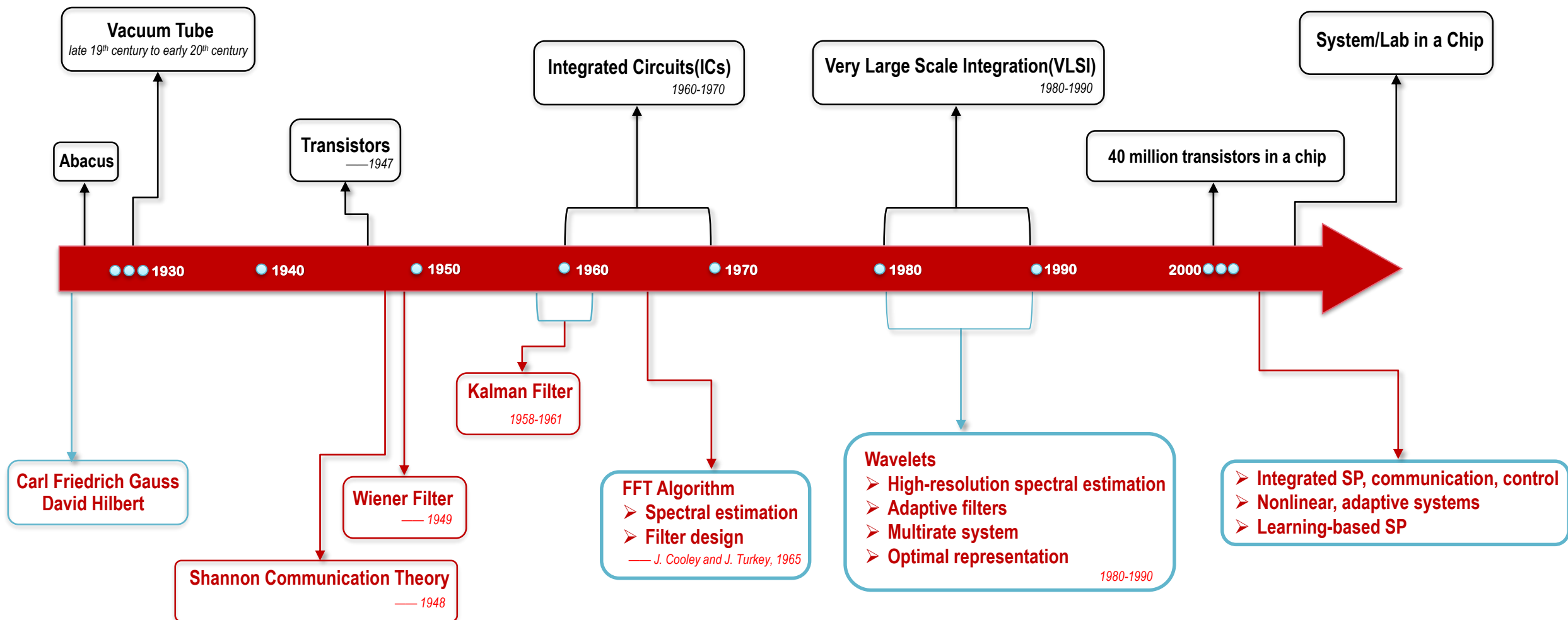
What is DSP ?

Image Reconstruction



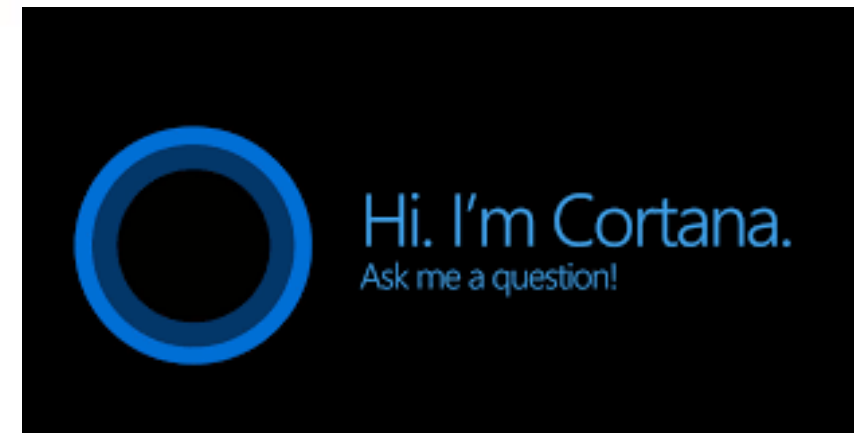
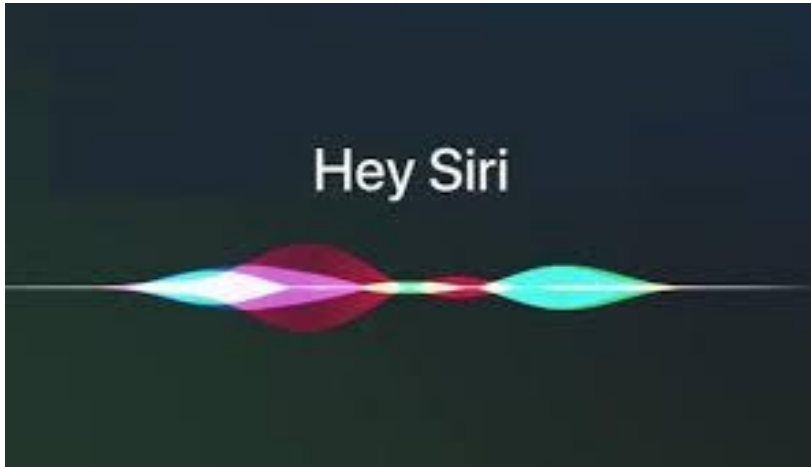
Why to Take ECE310 ?

Historical Perspective of Key Developments in Signal Processing



Why to Take ECE310 ?

Speech-based Human Computer Interactions



Why to Take ECE310 ?

Intelligent Computer Vision



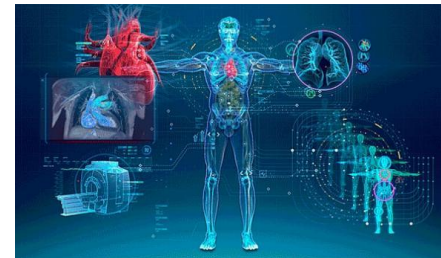
Facial recognition



Self-driving vehicles



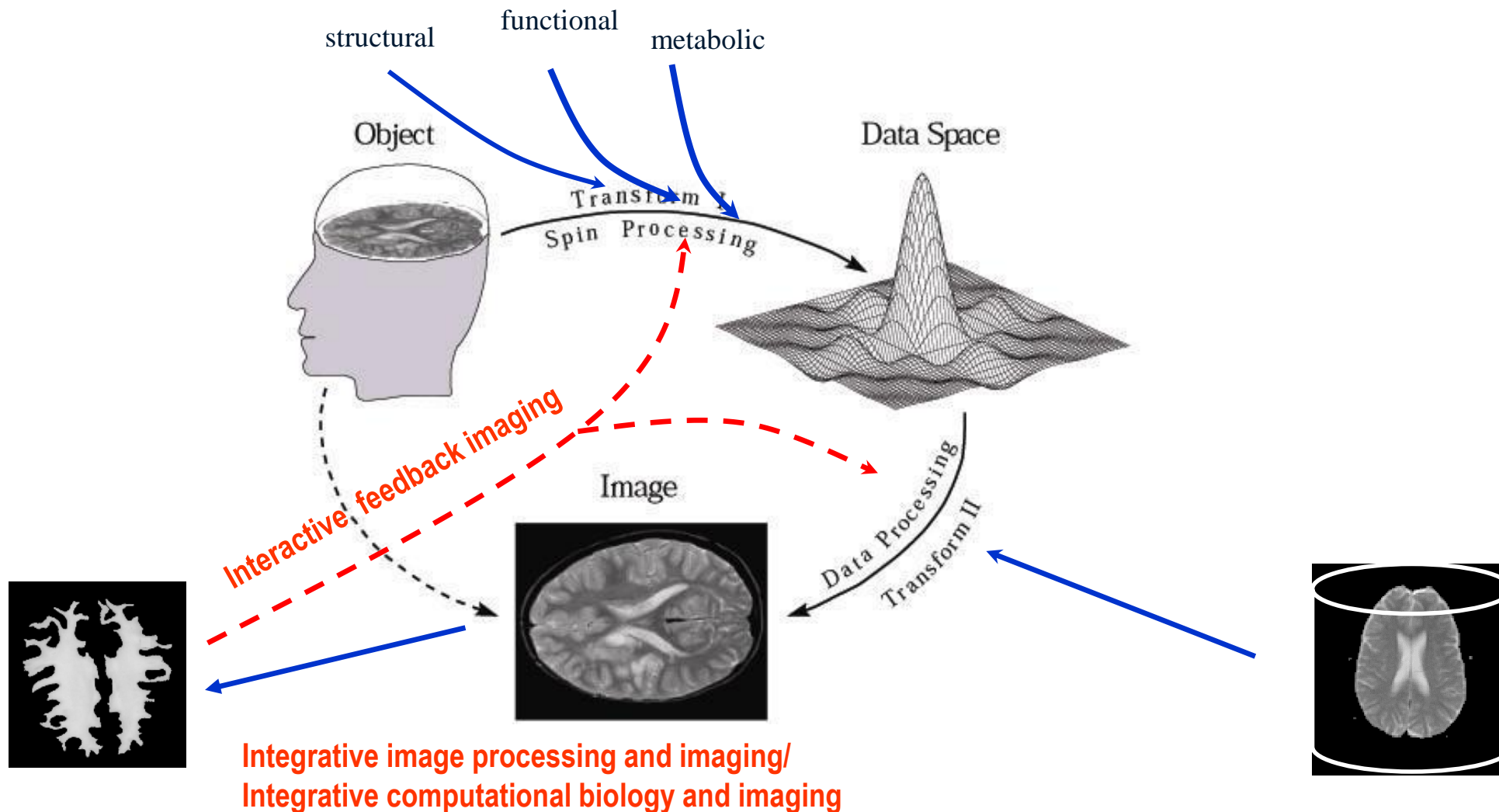
Robotics and manufacturing



Medical diagnosis

Why to Take ECE310 ?

Intelligent Biomedical Imaging



How to Do Well in ECE310 ?

- ✓ **Make sure you want it!**
- ✓ **Don't get behind**
- ✓ **Come to class: total 33 lecture hours**
- ✓ **Do your homework**
- ✓ **Use the TAs**
- ✓ **Don't be intimidated by Mr. Fourier**

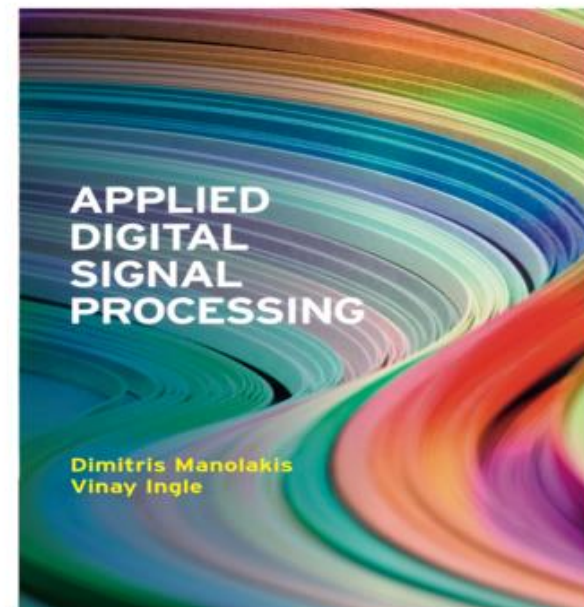
Logistics

Key Features:

- 3 lectures/week
- 1 recitation session/week
- TA office hours
- Piazza discussion sessions
- Website: handouts & announcements

Grading Scheme:

- Homework: 25%
- Midterm exam1: 20%
- Midterm exam2: 20%
- Final exam: 35%



Dimitris G. Manolakis and Vinay K. Ingle
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