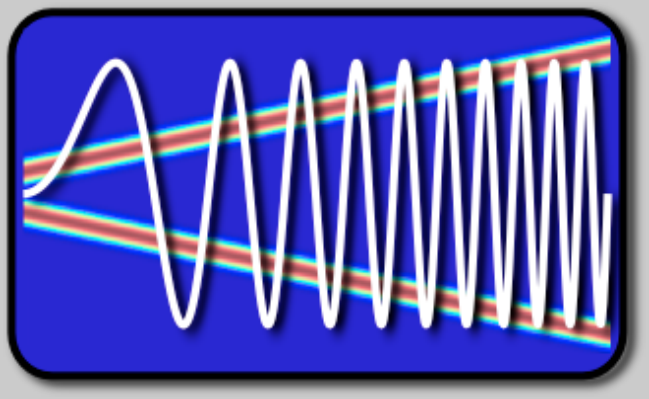
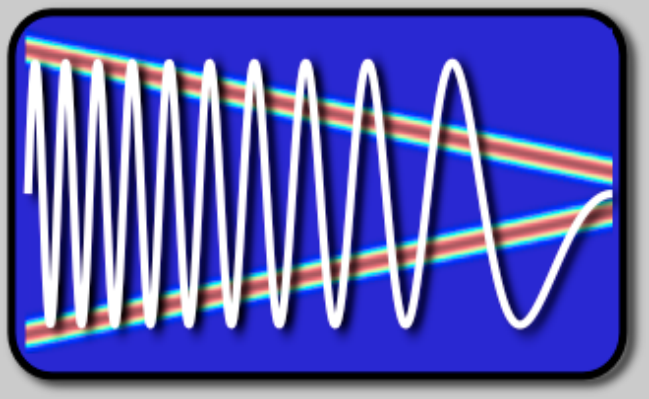


# EE123
# Digital Signal Processing



## Lecture 35
## Last Lecture

M. Lustig, EECS UC Berkeley

## Announcements

- Lab6 + HW Due tonight
- Midterm this Friday
  - Material -- covers entire class
  - Focus:
    - Filter Design
    - Xform Analysis of LTI systems
    - There may be some lab related material
  - Conflicts? please email ASAP
- Posted comments on project proposals

## Preferred Project

- Transmit an image with best quality in 75 seconds
- With APRS style packets, and no compression -- 2500 color pixels (7500b)
- Tips:
  - Start simple
    - no compression
    - APRS packets
    - resize image to the right size in the encoder
    - decode and resize to the original size in the decoder
  - Improve on what you got

## What did we talk about

- Discrete time signal and systems
- Transforms: Z, DTFT, DFT, Wavelets....
- Frequency Analysis
- Time-Frequency Tiling
- Sampling - Ideal and non-ideal
- 2D
- Compressive Sampling
- Filter Design
- Transform Analysis of LTI Systems

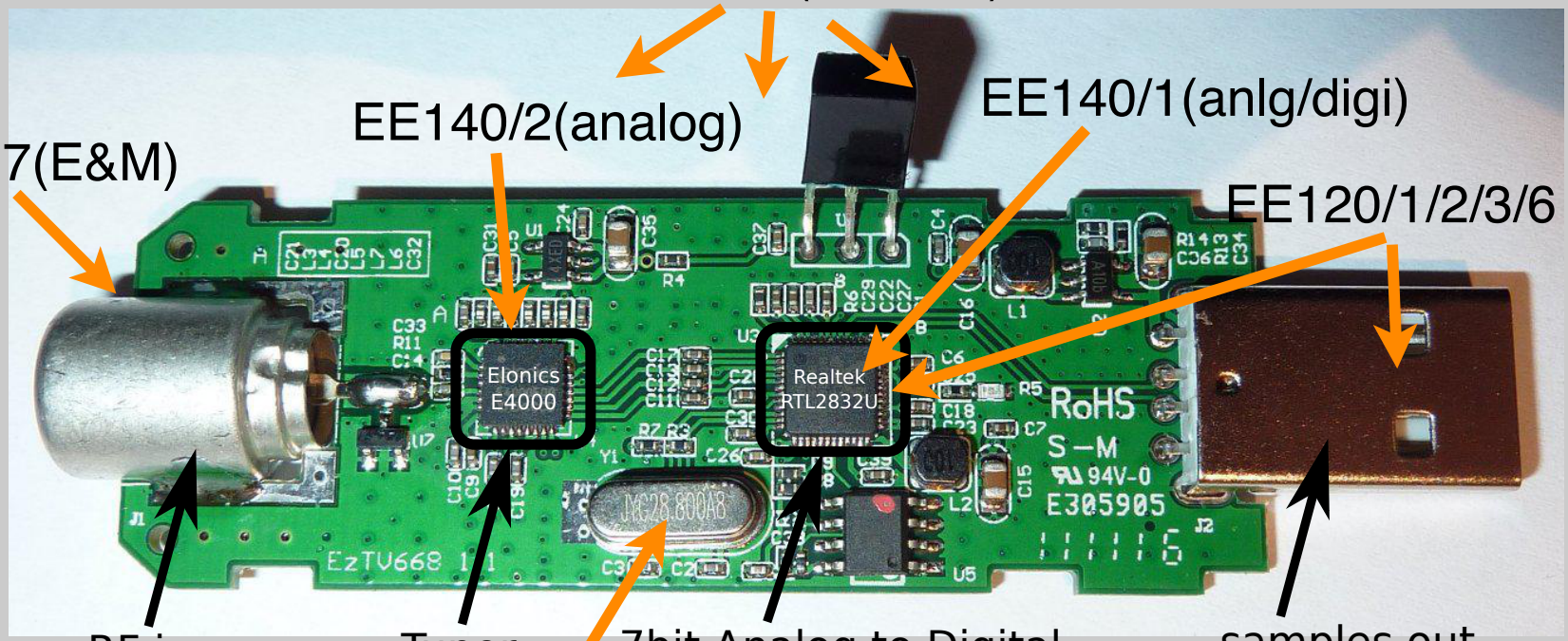
## What did we do

- Implemented a Sonar
- Experienced with SDRs - ADS-B and FM
- Got a ham license
- Digital Communications -- with real-life pain

- Applications

# What Next?

- Inexpensive TV dongle based on RTL2832U and E4000 /820T chipset can be used as SDR



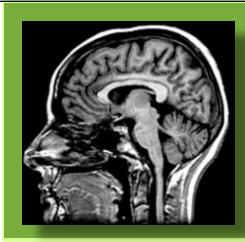
## What next?

- EE121 Digital Comm
- EE122 Networking
- EE126 Prob. and Random Processes
- EE127A  Optimization
- EE128 Control
- EE145B - Medical imaging
- CS188/189 - AI+ML (Signal interpretation)
- CS 194 (comp photography)
- CS 194 (Intro to data science)

## More Adcanced

- EE225A  Statistical signal processing
- EE225B Image Processing
- CS280 Computer Vision
- EE224A, 226A, 227A, 229
- CS 281A+B

- EE225E Principles of MRI



# Principles of Magnetic Resonance Imaging EEc225E / BIOEc265

## MRI has revolutionized diagnostic medicine. Ever wondered how it really works?

Spring 2016

Prerequisites: Either EE 120 or BioEC165/El Eng C145B
Units: 4
Instructor: Michael (Miki) Lustig

Magnetic Resonance Imaging (MRI) is an incredible non-invasive imaging modality. It is amazing how interactions with atomic nuclei (yes, that's right, nuclei!) through manipulations of radio-frequency and magnetic fields can result in beautiful clinical images with variety of anatomical and functional contrasts.
The class will cover:

**Fundamentals of MRI:**

- Multi-dimensional Fourier Transforms and linear systems
- Nuclear Magnetic Resonance Physics
- Imaging Sequences
- Contrast Generation
- Image reconstruction
- MRI Hardware and Software
- Imaging tradeoffs and image artifacts

**Advanced Topics:**

- Rapid imaging
- Parallel Imaging
- Emerging research opportunities (High-field, dynamic imaging, functional imaging, hyperpolarization,compressed sensing)

**This year official lab component.**
**Labs include: Matlab-based sequence design and image reconstruction. Actual scanning on a clinical 3T system at the brain imaging center**


M. Lustig, EECS UC Berkeley

# Wednesday

- Balint Seeber