

EE 691: Advanced MRI

Fall 2008, Tuesdays, 5-8pm, GFS Room 223
USC University Park Campus

Instructor/Guide: Prof. Krishna Nayak, knayak@usc.edu, (213) 740-3494
EEB 406, OH: by appointment

Prerequisite: EE 591 Magnetic Resonance Imaging and Reconstruction

Recommended: EE 441 Linear Algebra
EE 562a Random Processes

This course is a follow-up to EE 591 Magnetic Resonance Imaging and Reconstruction, and is meant for individuals interested in pursuing advanced research related to the development and/or use of new MRI techniques. An emphasis will be placed on recent developments that 1) have had high impact on the field and/or show strong promise, 2) involve novel pulse sequence design, and/or 3) enable imaging of anatomy and function in a way that surpasses what is currently possible with any modality.

The format will be similar to that of a journal club. There will be one or two assigned readings per week. Each class meeting will consist of a 30-60 minute lecture, followed by a group discussion (with occasional guests). The final 30 minutes will be an introduction to the following week's topic. Grading will be based on class participation and quizzes.

Required Course Materials:

- Handouts and online lectures (from the ISMRM 2008 scientific sessions)
- <http://mrel.usc.edu/class/691/>

Grading:

- 50% Quizzes
 - Bi-weekly, short-answer, lowest quiz score is discarded.
- 25% Leading one Topic
 - Will involve 1) identifying optional readings, 2) selecting quiz questions, 3) selecting three (hopefully controversial) discussion questions, and 4) moderating the in-class discussion.
- 25% Class Participation

Additional References:

- DG Nishimura, Principles of Magnetic Resonance Imaging
- MA Bernstein et al., Handbook of MRI Pulse Sequences, Academic Press
- EM Haacke et al., Magnetic Resonance Imaging: Physical Principles and Sequence Design, Wiley
- ZP Liang and PC Lauterbur, Principles of Magnetic Resonance Imaging: a Signal Processing Perspective, Wiley-IEEE

Software:

- MATLAB
- SpinBench MRI simulator

STUDENTS WITH DISABILITIES:

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. – 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.