

**BIOENGINEERING 245: ELECTROMAGNETIC NEUROIMAGING**  
<http://dnl.ucsf.edu/bioeng245>  
**Fall Quarter 2003**

**Instructors:**

Dr. Thomas Ferree (<http://dnl.ucsf.edu>)  
 \*Dr. Srikantan Nagarajan (<http://bil.ucsf.edu/>)  
<sup>B</sup> Both

**Meeting:**

Time: Mondays and Wednesdays 2:00-3:30 PM  
 Place: UCSF Parnassus Campus, Medical Sciences Building, Room S172  
 Office Hours: By appointment, with either instructor

**Lecture Schedule:**

<sup>B</sup> Mon 9/15	Introduction to EEG-MEG (Chapter 1)
Wed 9/17	Membrane Biophysics, Cable Equation (Chapter 2)
Mon 9/22	Solutions to Cable Equation (Chapter 2), Vector Calculus (Appendix A)
Wed 9/24	Dirac Delta Function (Appendix A), Differential Form of Coulomb's Law
Mon 9/29	Electromagnetic Fields in Biological Tissue (Chapter 3)
Wed 10/1	Extracellular Fields of Idealized Current Sources (Chapter 4)
Mon 10/6	Extracellular Fields of Idealized Current Sources (Chapter 4)
Wed 10/8	Head Modeling (Chapter 5)
Mon 10/13	Lead Field Theory, Sensitivity of Scalp Sensors (Chapter 6)
*Wed 10/15	Principles of EEG-MEG Data Acquisition (Chapter 7)
Mon 10/20	<b>MidTerm Exam</b>
*Wed 10/22	Laboratory Demonstration of EEG-MEG Acquisition
Mon 10/27	Linear Response Theory (Appendix C), Event-Related Potentials (Chapter 8)
Wed 10/29	Fourier Transform (Appendix B), Power Spectrum and Coherence (Chapter 8)
*Mon 11/3	Power Spectrum Estimation from Real Data
*Wed 11/5	Power Spectrum Estimation from Real Data
Mon 11/10	Single- and Multiple Dipole Fitting
*Wed 11/12	Distributed Source Estimation, Least-Squares Solutions
*Mon 11/17	Spatial Filtering and Beamforming
*Wed 11/19	Statistics and Hypothesis Testing
*Mon 11/24	<b>Final Exam / Projects Due</b>