

**ChE/BE 169 – Cellular Engineering**  
**Fall 2005**  
**Rev. 2/07**

**Instructor**

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**Meetings**

Lecture: 106 Spalding, MWF 2-3 pm.

**Grading.** Problem sets (approx. three, 40%); project (60%). No exams.

**Reading material**

1. *Receptors: models for binding, trafficking, and signaling.* Lauffenburger and Linderman. Oxford University Press.
2. Handouts and journal articles.

**Topics**

Overview

Sensing the Chemical Environment

Receptor-ligand interactions

Sensing the Physical Environment

Attachment, rolling and spreading

Responding to the Environment

Moving up and down gradients

Mapping Environmental Cues to Cell Response: biomolecular networks

Mechanisms of the Cellular Compass

Switching, Cycling and Committing: Cell Proliferation

Dynamics-encoded Messaging

Sensitive Amplifiers for Cell-based Sensors

From Single-cell Behaviors to Multicellular Structures

Natural (development) and Engineered (tissue engineering) Patterns