

Quantitative Analysis of the Tumor Microenvironment:

From Systems Biology to Multi-Scale Modeling

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The interaction of tumor cells with a complex and dynamic extra-cellular environment regulates migration, invasion and metastasis. Unfortunately these interactions have traditionally been studied in the context of artificial 2D environments, which are far from in vivo and lead to incomplete and inaccurate understanding of adhesion, motility, proteolytic activity and invasion.

In order to develop a comprehensive and systems-level understanding of how a tumor cell interacts with its complex microenvironment, we utilize a combination of high-resolution microscopy, biomaterial fabrication, bulk and micro-rheological measurements and multi-scale simulations rooted in statistical and continuum mechanics. Using an interdisciplinary approach allows us to understand and quantify the mechanical and chemical roles of the matrix in regulating signaling, adhesion and motility in a variety of cancer models.

Our integrated computational and experimental approach allows us to develop a quantitative map of the individual and the synergistic roles of cellular and extra-cellular regulators of adhesion, invasion and motility of tumor cells in a variety of native tissue environments.

Date: Friday, 22 May 2009
Time: 4 pm
Venue: LT 20
Host: Prof Paul Matsudaira

**Department of Biological Sciences
Seminar Announcement**

