Title: Modeling the ecosystem of bone metastases: insights from a multi scale, multi modeling approach

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Prostate cancer is one of the most commonly diagnosed cancers in men. Every year more than 30 thousand men in the US get diagnosed with cancer but of those, only 10% will succumb to the disease. Prostate cancer becomes lethal when it metastasizes to other organs and, in 90% of the cases, patients show evidence of metastases to the bone. Understanding prostate cancer metastasis to the bone is thus key if we want to find ways to improve treatment and decrease mortality. Successful metastases come from prostate cancer cells that can interact with the resident stromal cells and take advantage of the host physical microenvironment. These interactions are key but difficult to model experimentally due to the complexity of the factors and actors involved. Mathematical models can help by integrating experimental and clinical data, biological insights and by balancing the need to capture enough detail to model biological reality with the need for simplicity. In this talk I will describe how a multi pronged multi scale integrated modeling framework can help understand how successful metastases establish themselves, the importance of the microenvironment in preventing or facilitating the establishment of bone metastases and lead to new treatment approaches.