2013 JMNMF RSA Summary & Photo
Elizabeth Shenk, Boston University School of Medicine – Boston Medical Center

Pictured Left to Right: Greg Safko, JMNMF President; Rhoda Alani, MD, Herbert Mescon Professor and Chair - Department of Dermatology, B.U. School of Medicine, Dermatologist-in-Chief; Elizabeth Shenk, JMNMF RSA Recipient, Susan Bancroft, JMNMF Board Member; and, Regina S. Bodnar, RN, JMNMF Chair.

The overall goal of my project, known as an Engineered Metastatic Platform, is to develop a system to define the precise factors that mediate how a cancer metastasizes to a particular site in the body and why. When cancer cells travel throughout the body and form colonies distant from the primary tumor, the process is known as metastasis. The vast majority of cancer deaths are caused by metastases and so it is extremely important to investigate this process. Most research currently being done either oversimplifies the problem and is therefore unrealistic, such as by working in two dimensions on plastic, or it is not easily reproducible – for instance, research using mice models. The Engineered Metastatic Platform simplifies the metastatic process, while keeping as much physiological relevance as possible. By using a small scale, three-dimensional model where human melanoma cells are in the middle and human "niche" cells from potential metastatic sites – such as liver, lung, bone, and skin – are outside the tumor cells, we have created a system that is highly reproducible as well as being physiologically relevant. Using the Engineered Metastatic Platform, we can monitor where the melanoma cells move and by following the speed and destination of melanoma migration we can identify what factors are important in cancer metastasis. The three-dimensional model we're creating can also be altered to see what factors may be most important. For example, if a melanoma moves to the lung when there are equal numbers of lung cells as other niche cells, will it still go to lung when lung cells constitute only one-tenth the amount of other niche cells? By asking these questions, we hope to determine whether a tumor is always destined to metastasize to a specific niche or whether it can be reprogrammed depending on its surroundings. Another aspect of this project that should be useful is that we will be able to essentially take apart the 3D platform and collect the melanoma cells, separating them from the niches to which they have moved. After harvesting the cancer cells, we will look for genetic differences that may have contributed to the migratory behavior. The goal of this research is to be able to use this technology to develop new drugs that target the metastatic process which can be specific to each patient. By specifically targeting metastasis, we should be able to greatly reduce the deaths due to melanoma, as well as other cancers.