



**Susan G. Komen
Research Grants – Fiscal Year 2014**

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Radiographic-histological correlates of dense breast tissue

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Lead Organization: University of Pennsylvania

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Public Abstract:

Screening mammography has saved countless lives by allowing physicians to visualize breast cancer in its earliest stages. The use of mammography has also identified one of the strongest risk-factors for developing breast cancer: a woman's breast density. The more dense, or fibroglandular, tissue a woman has in her breast, the higher her risk is for developing breast cancer and having cancer missed by mammography. While the biology behind breast density and developing breast cancer is not yet well understood, breast density as seen through mammography is essentially caused by underlying characteristics of the woman's breast tissue. The research I propose as part of this fellowship will seek to better understand the biology of breast density by establishing links between the mammographic appearance of the dense tissue and its tissue-level biology. Ultimately, the findings of my study could lead to more accurate identification of those women who are most likely to develop breast cancer due to their breast density and an improved understanding of the biology underlying this risk for breast cancer, so we could reduce such a risk with targeted treatments. My ultimate goal is to establish a line of breast cancer research that leverages information from the fields of pathology and radiology in order to better understand breast biology. This fellowship will allow me to obtain clinical training complementary to my background in bioengineering, bringing me closer to this goal. By merging clinical knowledge with bioengineering and computer science techniques, I plan to develop novel biomarkers that non-invasively identify and monitor biological processes underlying a woman's breast density and her risk to develop breast cancer. This, in turn, would enable me to perform clinically relevant research in breast cancer and have a direct impact in saving women's lives. This fellowship will also help me establish my own line of independent research by providing me the opportunity to work on a high-impact, novel research question and train under a multi-disciplinary cadre of clinical and scientific mentors, each a respected expert in their field. By the end of this fellowship, I will also have obtained the necessary preliminary data needed to drive larger research studies that will bring these findings into clinical practice as an independent faculty member of an established research institution. This research proposed in this fellowship could ultimately lead to improvements in identifying those women who would benefit from alternative imaging techniques for breast cancer screening, such as MRI or whole breast ultrasound, or who would benefit from risk-reducing treatments. Potentially, findings from this study could also lead in the long term to improvements in the ability of physicians to detect subtle changes of an individual woman's breast tissue biology and risk, so that she can obtain personalized care for reducing her risk before she develops breast cancer