

Marjan Rafat, PhD

269 Campus Dr. Rm. 1260
Stanford, CA 94305

(650) 724-4087
mrafat@stanford.edu

Education

-
- Harvard University** Cambridge, MA
May 2012
- PhD in Engineering Sciences
 - Concentration: Biomedical Engineering
 - Dissertation Title: "Dual Antibody Functionalized Polyvinyl Alcohol and Alginate Hydrogels for Synergistic Endothelial Cell Adhesion"
- Massachusetts Institute of Technology (MIT)** Cambridge, MA
Jun. 2006
- SB in Chemical Engineering
 - Minors in Biomedical Engineering and Chemistry

Research Experience

-
- Stanford Imaging Radiobiology Laboratory** Stanford, CA
Postdoctoral Scholar Sep. 2012-Present
Advisor: Prof. Edward Graves
- Determined the relationship between cancer therapies and circulating tumor cell recruitment
 - Evaluated the effects of radiation and surgery on tumor and immune cell migration in a preclinical breast cancer model
 - Analyzed the role of the tumor microenvironment in cancer recurrence
 - Examined the normal tissue sparing effect of ultra high dose rate irradiation
- Harvard Biomaterials Laboratory** Cambridge, MA
Graduate Research Scientist Sep. 2006-May 2012
Advisor: Prof. Debra Auguste
- Studied the relationship between geometry, flow patterns, and endothelial cell gene expression in cerebral aneurysms
 - Synthesized bioadhesive polyvinyl alcohol and alginate hydrogels that exhibit *in situ* crosslinking for aneurysm treatment
 - Improved cardiomyocyte function using conductive hydrogel scaffolds
 - Assembled pH-sensitive colloids into morphing microstructures
- MIT Biomaterials Science and Engineering Lab** Cambridge, MA
Student Research Associate Jan. 2003-Aug. 2006
Advisor: Prof. ChoKyun Rha
- Characterized the physiochemical properties of asiatic and madecassic acid
 - Proved an existing critical micelle concentration, which had never been reported in the literature

Research Funding

-
- K99 CA201304** (Rafat) 04/01/16 - 03/31/18
NIH NCI \$199,100
- Deconstructing the Tumor Microenvironment and its Contribution to Metastasis**
The goal of this project is to determine the microenvironmental factors responsible for local recurrence following therapy in breast cancer.
Role: PI

Awards and Fellowships

-
- AACR Women in Cancer Research Scholar Award 2016
Katherine McCormick Advanced Postdoctoral Fellowship 2015-2016
Women in Molecular Imaging Scholar Award 2015
Best Poster Award, 7th Annual Center for Biomedical Imaging at Stanford Symposium 2015

The Helena Anna Henzl-Gabor Young Women in Science Fund for Postdoctoral Scholars Travel Grant	2015
World Molecular Imaging Congress Student Travel Stipend	2014, 2015
Advanced Research Center for Medical Physics (ARCMP) Travel Award	2014
Canceropole Grand Ouest Travel Grant Award	2013
NIH NRSA Postdoctoral Fellowship in the Radiation Sciences (T32)	2012-2013; 2015-2016
Biomedical Engineering Society Travel Grant Award	2010, 2011
American Heart Association Founders Affiliate Predoctoral Fellowship	2009-2011
Honorable Mention, National Science Foundation Graduate Research Fellowship	2007
Certificate of Distinction in Teaching, Harvard University	2007, 2009

Peer-Reviewed Publications

1. Lartey FM*, **Rafat M***, Negahdar M, Malkovskiy AV, Dong X, Sun X, Li M, Doyle T, Rajadas J, Graves EE, Loo BW Jr, Maxim PG. Dynamic CT Imaging of Volumetric Changes in Pulmonary Nodules Correlates with Physical Measurements of Stiffness. *Radiotherapy and Oncology*. 2017; 122(2): 313-318. *Equal contribution.
2. Schüler E, Trovati S, King G, Lartey FM, **Rafat M**, Villegas M, Praxel AJ, Loo BW Jr, Maxim PG. Experimental Platform for Ultra-high Dose Rate FLASH Irradiation of Small Animals using a Clinical Linear Accelerator. *International Journal of Radiation Oncology, Biology, Physics*. 2017; 97(1): 195-203.
3. Aguilera TA, **Rafat M**, Castellini L, Shehade H, Kariolis MS, Hui A, Stehr H, von Eyben R, Jiang D, Ellies LG, Koong AC, Diehn M, Rankin EB, Graves EE, Giaccia AJ. Reprogramming the Immunological Microenvironment Through Radiation and Targeting Axl. *Nature Communications*. 2016; 7: 13898.
4. You JO*, **Rafat M***, Almeda D, Maldonado N, Guo P, Nabzdyk CS, Chun M, LoGerfo FW, Hutchinson JW, Pradhan-Nabzdyk LK, Auguste DT. pH-Responsive Scaffolds Generate a Pro-Healing Response. *Biomaterials*. 2015; 57: 22-32. *Equal contribution. *Highlighted in Materials Today*. May 21, 2015.
5. Vilalta M, **Rafat M**, Giaccia AJ, Graves EE. Recruitment of Circulating Breast Cancer Cells Is Stimulated by Radiotherapy. *Cell Reports*. 2014; 8(2): 402-409.
6. Lartey FM, Ahn GO, Ali R, Rosenblum S, Shen B, Miao Z, Arksey N, Vilalta M, **Rafat M**, Liu H, Chen JW, Palmer T, Chin FT, Guzman R, Loo BW Jr, Graves EE. The Relationship Between Serial [(18)F]PBR06 PET Imaging of Microglial Activation and Motor Function Following Stroke in Mice. *Molecular Imaging & Biology*. 2014; 16(6): 821-829.
7. **Rafat M**, Rotenstein L, Hu J, Auguste DT. Engineered Endothelial Cell Adhesion via VCAM1 and E-selectin Antibody-Presenting Alginate Hydrogels. *Acta Biomaterialia*. 2012; 8(7): 2697-2703.
8. **Rafat M**, Rotenstein L, You JO, Auguste DT. Dual Functionalized PVA Hydrogels that Adhere Endothelial Cells Synergistically. *Biomaterials*. 2012; 33(15): 3880-3886.
9. You JO, **Rafat M**, Auguste DT. Cross-Linked, Heterogeneous Colloidosomes Exhibit pH-Induced Morphogenesis. *Langmuir*. 2011; 27(18): 11282-11286.
10. You JO, **Rafat M**, Ye GJC, Auguste DT. Nanoengineering the Heart: Conductive Scaffolds Enhance Connexin 43 Expression. *Nano Letters*. 2011; 11(9): 3643-3648. *Highlighted in Nature Nanotechnology*. 2011; 6(11): 692-693.
11. **Rafat M**, Raad DR, Rowat AC, Auguste DT. Fabrication of Reversibly Adhesive Fluidic Devices using Magnetism. *Lab on a Chip*. 2009; 9(20): 3016-3019.
12. **Rafat M**, Fong KW, Goldsipe A, Stephenson BC, Coradetti ST, Sambandan TG, Sinskey AJ, Rha CK. Association (Micellization) and Partitioning Aglycon Triterpenoids. *Journal of Colloid and Interface Science*. 2008; 325(2): 324-330.

Pending Peer-Reviewed Publications

1. **Rafat M**, Aguilera TA, Vilalta M, Bronsart LL, von Eyben R, Golla MA, Afghahi A, Jenkins MJ, Kurian AW, Horst KC, Giaccia AJ, Graves EE. CD8+ T cells Prevent Circulating Tumor Cell-Mediated Local Recurrence Following Radiation Therapy in Triple Negative Breast Cancer. 2017; Submitted.

Review Articles

1. Vilalta M, **Rafat M**, Graves EE. Effects of Radiation on Metastasis and Tumor Cell Migration. *Cellular and Molecular Life Sciences*. 2016; 73 (16): 2999-3007.
2. **Rafat M**, Ali R, Graves EE. Imaging Radiation Response in Tumor and Normal Tissue. *American Journal of Nuclear Medicine and Molecular Imaging*. 2015; 5(4): 317-332.

Book Chapter

1. Satterstrom FK, **Rafat M**, You JO and Auguste DT. Emerging Technologies in Nanomedicine. Chapter 11. *Nanobiomaterials Handbook*. 2011. CRC press/Taylor Francis group. Edited by Balaji Sitharaman.

Research Highlights

1. **Rafat M**. Enzymatically crosslinked microporous hydrogel scaffolds that form *in situ* promote dermal healing. *Regenerative Medicine*. 2015; 10(4): 391-392.
2. **Rafat M**. Real-time Evaluation of Cell Viability using Nanoprobes. *Regenerative Medicine*. 2015; 10(4): 391-392.
3. **Rafat M**. Harnessing the immune response for successful scaffold vascularization. *Regenerative Medicine*. 2015; 10(1): 15-16.
4. **Rafat M**. Triggering the switch from benign to malignant phenotypes *in vitro* through independent modulation of extracellular matrix stiffness and composition. *Regenerative Medicine*. 2014; 9(6): 721-722.

Invited Talks

1. **Rafat M**. Normal Tissue Irradiation Promotes Tumor and Immune Cell Infiltration in a Breast Cancer Model. ME 389 – Biomechanical Research Symposium. Stanford University; 05/2016.
2. **Rafat M**. CD8+ T Cells Inhibit Tumor Cell Migration to Irradiated Normal Tissues. Emerging Scholars in Engineering Lecture. Vanderbilt University School of Engineering; 10/2016.

Selected Oral Presentations

1. **Rafat M**, Vilalta M, Aguilera TA, Giaccia AJ, Graves EE. Evaluating Microenvironmental Changes Following Normal Tissue Irradiation: The Role of CD8+ T Cells in Breast Tumor Cell Migration *in vivo*. Biomedical Engineering Society, Annual Fall Meeting; 10/2016.
2. **Rafat M**, Vilalta M, Aguilera TA, Giaccia AJ, Graves EE. Tumor and immune cell infiltration are enhanced by irradiation of normal tissues in immunocompromised mice. American Association for Cancer Research; 04/2016.
3. **Rafat M**, Vilalta M, Aguilera TA, Giaccia AJ, Graves EE. Normal Tissue Irradiation Promotes Tumor and Immune Cell Infiltration. World Molecular Imaging Congress, Annual Meeting; 09/2015 (Highlight Presentation).
4. **Rafat M**, Vilalta M, Aguilera TA, Giaccia AJ, Graves EE. Tumor and Immune Cell Infiltration are Enhanced by Irradiation of Normal Tissue. 14th International Tumor Microenvironment Workshop; 08/2015.
5. **Rafat M**, Vilalta M, Aguilera TA, Giaccia AJ, Graves EE. Irradiation of normal tissues stimulates tumor cell migration. AACR-SNMMI Joint Conference; 02/2015.
6. **Rafat M**, Vilalta M, Giaccia AJ, Graves EE. Tumor cell migration is enhanced by normal tissue irradiation in a preclinical mouse model. World Molecular Imaging Congress, Annual Meeting; 09/2014.
7. **Rafat M**, Bazalova M, Palma BA, Kozak MM, Jiang D, Dunning M, McCormick DJ, Nelson JL, Hemsing E, Lartey FM, Graves EE, Koong AC, Maxim PG, Loo BW. Radiobiological Advantage of Very Rapid Irradiation. American Association of Physicists in Medicine, Annual Meeting; 07/2014.
8. **Rafat M**, Bazalova M, Lartey FM, Graves EE, Maxim PG, Loo BW. Biological Impact of Very Rapid Irradiation. Cancerpole Grand Ouest, The Future of Radiation Oncology: Imaging, Dosimetry, Biology & Therapy Workshop; 09/2013.

9. **Rafat M**, Rotenstein L, You JO, Auguste DT. Engineering Bioadhesive Hydrogels for Aneurysm Occlusion. Materials Research Society, Fall Meeting; 11/2011.
10. **Rafat M**, Rotenstein L, You JO, Auguste DT. Engineering Bioadhesive Polyvinyl Alcohol Hydrogels for Aneurysm Occlusion. American Institute of Chemical Engineers, Annual Meeting; 10/2011.
11. **Rafat M**, Rotenstein L, You JO, and Auguste DT. A Novel Bioactive Hydrogel for Aneurysm Occlusion. American Institute of Chemical Engineers, Annual Meeting; 11/2010.
12. **Rafat M**, You JO and Auguste DT. Programmable Morphogenesis Via the Directed Assembly of Colloid Structures. American Institute of Chemical Engineers, Annual Meeting; 11/2010.
13. **Rafat M**, You JO and Auguste DT. Controlled Delivery of Programmable Colloidal Structures. Biomedical Engineering Society, Annual Fall Meeting; 10/2010.
14. **Rafat M**, Raad DR and Auguste DT. Fabrication of Reversibly Adhesive Fluidic Devices by Magnetic Adhesion. Sound Bite, 37th New England Complex Fluids Meeting; 12/2008.
15. **Rafat M**, Heller M, Stone HA and Auguste DT. Investigation of Hemodynamics in Saccular Aneurysms. American Institute of Chemical Engineers, Annual Meeting; 11/2008.

Selected Poster Presentations

1. **Rafat M**. Deconstructing the Tumor Microenvironment and its Contribution to Metastasis. Biomedical Engineering Society, Annual Fall Meeting; 10/2015.
2. **Rafat M**, Vilalta M, Aguilera TA, Giaccia AJ, Graves EE. Irradiation of Normal Tissues Stimulates Tumor Cell Migration. 7th Annual Center for Biomedical Imaging at Stanford Symposium; 4/2015 (Best poster award).
3. **Rafat M**, Vilalta M, Giaccia AJ, Graves EE. Normal Tissue Irradiation Promotes Tumor Cell Migration. American Society for Radiation Oncology; 09/2014.
4. **Rafat M**, Bazalova M, Palma BA, Kozak MM, Jiang D, Dunning M, McCormick DJ, Nelson JL, Hemsing E, Lartey FM, Graves EE, Koong AC, Maxim PG, Loo BW. Impact of Very Rapid Irradiation on Clonogenic Survival. American Society for Radiation Oncology; 09/2014.
5. **Rafat M**, Rotenstein L, Hu J, You JO, Auguste DT. Dual Functionalized Hydrogels that Synergistically Adhere Inflamed Endothelial Cells. Bioinspired Materials Gordon Research Conference; 06/2012.

Teaching and Mentoring

Stanford Pre-Collegiate Studies Program <i>Guest Instructor</i> Topics in Biosciences and Biotechnology: Cancer Biology Section	Stanford, CA Jul. 2014
Harvard Engineering and Applied Sciences <i>Head Teaching Fellow</i> , Introduction to Fluid Mechanics and Transport Processes (Undergraduate course) <i>Teaching Fellow</i> , Drug Delivery (Graduate course)	Cambridge, MA Jan. 2009-May 2009 Sep. 2007-Jan. 2008
Science Club for Girls <i>Mentor</i>	Cambridge, MA Jan. 2008-May 2012
NSF Research Experiences for Undergraduates <i>Mentor</i>	Cambridge, MA Jun. 2007-Aug. 2010

Professional Associations

American Association for Cancer Research (AACR)	2015-Present
World Molecular Imaging Society (WMIS)	2014-Present
Materials Research Society (MRS)	2011-Present

American Association for the Advancement of Science (AAAS)	2008-Present
Biomedical Engineering Society (BMES)	2007-Present
Tau Beta Pi Massachusetts Beta Chapter	2006-Present
American Institute of Chemical Engineers (AIChE)	2005-Present
Society of Women Engineers (SWE)	2004-Present

Professional Experience

Reviewer

<i>The International Journal of Biochemistry & Cell Biology</i>	Sep. 2016-Present
<i>Translational Research</i>	Jul. 2016-Present
<i>Stroke</i> , Journal of the American Heart Association	Apr. 2010-Present

Stanford Women in Science and Engineering

<i>Radiation Oncology Representative</i>	Stanford, CA Oct. 2012-Present
--	-----------------------------------

Allurion Technologies, Inc.

<i>Scientific Consultant</i>	Cambridge, MA Mar. 2011-Sep. 2012
------------------------------	--------------------------------------

Harvard Topics in Bioengineering Seminar Series

<i>Co-Founder</i>	Cambridge, MA Jan. 2009-May 2012
-------------------	-------------------------------------

Harvard Graduate Women in Science and Engineering

<i>Board Member and Bioengineering Representative</i>	Cambridge, MA Sep. 2008-May 2012
---	-------------------------------------