Marjan Rafat

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Education

Harvard University Cambridge, MA
- PhD in Engineering Sciences May 2012
- 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
- SB in Chemical Engineering June 2006
- Minors in Biomedical Engineering and Chemistry

Research Experience

Stanford Imaging Radiobiology Laboratory Stanford, CA
Postdoctoral Scholar Aug. 2012-Present
Advisor: Prof. Edward Graves
- Studied the relationship between radiation therapy and tumor recurrence
- Evaluated the effects of radiation on tumor cell migration

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
- Analyzed the physiochemical properties of asiatic and madecassic acid
- Proved an existing critical micelle concentration, which had never been reported in the literature

Teaching and Mentoring

Harvard Engineering and Applied Sciences Cambridge, MA
Head Teaching Fellow, Introduction to Fluid Mechanics and Transport Processes (Undergraduate course) Jan. 2009-May 2009

Science Club for Girls Cambridge, MA
Mentor Jan. 2008-May 2010

Harvard Engineering and Applied Sciences Cambridge, MA
Teaching Fellow, Drug Delivery (Graduate course) Sep. 2007-Jan. 2008

NSF Research Experiences for Undergraduates Cambridge, MA
Mentor Jun. 2007-Aug. 2010

Awards and Fellowships

Recipient, Biomedical Engineering Society Travel Grant Award	2010, 2011
Recipient, 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

Professional Associations

Materials Research Society (MRS)	2011-Present
American Association for the Advancement of Science (AAAS)	2008-Present
American Chemical Society (ACS)	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

Allurion Technologies, Inc. Cambridge, MA
Scientific Consultant Mar. 2011-Present

***Stroke*, Journal of the American Heart Association** Apr. 2010-Present
Reviewer

Harvard Topics in Bioengineering Seminar Series Cambridge, MA
Co-Founder Jan. 2009-Present

Harvard Graduate Women in Science and Engineering Cambridge, MA
Board Member and Bioengineering Representative Sep. 2008-Present

Presentations

1. **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.
2. **Rafat M**, Rotenstein L, You JO, Auguste DT. Engineering Bioadhesive Hydrogels for Aneurysm Occlusion. Materials Research Society, Fall Meeting; 11/2011 (Oral Presentation).
3. **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 (Oral presentation).
4. You JO, **Rafat M**, Auguste DT. Cross-Linked Collidosomes Exhibit pH-Induced Morphogenesis. American Institute of Chemical Engineers, Annual Meeting; 10/2011 (Oral presentation).
5. You JO, Almeda D, **Rafat M**, Auguste DT. Novel pH-Responsive Scaffolds with Self-Actuating Oxygen Transport. American Institute of Chemical Engineers, Annual Meeting; 10/2011 (Oral presentation).
6. **Rafat M**, Rotenstein L, You JO, and Auguste DT. Engineering Bioadhesive Polyvinyl Alcohol Hydrogels for Aneurysm Treatment. Biomedical Engineering Society, Annual Fall Meeting; 10/2011.
7. Hu J, Rotenstein L, **Rafat M**, Auguste DT. Engineering Endothelial Cell Adhesion Using Cooperative Alginate Hydrogels. Biomedical Engineering Society, Annual Fall Meeting; 10/2011.

8. You JO, Almeda D, **Rafat M**, Auguste DT. Novel pH-responsive Scaffolds with Self-Actuating Oxygen Transport. Biomedical Engineering Society, Annual Fall Meeting; 10/2011.
9. Warner HJ, Ye GJC, **Rafat M**, Auguste DT. Effect of Verapamil and Atorvastatin on Endothelial Cell Viability. Biomedical Engineering Society, Annual Fall Meeting; 10/2011.
10. **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 (Oral presentation).
11. **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 (Oral presentation).
12. You JO, **Rafat M**, Ye GJC and Auguste DT. Self-assembled three-dimensional conductive scaffolds for stimulated cell culture. American Institute of Chemical Engineers, Annual Meeting; 11/2010 (Oral presentation).
13. **Rafat M**, You JO and Auguste DT. Controlled Delivery of Programmable Colloidal Structures. Biomedical Engineering Society, Annual Fall Meeting; 10/2010 (Oral presentation).
14. **Rafat M**, Rotenstein L, You JO, and Auguste DT. Novel Bioactive Hydrogels for Aneurysm Treatment. Biomedical Engineering Society, Annual Fall Meeting; 10/2010.
15. You JO, **Rafat M**, Ye GJC and Auguste DT. Self-assembled three-dimensional conductive scaffolds for stimulated cell culture. Biomedical Engineering Society, Annual Fall Meeting; 10/2010.
16. You JO, **Rafat M** and Auguste DT. pH-Sensitive and Conductive Nanocomposite Hydrogels with Embedded Gold Nanoparticles. Institute of Biological Engineering Annual Conference, Speaker; 03/2010 (Oral presentation).
17. You JO, Ye GJC, **Rafat M** and Auguste DT.Self-Assembled Three-Dimensional Conductive Scaffolds for Stimulated Cell Culture. Institute of Biological Engineering Annual Conference; 03/2010 (Oral presentation).
18. You JO, **Rafat M** and Auguste DT. Conductive and pH-sensitive nanocomposite hydrogels with embedded gold nanoparticles. American Institute of Chemical Engineers, Annual meeting, Speaker; 11/2009 (Oral presentation).
19. You JO, **Rafat M** and Auguste DT. Self-assembled gold nanoparticles embedded in conductive and pH-sensitive nanocomposite hydrogels. Biomedial Engineering Society, Annual Fall Meeting, Speaker; 10/2009 (Oral presentation).
20. **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 (Oral presentation).
21. **Rafat M**, Heller M, Stone HA and Auguste DT. Investigation of Hemodynamics in Saccular Aneurysms. American Institute of Chemical Engineers, Annual Meeting; 11/2008 (Oral presentation).
22. **Rafat M**, Heller M, Stone HA and Auguste DT. Coupling Hemodynamics and Protein Regulation in Cerebral Saccular Aneurysms. American Institute of Chemical Engineers, Annual Meeting; 11/2008.
23. **Rafat M**, Heller M, Stone HA and Auguste DT. Correlating Hemodynamics and Protein Regulation in Intracranial Aneurysms. Biomedical Engineering Society, Annual Fall Meeting; 10/2008.

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.

Peer-Reviewed Publications

1. **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.
2. **Rafat M**, Rotenstein L, You JO, Auguste DT. Dual Functionalized PVA Hydrogels that Adhere Endothelial Cells Synergistically. *Biomaterials*. 2012; 33(15): 3880-3886.
3. You JO, **Rafat M**, Auguste DT. Cross-Linked, Heterogeneous Colloidosomes Exhibit pH-Induced Morphogenesis. *Langmuir*. 2011; 27(18): 11282-11286.
4. 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.*
5. **Rafat M**, Raad DR, Rowat AC and Auguste DT. Fabrication of Reversibly Adhesive Fluidic Devices using Magnetism. *Lab on a Chip*. 2009; 9(20): 3016-3019.
6. **Rafat M**, Fong KW, Goldsipe A, Stephenson BC, Coradetti ST, Sambandan TG, Sinskey AJ and Rha CK. Association (Micellization) and Partitioning Aglycon Triterpenoids. *Journal of Colloid and Interface Science*. 2008; 325(2): 324-330.

References

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