

SAMIRA M. AZARIN

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EDUCATION

University of Wisconsin**Madison, WI**Doctor of Philosophy in Chemical Engineering, *December 2011*

Minor: Science and Technology Studies

Massachusetts Institute of Technology**Cambridge, MA**Bachelor of Science in Chemical Engineering, *June 2006***FELLOWSHIPS AND AWARDS**

- Baxter Young Investigator Award, *2013*
- National Science Foundation Graduate Research Fellowship, *2007-2010*
- Ronald A. Ragatz Outstanding Teaching Assistant Award, *2008*
- Interdisciplinary Stem Cell Fellowship, UW-Madison Regenerative Medicine and Stem Cell Cluster, *2007*

RESEARCH EXPERIENCE

Northwestern University, Dept. of Chemical and Biological Engineering**Evanston, IL****Postdoctoral Fellow****Research Advisors: Lonnie D. Shea and Jacqueline S. Jeruss**

- Developed biomaterial scaffolds to engineer a pre-metastatic niche in order to recruit and detect metastatic breast cancer cells *in vivo*
- Studied the role of extracellular matrix organization in driving colon cancer progression (*January 2012-Present*)

UW-Madison, Department of Chemical and Biological Engineering**Madison, WI****Graduate Research Fellow****Research Advisors: Sean P. Palecek and Juan J. de Pablo****Dissertation Title: *Engineering Processes to Regulate Growth and Differentiation of Human Pluripotent Stem Cells***

- Evaluated the effects of modulating intercellular interactions on growth, self-renewal and cardiac differentiation of human pluripotent stem cells and elucidated the molecular mechanisms governing these effects.
- Developed a novel method for the differentiation of human pluripotent stem cells into endothelial cells specific to the blood-brain barrier. (*September 2006-December 2011*)

MIT, Department of Chemical Engineering**Cambridge, MA****Undergraduate Research Assistant****Research Advisors: Paula T. Hammond and Robert S. Langer**

- Developed novel polymer-based drug delivery systems to selectively target human prostate cancer cells. (*June 2005-June 2006*)

Amgen Inc.**Thousand Oaks, CA****Intern, Process Development Department**

- Developed a computer program to evaluate parameters in reactor scale-up from pilot to manufacturing processes.
- Determined the cause of precipitation in held media and investigated its toxic effect on CHO cells in shaker flasks. (*Summer 2004*)

**MIT, Department of Chemical Engineering
Undergraduate Research Assistant
Research Advisor: Jean-Francois Hamel**

Cambridge, MA

- Investigated the effect of simulated microgravity conditions on the production of monoclonal antibodies in IB4 cells.
- Optimized production of MethA tumor cells in twenty-liter bioreactors. Developed roller bottle cell culture process for SM-1 cell line. (*January 2003-June 2004*)

TEACHING EXPERIENCE

University of Wisconsin

Madison, WI

- Delta Certificate in Research, Teaching, and Learning (*Completed March 2013*)
- Instructor: Thermodynamics of Mixtures (*Spring 2011*)
- Instructor: Introduction to Society's Engineering Grand Challenges (*Fall 2010*)
- Teaching Assistant: Process Synthesis (*Fall 2008*)
- Teaching Assistant: Mass Transfer Operations (*Fall 2007*)

LEADERSHIP AND SERVICE

University of Wisconsin

Madison, WI

- Undergraduate research mentor: Heidi M. Mielke (*September 2008–May 2009*), Janice M. Almodovar (*Summer 2010*), Elise A. Larson (*September 2008-May 2011*)
- Chemical Engineering Graduate Society: President (*September 2007-September 2008*)
- American Society for Engineering Education Student Chapter: President (*September 2007-May 2009*)
- NSF CIRTl's Delta Program, UW-Madison: Steering Committee Member (*September 2007-December 2010*)
- Various outreach activities: PEOPLE Program, WiCell Summer Science Camp, Science Expeditions, Engineering Expo, College for Kids (*July 2007-July 2011*)

Northwestern University

Evanston, IL

- Undergraduate research mentor: Adam R. Morabito (*April 2012–Present*), Eric J. Jiang (*June 2012-Present*), Yinying Ren (*June 2012-Present*), Linnette Figueroa (*Summer 2012*)

PUBLICATIONS

1. **Azarin SM**, Yi J, Gower RM, Aguado BA, Sullivan ME, Goodman AG, Jiang EJ, Rao SS, Ren Y, Backman V, Jeruss JS, and LD Shea. "An *in vivo* sensor for detection of metastasis." *Under Review at Nature*.
2. Gower RM, Boehler RM, **Azarin SM**, Ricci CF, Leonard JN, and LD Shea. "Modulation of leukocyte infiltration and phenotype in microporous tissue engineering scaffolds via vector induced IL-10 expression." *Under Review at Biomaterials*.
3. Lippmann ES, Al-Ahmad A, **Azarin SM**, Palecek SP, and EV Shusta. "A retinoic acid-enhanced, multicellular human blood-brain barrier model derived from stem cell sources." *Under Review at Proc Natl Acad Sci USA*.
4. Lian, X, Zhang J, **Azarin SM**, Zhu K, Hazeltine LB, Bao X, Hsiao C, Kamp TJ, and SP Palecek. "Directed cardiomyocyte differentiation from human pluripotent stem cells by modulating Wnt/ β -catenin signaling under fully defined conditions." *Nat Protoc*. 8(1):162-75. 2013.
5. Lippmann ES*, **Azarin SM***, Kay JE, Nessler RA, Wilson HK, Palecek SP, and Shusta EV. "Human blood-brain barrier endothelial cells derived from pluripotent stem cells." *Nat Biotechnol*. 30(8):783-91. 2012.

*Equal contributions

- Lian X, Hsiao C, Wilson G, Zhu K, Hazeltine LB, **Azarin SM**, Raval KK, Zhang J, Kamp TJ, and Palecek SP. "Robust cardiomyocyte differentiation from human pluripotent stem cells via temporal modulation of canonical Wnt signaling." *Proc Natl Acad Sci USA*. 109(27):E1848-57. 2012.
- Azarin SM**, Larson EA, Almodovar JM, de Pablo JJ, and Palecek SP. "Effects of 3-D microwell culture on growth and metabolism of human embryonic stem cells." *Biotechnol Appl Biochem*. 59(2):88-96. 2012.
- Azarin SM**, Lian X, Larson EA, Mielke HM, de Pablo JJ, and Palecek SP. "Modulation of Wnt/ β -catenin signaling in human embryonic stem cells using a 3-D microwell array." *Biomaterials*. 33(7):2041-9. 2012.
- Broderick AH, **Azarin SM**, Buck ME, Palecek SP, and Lynn DM. "Fabrication and selective functionalization of amine-reactive polymer multilayers on topographically patterned microwell cell culture arrays." *Biomacromolecules*. 12(6):1998-2007. 2011.
- Azarin SM** and Palecek SP. "Matrix revolutions: a trinity of defined substrates for long-term expansion of human ESCs." *Cell Stem Cell*. 7(1):7-9. 2010.
- Azarin SM**, and Palecek SP. "Development of scalable culture systems for human embryonic stem cells." *Biochem Eng J*. 48(3):378-84. 2010.
- Mohr JC, Zhang J, **Azarin SM**, Soerens AG, de Pablo JJ, Thomson JA, Lyons GE, Palecek SP, and Kamp TJ. "The microwell control of embryoid body size in order to regulate cardiac differentiation of human embryonic stem cells." *Biomaterials*. 31(7):1885-93. 2010.
- Metallo CM, **Azarin SM**, Moses LE, Ji L, de Pablo JJ, and Palecek SP. "Human embryonic stem cell-derived keratinocytes exhibit an epidermal transcription program and undergo epithelial morphogenesis in engineered tissue constructs." *Tissue Eng Part A*. 16(1):213-23. 2010.
- Metallo CM, **Azarin SM**, Ji L, de Pablo JJ, and Palecek SP. "Engineering tissue from human embryonic stem cells." *J Cell Mol Med*. 12(3):709-29. 2008.
- Wood KC, **Azarin SM**, Arap W, Pasqualini R, Langer R, and Hammond PT. "Tumor-targeted gene delivery using molecularly engineered hybrid polymers functionalized with a tumor-homing peptide." *Bioconjug Chem*. 19(2):403-5. 2008.

PATENTS

- Lippmann ES, **Azarin SM**, Palecek SP, and Shusta EV. "Retinoic acid enhanced human stem cell derived blood brain barrier model," US Patent Application No. 61/724072, Filed November 8, 2012.
- Shea LD, **Azarin SM**, Gower RM, and Jeruss JJ. "Synthetic scaffolds for metastasis detection," US Patent Application No. 61/700703, Filed September 13, 2012.
- Lippmann ES, **Azarin SM**, Palecek SP, and Shusta EV. "Human blood-brain barrier endothelial cells derived from pluripotent stem cells and blood-brain barrier model thereof," US Patent Application No. 13/174977, Filed June 8, 2011.
- Zhang J, Wilson GF, **Azarin SM**, Lian X, Palecek SP, and Kamp TJ. "Cardiac differentiation of human pluripotent stem cells under defined conditions using matrix overlay methods," US Patent Application No. 12/946019, Filed November 15, 2010.

PRESENTATIONS

- Azarin SM**, Gower RM, Aguado BA, Yi J, Jeruss JS, Backman V, and Shea LD. "Development of an *in vivo* metastasis sensor using biomaterial scaffolds." Oral presentation at the annual meeting of the American Institute of Chemical Engineers (AIChE), San Francisco, CA (November 2013).

2. **Azarin SM**, Gower RM, Aguado BA, Yi J, Jeruss JS, Backman V, and Shea LD. "Biomaterial scaffolds for early detection of breast cancer metastasis." Oral presentation at the annual meeting of the Biomedical Engineering Society (BMES), Seattle, WA (*September 2013*).
3. **Azarin SM**, Gower RM, Aguado BA, Jeruss JS, and Shea LD. "Biomaterial scaffolds to engineer a pre-metastatic niche." Poster presented at the American Association for Cancer Research (AACR) Special Conference on Tumor Invasion and Metastasis, San Diego, CA (*January 2013*).
4. **Azarin SM**. "The crosstalk between tumor progression and the cancer cell microenvironment." Invited talk, Robert H. Lurie Comprehensive Cancer Center Mini-Symposium on The Role of Alterations in the Connective Tissue Matrix in Carcinogenesis, Northwestern University, Evanston, IL (*October 2012*).
5. **Azarin SM**, Lian X, Larson EA, de Pablo JJ, and Palecek SM. "Modulation of Wnt/ β -catenin signaling in human embryonic stem cells using a 3-D microwell array system." Oral presentation at the annual meeting of the American Institute of Chemical Engineers (AIChE), Minneapolis, MN (*September 2011*).
6. **Azarin SM**. "Engineering processes for efficient production of functional cardiomyocytes from human pluripotent stem cells." Invited talk, Department of Chemical and Biological Engineering, University of Wisconsin- Madison, Madison, WI (*April 2011*).
7. **Azarin SM**, Mielke HM, Larson EA, de Pablo JJ, and Palecek SP. "Effects of 3-D microwell confinement on Wnt/ β -catenin signaling in human embryonic stem cells." Oral presentation at the annual meeting of the American Chemical Society (ACS), Anaheim, CA (*March 2011*).
8. **Azarin SM**, Lippmann ES, Shusta EV, and Palecek SP. "Human blood-brain barrier endothelial cells derived from pluripotent stem cells." Poster presented at the Stem Cells in Development, Tissue Homeostasis and Disease Keystone Symposium, Santa Fe, NM (*February 2011*).
9. **Azarin SM**, Mielke HM, Larson EA, de Pablo JJ, and Palecek SP. "Effects of 3-D microwell confinement on Wnt signaling in human embryonic stem cells." Poster presented at the annual meeting of the International Society for Stem Cell Research (ISSCR), San Francisco, CA (*June 2010*).
10. **Azarin SM**, Mielke HM, de Pablo JJ, and Palecek SP. "Effects of microwell confinement on self-renewal and differentiation of human embryonic stem cells." Poster presented at the annual Hilton Head Workshop on Regenerative Medicine, Hilton Head, SC (*March 2009*).
11. **Azarin SM**, Ferrier N, Kennedy SM, Klingenberg D, Masters K, McMahon KD, Russell J, and Hagness SC. "Work in Progress: A first-year introduction-to-engineering course on society's engineering grand challenges." Paper presented at the annual ASEE/IEEE Frontiers in Education Conference, Saratoga Springs, NY (*October 2008*).
12. **Azarin SM** and Hogle LF. "Navigating the regulatory networks governing human embryonic stem cell research from the lab bench to the clinic." Poster presented at the annual World Stem Cell Summit, Madison, WI (*September 2008*).
13. **Azarin SM**, and Hogle LF. "Benchtop to bedside and back again? What stem cell researchers need to know about the governance of basic and translational research." UW-Madison Stem Cell Campus Laboratory Meeting, Madison, WI (*December 2007*).