PAMELA K. KREEGER, Ph.D.

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PROFESSIONAL EXPERIENCE

Assistant Professor	Department of Biomedical Engineering, 2009 – present Research focus: Experimental and computational analysis of cell signaling mechanisms (in particular endocrine signaling and the relationship of inflammation to disease), with a focus on women's health (e.g., breast cancer, ovarian cancer, endometriosis).
Post-Doctoral Fellow	Biological Engineering, Massachusetts Institute of Technology, 2005-2008 Research topic: Experimental and computational investigations of RAS signaling networks in apoptosis utilizing both *in vitro* and *in vivo* systems Post-doctoral advisor: Douglas A. Lauffenburger
Ph.D.	Chemical Engineering, Northwestern University, June 2005 Thesis title: Alginate Matrices for the *in vitro* Culture of Ovarian Follicles: Regulation by Extracellular Matrix and Follicle Stimulating Hormone Thesis advisor: Lonnie D. Shea
Intern	Fermi National Accelerator Laboratory, Summers 1999 – 2000 Beams Division, mechanical engineering support
B.S.	Chemistry, Valparaiso University, May 2000 Minors: Biology, Mathematics, and History *Summa cum laude*

TEACHING EXPERIENCE

BME 201	Biomedical Engineering Design	Spring 2009
BME 510	Tissue Engineering	Fall 2009
BME 601	Tissue Engineering Lab	Fall 2009

PROGRAM AFFILIATIONS

Biomedical Engineering Center for Translational Research
Cellular and Molecular Biology Program
Computation and Informatics in Biology and Medicine
Endocrinology and Reproductive Physiology Program
Genomic Sciences Training Program
Molecular and Environmental Toxicology Center
Molecular Biosciences Training Grant Program
University of Wisconsin Comprehensive Cancer Center

FELLOWSHIPS AND AWARDS

NSF CAREER Award	2010
Searle Scholars Nominee	2009
American Cancer Society Postdoctoral Fellowship	2008
Anna Fuller Fund Fellowship in Molecular Oncology	2006
Northwestern University Fellow	2004-2005
Alpha Lambda Delta Graduate Fellowship	2004-2005
USDA Merit Travel Fellowship Award	2004
Gramm Travel Fellowship Award	2004
Metz Scholarship in Reproductive Biology	2002
Student Travel Award, Biomedical Engineering Society	2002
National Defense Science and Engineering Graduate Fellowship	2001-2004
National Science Foundation Fellowship (declined)	2001
Cabell Fellowship, Northwestern University	2000-2001

CURRENT RESEARCH FUNDING

CAREER: Quantitative Analysis of Endocrine Disruptin Chemicals, *National Science Foundation*
Role: Principal Investigator $400,000 03/2010-02/2015

Multi-cellular *in vitro* Culture System to Study Endometriosis, *Graduate School Research Committee Grant, University of Madison-Wisconsin*
Role: Principal Investigator $47,431 07/2010 - 06/2011

PREVIOUS RESEARCH FUNDING

Equipment Grant: Luminescent Plate Reader, *Turner BioSystems Instrument Grant Program*
Role: Principal Investigator

Systems Biology Analysis of Nuclear and Membrane-Initiated Signaling by Endocrine Disrupting Chemicals, *MIT's Center for Environmental Health Sciences Pilot Project*
Role: Co-Investigator $25,000 05/2007 - 04/2008

PUBLICATIONS

1. P.K. Kreeger, Y. Wang, K.M. Haigis, D.A. Lauffenburger. "Integration of Multiple Signaling Pathway Activities Resolves K-RAS / N-RAS Mutation Paradox in Colon Epithelial Cell Response to Inflammatory Cytokine Stimulation." DOI 10.1039/ b925935j.

2. P.K. Kreeger, D.A. Lauffenburger. "Cancer Systems Biology: a Network Modeling Perspective." *Carcinogenesis*. 31, p 2-8, 2010.

3. P.K. Kreeger, R. Mandhana, S.K. Alford, K.M. Haigis, D.A. Lauffenburger. "RAS mutations affect tumor necrosis factor-induced apoptosis in colon carcinoma cells via ERK-modulatory negative and positive feedback circuits along with non-ERK pathway effects." *Cancer Research*. 69, p 8191-8199, 2009.

4. M. Xu, P.K. Kreeger, L.D. Shea, and T.K. Woodruff. "Tissue Engineered Follicles Produce Live, Fertile Offspring." *Tissue Engineering*. 12, p 2739-2746, 2006. (highlighted in *Nature Medicine*, Nov. 2008, p 1178 and p 1182)

5. S.K. Bristol-Gould, P.K. Kreeger, C.G. Selkirk, S.M. Kilen, K.E. Mayo, L.D. Shea, and T.K. Woodruff. "Fate of the Initial Follicle Pool: Empirical and Mathematical Evidence Supporting its Sufficiency for Adult Fertility." *Developmental Biology*. 298, p 149-154, 2006. (co-first author, highlighted in *Nature Medicine*, Nov. 2008, p 1190)

6. S.K. Bristol-Gould, P.K. Kreeger, C.G. Selkirk, S.M. Kilen, R.W. Cook, J.L. Kipp, L.D. Shea, K.E. Mayo, and T.K. Woodruff. "Postnatal Regulation of Germ Cells by Activin: the Establishment of the Initial Follicle Pool." *Developmental Biology.* 298, p 132-148, 2006. (co-first author, highlighted in *Nature Medicine*, Nov. 2008, p 1190)

7. P.K. Kreeger, J.W. Deck, T.K. Woodruff, and L.D. Shea. "The *In Vitro* Regulation of Ovarian Follicle Development Using Alginate-Extracellular Matrix Gels." *Biomaterials*. 27, p 714-723, 2006.

8. P.K. Kreeger, N.N. Fernandes, T.K. Woodruff, and L.D. Shea. "Regulation of Mouse Follicle Development by Follicle Stimulating Hormone in a Three-Dimensional *In Vitro* Culture System is Dependent on Follicle Stage and Dose." *Biology of Reproduction*. 73, p 942-950, 2005.

9. P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Murine Granulosa Cell Morphology and Function are Regulated by a Synthetic Arg-Gly-Asp Matrix." *Molecular and Cellular Endocrinology*. 205, p 1-10, 2003.

10. P.K. Kreeger and L.D. Shea. "Scaffolds for Directing Cellular Responses and Tissue Formation." In Biomimetic Materials and Design: Interactive Biointerfacial Strategies, Tissue Engineering and Drug Delivery. Marcel Dekker, Inc, 2002.

11. A.G. Cook and P.K. Kreeger. "Reaction of Morpholine with t-Butyl Acetoacetate: A Study of Kinetic vs. Thermodynamic Control, Product Identification, and Molecular Modeling." *Journal of Chemical Education*. 77, p 90-92, 2000.

INVITED PRESENTATIONS

1. P.K. Kreeger. "Systems Biology Analysis of Cellular Signaling: Extension to the ER Network." University of Wisconsin School of Medicine and Public Health, Endocrine Grand Rounds. Jan 2010.

2. P.K. Kreeger. "Experimental and Computational Analysis of Cancer Signaling Networks." University of Michigan, Department of Biomedical Engineering Seminar Series. Apr. 2009.

3. P.K. Kreeger. "Biomedical Engineering and Cancer." Valparaiso University, Department of Chemistry Seminar Series. Mar. 2009.

4. P.K. Kreeger. "Biological Engineering Approaches for Women's Health." *Moving Into the Future: New Dimensions and Strategies for Women's Health Research*. St. Louis, MO. Mar. 2009.

5. P.K. Kreeger. "Analysis of Cancer Signaling Networks." University of Wisconsin-Madison, Department of Chemical and Biological Engineering Seminar Series. Feb. 2009.

6. P.K. Kreeger, D.A. Lauffenburger. "Validation of Multiplexing Technology for Systems Biology Approaches." Merrimack Pharmaceuticals. Cambridge, MA. Apr. 2007.

7. P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Alginate Matrices for the *In Vitro* Culture of Immature Murine Ovarian Follicles." *Midwest Microscopy and Microanalysis Society*, Evanston, IL. Mar. 2004.

8. P.K. Kreeger and L.D. Shea. "Tissue Engineering: General Principles and Application in Ovarian Biology." Valparaiso University, Department of Chemistry Seminar Series. Mar. 2003.

PRESENTATIONS

1. P.K. Kreeger, K.M. Haigis, T. Jacks, D.A. Lauffenburger. "Experimental and Computational Analysis of RAS Mutation Effects in Apoptosis Signaling." *American Institute of Chemical Engineers*. Salt Lake City, UT. Nov. 2007.

2. P.K. Kreeger, K.M. Haigis, T. Jacks, D.A. Lauffenburger. "Systems Biology Analysis of RAS Mutation Effects in Apoptosis." *Biomedical Engineering Society*. Los Angeles, CA. Sept. 2007.

3. E.R. West, P.K. Kreeger, J.W. Deck, T.K. Woodruff, and L.D. Shea. "Alginate Hydrogel Mechanics Regulate Follicle Growth in a Three-Dimensional *In Vitro* Culture System." *American Institute of Chemical Engineers*. Cincinnati, OH. Nov. 2005.

4. E.R. West, P.K. Kreeger, J.W. Deck, T.K. Woodruff, and L.D. Shea. "Alginate Hydrogel Mechanics Regulate Follicle Growth in a Three-Dimensional *In Vitro* Culture System." *Northwestern University Reproductive Mini-Symposium*. Evanston, IL. Oct. 2005.

5. P.K. Kreeger, N.N. Fernandes, J.W. Deck, T.K. Woodruff, and L.D. Shea. "Extracellular Matrix Regulation of Follicle Development in an *In Vitro* Culture System." *European Society for Human Reproduction Campus: Mammalian Oogenesis and Folliculogenesis*. Paris, France. Mar. 2005.

6. P.K. Kreeger, N.N. Fernandes, T.K. Woodruff, and L.D. Shea. "Alginate-Extracellular Matrix Gels to Promote Maturation of Ovarian Follicles." *American Institute of Chemical Engineers*. Austin, TX. Nov. 2004.

7. K.E. Mayo, S.K. Bristol-Gould, J.L. Kipp, J. Weck, S.M. Kilen, A. Burkart, C. Matulis, P.K. Kreeger, and T.K. Woodruff. "Regulation and Actions of Inhibin and Activin in the Ovary." *Serono Ovarian Workshop*. Vancouver, Canada. July 2004.

8. T.K. Woodruff, P.K. Kreeger, C.B. Berkholtz, J. Roh, S. Kalra, J. Zhang, R. Kazer, and L.D. Shea. "TGFβ Family Members that Impact on Follicle Development and Oocyte Growth." *Updates in Infertility Treatment*, Marco Island, FL. Jan. 2004.

9. P.K. Kreeger, C.B. Berkholtz, T.K. Woodruff, and L.D. Shea. "Alginate Matrices for the Culture of Immature Murine Ovarian Follicles." *American Institute of Chemical Engineers*, San Francisco, CA. Nov. 2003.

10. P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Collagen Type I Improves Survival and Stimulates Granulosa-Oocyte Complex Growth *In Vitro*." *Northwestern University Reproductive Mini-Symposium*. Evanston, IL. Oct. 2003. Constance Campbell Award.

11. P.K. Kreeger, C.B. Berkholtz, T.K. Woodruff, and L.D. Shea. "*In Vitro* Maturation of Granulosa-Oocyte Complexes in Synthetic Scaffolds." *Society for Biomaterials*. Reno, NV. Apr. 2003.

12. P.K. Kreeger, C.B. Berkholtz, T.K. Woodruff, and L.D. Shea. "A Novel System for *In Vitro* Culture of Immature Granulosa-Oocyte Complexes." *Northwestern University Reproductive Mini-Symposium*. Evanston, IL. Oct. 2002. Constance Campbell Award.

13. S.A. Pangas, H. Saudye, P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Hydrogel Scaffolds for the Culture of Primary Ovarian Follicles." *American Institute of Chemical Engineers*. Reno, NV. Nov. 2001.

POSTER SESSIONS

1. P.K. Kreeger, R. Mandhana, T. Jacks, K.M. Haigis, M. Yaffe, D.A. Lauffenburger. "Autocrine Signaling Loops are Altered by Mutations in Different RAS Isoforms." *American Association for Cancer Research: Chemical and Biological Aspects of Inflammation and Cancer*. Ko Olina, Oahu, HI. Oct. 2008. Aflac, Inc. Scholar-in-Training award.

2. P.K. Kreeger, R. Mandhana, T. Jacks, K.M. Haigis, D.A. Lauffenburger. "Autocrine Signaling Loops are Altered by Mutations in Different RAS Isoforms." *Biomedical Engineering Society*. St. Louis, MO. Oct. 2008.

3. P.K. Kreeger, R. Mandhana, T. Jacks, K.M. Haigis, D.A. Lauffenburger. "Autocrine Signaling Loops: Impact of Different RAS Isoforms." *Systems Biology of Human Disease*. Boston, MA. Oct. 2008. Selected for oral presentation briefs.

4. P.K. Kreeger. "Systems Biology Approach to Endocrine Signaling." *American Institute of Chemical Engineers*. Salt Lake City, UT. Nov. 2007.

5. P.K. Kreeger, K.M. Haigis, R. Mandana, T. Jacks. D.A. Lauffenburger. "Systems Biology Analysis of RAS Mutation Effects in Apoptosis." *Engineering Cell Biology – the Cell in Context.* Cambridge, MA. Aug. 2007.

6. P.K. Kreeger, K.M. Haigis, D.A. Lauffenburger, T. Jacks. "Integrating Systems Biology and Mouse Models of Colon Cancer through the Study of N-Ras." *Integrative Cancer Biology Program & Mouse Models of Human Cancer Joint Meeting*. Bethesda, MD. Dec. 2006.

7. P.K. Kreeger, S.K. Bristol-Gould, C.G. Selkirk, S.M. Kilen, K.E. Mayo, L.D. Shea, and T.K. Woodruff. "The Fate of the Initial Follicle Pool: Empirical and Mathematical Evidence Supporting its Sufficiency for Fertility." *Endocrine Society.* Boston, MA. June 2006.

8. S.K. Bristol-Gould, P.K. Kreeger, C.G. Selkirk, S.M. Kilen, R.W. Cook, J.L. Kipp, L.D. Shea, K.E. Mayo, and T.K. Woodruff. "Postnatal Regulation of Germ Cells by Activin: Establishment of and Optimal and Necessary Quantity of Follicles Prior to Puberty." *Endocrine Society.* Boston, MA. June 2006.

9. M. Xu, P.K. Kreeger, L.D. Shea, and T.K. Woodruff. "Tissue Engineered Follicles Produce Live, Fertile Offspring." *Endocrine Society.* Boston, MA. June 2006.

10. S.K. Bristol-Gould, P.K. Kreeger, C.G. Hutten, S.M. Kilen, R.W. Cook, J.L. Kipp, L.D. Shea, K.E. Mayo, T.K. Woodruff, "Postnatal Regulation of Germ Cells by Activin." *Northwestern University Reproductive Mini-Symposium*. Evanston, IL. Oct. 2005.

11. P.K. Kreeger, J.W. Deck, N.N. Fernandes, T.K. Woodruff, and L.D. Shea. "Reconstructed Basement Membrane Regulation of Murine Follicle Maturation in a Three-Dimensional Culture System." *Society for the Study of Reproduction*. Vancouver, Canada. Aug. 2004. USDA Merit Award.

12. P.K. Kreeger, N.N. Fernandes, C.B. Berkholtz, T.K. Woodruff, and L.D. Shea. "Gonadotropin Supplementation Enhances Development for Murine Preantral Follicles Cultured in a Three-Dimensional System." *Society for the Study of Reproduction*. Vancouver, Canada. Aug. 2004.

13. P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Reconstructed Basement Membrane and Gonadotropin Regulation of Murine Follicle Maturation in a Three-Dimensional Culture System." *Serono Ovarian Workshop*. Vancouver, Canada. July 2004. Cornelia Channing Award.

14. P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Alginate Scaffolds for the Culture of Ovarian Follicles in a Stage Specific Manner." *American Institute of Chemical Engineers*. Austin, TX. Nov. 2004.

15. P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Three-Dimensional Culture of Murine Follicles *In Vitro*: Extracellular Matrix Effects." *Gordon Research Conference: Reproductive Tract Physiology*, New London, CT. June 2004. Gramm Award.

16. P.K. Kreeger, C.B. Berkholtz, T.K. Woodruff, and L.D. Shea. "A Novel Three-Dimensional System for the *In Vitro* Culture of Immature Murine Ovarian Follicles." *Society for the Study of Reproduction*. Cincinnati, OH. July 2003.

17. C.B. Berkholtz, P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Follicle Size Increases in a Synthetic Stroma." *Northwestern University Reproductive Mini-Symposium*. Evanston, IL. Oct. 2002.

18. P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Alginate Matrices to Regulate Granulosa Cell Morphology and Steroid Production." *Biomedical Engineering Society*. Houston, TX. Oct. 2002. Student Travel Award.

19. P.K. Kreeger, T.K. Woodruff, and L.D. Shea. "Synthetic Scaffolds to Regulate Granulosa Cell Adhesion and Spreading." *Northwestern University Reproductive Mini-Symposium*. Evanston, IL. Oct. 2001. Constance Campbell Award.

ACTIVITIES AND UNIVERSITY SERVICE

Valparaiso University Chemistry Alumni Advisory Board	2009-present
UW-Madison BME Graduate Recruitment Co-Chair	2009-present
Organizing Committee, ICBP Junior Investigator National Meeting	2009
MIT Cell Decision Processes Center	2005-2008
MIT Integrative Cancer Biology Program	2005-2008
Faculty Search Committee, Northwestern Department of Chemical and Biological Engineering	2002, 2004
Graduate Recruitment Committee, Northwestern Department of Chemical and Biological Engineering	2003
Co-President of Chemical Engineering Graduate Student Fellowship	2001

PROFESSIONAL SOCIETIES

American Society for Engineering Education (ASEE)
Biomedical Engineering Society (BMES)

GRADUATE STUDENTS MENTORED

Dan Tian	2009 – present
Rexxi Prasasya	2009 – present

UNDERGRADUATE STUDENTS MENTORED

Tyler Vovos	Undergraduate in Biomedical Engineering, 2010 - present
Katie Pollock	Undergraduate in Biomedical Engineering, 2009 – present
Rexxi Prasasya	Undergraduate in Biomedical Engineering, 2009
Brandon Ingalls	Undergraduate in Biology, 2009
Roli Mandhana	Undergraduate in Biological Engineering, 2007 - 2008
Amy Marshall	Undergraduate in Biology, 2007 - 2008
Rebecca Kusko	Undergraduate in Biology, summer 2006
Jason Deck	Undergraduate in Biomedical Engineering, 2003-2005
Stephen Sung	Undergraduate in Chemical Engineering, 2002 - 2003
Amy Lewis	Undergraduate in Chemical Engineering, 2001 - 2002