

# PAMELA K. KREEGER, Ph.D.

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Department of Biomedical Engineering  
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## PROFESSIONAL EXPERIENCE

- Assistant Professor Department of Biomedical Engineering, 2009 – present  
Research focus: Experimental and computational analysis of cell signaling mechanisms and cell-cell interactions, with a focus on women's health (e.g., 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 2009-2011
BME 601	Tissue Engineering Lab	Fall 2009-2010

## PROGRAM AFFILIATIONS

Biomedical Engineering Center for Translational Research  
Biotechnology Training Program  
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 Training Grant  
Molecular Biosciences Training Grant Program  
University of Wisconsin Comprehensive Cancer Center

## FELLOWSHIPS AND AWARDS

NSF CAREER Award	2010
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

Graduate School Research Committee Grant, University of Wisconsin-Madison Analysis of Signaling Networks in Ovarian Cancer Role: Principal Investigator	07/2011 - 06/2012 \$48,251
NSF CBET-0951613 CAREER: Quantitative Analysis of Endocrine Disrupting Chemicals Role: Principal Investigator	03/2010-02/2015 \$406,000
NIH R01-GM099031 Combinatorial Analysis of Migration Stimuli for Enhanced Wound Healing Role: Co-Investigator (PI: KS Masters)	09/2011-04/2015 \$1,124,240
American Cancer Society Institutional Research Grant Microscale Culture to Enable the Study of Ovarian Cancer-Macrophage Interactions Role: Principal Investigator	09/2011-08/2012 \$29,549

## PREVIOUS RESEARCH FUNDING

Graduate School Research Committee Grant, University of Madison-Wisconsin Multi-cellular <i>in vitro</i> Culture System to Study Endometriosis Role: Principal Investigator	07/2010 - 06/2011 \$47,431
Turner BioSystems Instrument Grant Program – Luminescent Plate Reader Role: Principal Investigator	
American Cancer Society PF-08-026-01-CCG Systems Biology Analysis of TNF $\alpha$ and RAS Cross-Talk <i>in vivo</i> and <i>in vitro</i> Role: Trainee	01/2008 - 12/2008 \$44,000
MIT's Center for Environmental Health Sciences Pilot Project Systems Biology Analysis of Nuclear and Membrane-Initiated Signaling by Endocrine Disrupting Chemicals Role: Co-Investigator	05/2007 - 04/2008 \$25,000

## PUBLICATIONS

1. R.D. Prasasya, K. Vang, P.K. Kreeger. "A Multivariate Model of ErbB Network Composition Predicts Ovarian Cancer Cell Response to Canertinib." *Biotechnology and Bioengineering*. 109, p. 213-224, 2012.
2. R.D. Prasasya, D. Tian, P.K. Kreeger. "Analysis of Cancer Signaling Networks by Systems Biology to Develop Therapies." *Seminars in Cancer Biology*. 21, p. 200-206, 2011.
3. 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." *Integrative Biology*. 2, p 202-208, 2010.
4. P.K. Kreeger, D.A. Lauffenburger. "Cancer Systems Biology: a Network Modeling Perspective." *Carcinogenesis*. 31, p 2-8, 2010.
5. 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.
6. M. Xu, P.K. Kreeger, L.D. Shea, 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)
7. S.K. Bristol-Gould, P.K. Kreeger, C.G. Selkirk, S.M. Kilen, K.E. Mayo, L.D. Shea, 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)
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, 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)
9. P.K. Kreeger, J.W. Deck, T.K. Woodruff, L.D. Shea. "The *In Vitro* Regulation of Ovarian Follicle Development Using Alginate-Extracellular Matrix Gels." *Biomaterials*. 27, p 714-723, 2006.
10. P.K. Kreeger, N.N. Fernandes, T.K. Woodruff, 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.
11. P.K. Kreeger, T.K. Woodruff, 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.
12. P.K. Kreeger, 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.

13. A.G. Cook, 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. "Multivariate Modeling to Predict Drug Sensitivity in Ovarian Cancer." MathBio3: Modeling. Sept. 2011.
2. 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.
3. P.K. Kreeger. "Experimental and Computational Analysis of Cancer Signaling Networks." University of Michigan, Department of Biomedical Engineering Seminar Series. Apr. 2009.
4. P.K. Kreeger. "Biomedical Engineering and Cancer." Valparaiso University, Department of Chemistry Seminar Series. Mar. 2009.
5. 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.
6. P.K. Kreeger. "Analysis of Cancer Signaling Networks." University of Wisconsin-Madison, Department of Chemical and Biological Engineering Seminar Series. Feb. 2009.
7. P.K. Kreeger, D.A. Lauffenburger. "Validation of Multiplexing Technology for Systems Biology Approaches." Merrimack Pharmaceuticals. Cambridge, MA. Apr. 2007.
8. P.K. Kreeger, T.K. Woodruff, L.D. Shea. "Alginate Matrices for the *In Vitro* Culture of Immature Murine Ovarian Follicles." *Midwest Microscopy and Microanalysis Society*, Evanston, IL. Mar. 2004.
9. P.K. Kreeger, L.D. Shea. "Tissue Engineering: General Principles and Application in Ovarian Biology." Valparaiso University, Department of Chemistry Seminar Series. Mar. 2003.

## PRESENTATIONS

1. R.D. Prasasya, P.K. Kreeger. "Identification of a Multivariate ErbB Network Signature in Epithelial Ovarian Cancer." *Biomedical Engineering Society*. Hartford, CT. Oct. 2011.
2. 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.
3. 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.
4. E.R. West, P.K. Kreeger, J.W. Deck, T.K. Woodruff, 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.

5. E.R. West, P.K. Kreeger, J.W. Deck, T.K. Woodruff, 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.
6. P.K. Kreeger, N.N. Fernandes, J.W. Deck, T.K. Woodruff, 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.
7. P.K. Kreeger, N.N. Fernandes, T.K. Woodruff, L.D. Shea. "Alginate-Extracellular Matrix Gels to Promote Maturation of Ovarian Follicles." *American Institute of Chemical Engineers*. Austin, TX. Nov. 2004.
8. K.E. Mayo, S.K. Bristol-Gould, J.L. Kipp, J. Weck, S.M. Kilen, A. Burkart, C. Matulis, P.K. Kreeger, T.K. Woodruff. "Regulation and Actions of Inhibin and Activin in the Ovary." *Serono Ovarian Workshop*. Vancouver, Canada. July 2004.
9. T.K. Woodruff, P.K. Kreeger, C.B. Berkholtz, J. Roh, S. Kalra, J. Zhang, R. Kazer, L.D. Shea. "TGF $\beta$  Family Members that Impact on Follicle Development and Oocyte Growth." *Updates in Infertility Treatment*, Marco Island, FL. Jan. 2004.
10. P.K. Kreeger, C.B. Berkholtz, T.K. Woodruff, L.D. Shea. "Alginate Matrices for the Culture of Immature Murine Ovarian Follicles." *American Institute of Chemical Engineers*, San Francisco, CA. Nov. 2003.
11. P.K. Kreeger, T.K. Woodruff, 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.
12. P.K. Kreeger, C.B. Berkholtz, T.K. Woodruff, L.D. Shea. "*In Vitro* Maturation of Granulosa-Oocyte Complexes in Synthetic Scaffolds." *Society for Biomaterials*. Reno, NV. Apr. 2003.
13. P.K. Kreeger, C.B. Berkholtz, T.K. Woodruff, 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.
14. S.A. Pangas, H. Saudye, P.K. Kreeger, T.K. Woodruff, L.D. Shea. "Hydrogel Scaffolds for the Culture of Primary Ovarian Follicles." *American Institute of Chemical Engineers*. Reno, NV. Nov. 2001.

## POSTER SESSIONS

1. K. Z. Vang, R. Liu, K.S. Masters, P.K. Kreeger. "Partial Least Squares Regression Analysis of Protein Adsorption and 3T3 Cell Attachment to Nylon-3 Copolymers." 20th Annual National McNair Research Conference and Graduate Fair. Lake Geneva, WI. Nov. 2011.
2. G.J. Czaplowski, P.K. Kreeger. "Microfluidic Co-culture System to Study Soluble Factor Signaling in Epithelial Ovarian Cancer." *Biomedical Engineering Society*. Hartford, CT. Oct. 2011.
3. K. Pollock, P.K. Kreeger. "Characterization of Endometriotic Cell Behavior Using a 3D Culture Model." *UW Undergraduate Symposium*. Madison, WI. Apr. 2011.

4. R. Prasasya, K. Pollock, P.K. Kreeger. "Analysis of ErbB Inhibitor Sensitivity and ErbB Network Patterns in Epithelial Ovarian Cancer." *Biomedical Engineering Society*. Austin, TX. Oct. 2010.
5. M. Gnazzo, K. Pollock, R. Prasasya, P.K. Kreeger. "Signal Pathway Cross Talk Between the ErbB Receptor and IL-6 and IL-8 Cytokines in Ovarian Cancer Tumor Cells." *CIC/SROP Summer Research Conference*. Columbus, OH. July 2010.
6. 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.
7. 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.
8. 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.
9. P.K. Kreeger. "Systems Biology Approach to Endocrine Signaling." *American Institute of Chemical Engineers*. Salt Lake City, UT. Nov. 2007.
10. P.K. Kreeger, K.M. Haigis, R. Mandhana, 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.
11. 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.
12. P.K. Kreeger, S.K. Bristol-Gould, C.G. Selkirk, S.M. Kilen, K.E. Mayo, L.D. Shea, 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.
13. 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, T.K. Woodruff. "Postnatal Regulation of Germ Cells by Activin: Establishment of an Optimal and Necessary Quantity of Follicles Prior to Puberty." *Endocrine Society*. Boston, MA. June 2006.
14. M. Xu, P.K. Kreeger, L.D. Shea, T.K. Woodruff. "Tissue Engineered Follicles Produce Live, Fertile Offspring." *Endocrine Society*. Boston, MA. June 2006.
15. 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.
16. P.K. Kreeger, J.W. Deck, N.N. Fernandes, T.K. Woodruff, 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.

17. P.K. Kreeger, N.N. Fernandes, C.B. Berkholtz, T.K. Woodruff, 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.
18. P.K. Kreeger, T.K. Woodruff, 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.
19. P.K. Kreeger, T.K. Woodruff, 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.
20. P.K. Kreeger, T.K. Woodruff, 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.
21. P.K. Kreeger, C.B. Berkholtz, T.K. Woodruff, 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.
22. C.B. Berkholtz, P.K. Kreeger, T.K. Woodruff, L.D. Shea. "Follicle Size Increases in a Synthetic Stroma." *Northwestern University Reproductive Mini-Symposium*. Evanston, IL. Oct. 2002.
23. P.K. Kreeger, T.K. Woodruff, L.D. Shea. "Alginate Matrices to Regulate Granulosa Cell Morphology and Steroid Production." *Biomedical Engineering Society*. Houston, TX. Oct. 2002. Student Travel Award.
24. P.K. Kreeger, T.K. Woodruff, 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

UW-Madison Delta Program, Facilitator for Faculty Mentor Training	2010-present
Valparaiso University Chemistry Alumni Advisory Board	2009-present
UW-Madison CoE Women Faculty Mentoring Lunches Co-Chair	2009-present
UW-Madison BME Graduate Recruitment Committee	2009-2010
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 SERVICE

### Journal Reviews

1. *Biology of Reproduction*
2. *Bioinformatics*
3. *Biomaterials*
4. *Biotechnology and Bioengineering*
5. *Cellular and Molecular Bioengineering*

6. *Journal of Visualized Experiments*
7. *Macromolecular Bioscience*
8. *PLoS Computational Biology*
9. *Science*
10. *Tissue Engineering*

#### Additional Reviews

1. NSF Graduate Research Fellowship Program. 2010
2. BMES Annual Meeting Abstracts. "Systems Biology, Bioinformatics, and Computational Biology, Modeling of Biomolecules and their Interactions". 2010

#### Conference Service

1. Cellular Engineering and Modeling platform session. BMES Annual Meeting. Co-chair, 2011.
2. Systems Cell Biology platform session. BMES Annual Meeting. Co-chair, 2010.
3. Integrative Cancer Biology Program Junior Investigator National Meeting. Organizing Committee, 2009.

## PROFESSIONAL SOCIETIES

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

## GRADUATE STUDENTS MENTORED

Dan Tian, Biomedical Engineering (PhD)	2009 – present
Rexxi Prasasya, Biomedical Engineering (MS)	2009 – 2011
Danielle Bourgeois, Biomedical Engineering (PhD)	2010 – present
Greg Czaplowski, Biomedical Engineering (PhD)	2010 – present
Mary Regier, Biomedical Engineering (PhD, joint with Kristyn Masters)	2011 – present

## UNDERGRADUATE STUDENTS MENTORED

Sarah Dicker	Biomedical Engineering, 2012 – present
Kevin Beane	Biomedical Engineering, 2012 – present
Olivia Rice	Biomedical Engineering, 2012 - present
Hannah Pezzi	Biomedical Engineering, 2011 - present
Lauren Prusinski	CAREER program, summer 2011
Christie Rodriguez	SURE-REU program, summer 2011
Marika Xydes-Smith	IBS-SRP, summer 2011
Kang Vang	IBS-SRP (CIBM), summer 2011
Tyler Vovos	Biomedical Engineering, 2010
Megan Gnazzo	IBS-SRP, summer 2010
Valery Adorno Cruz	SURE-REU program, summer 2010
Katie Pollock	Biomedical Engineering, 2009 - 2011
Rexxi Prasasya	Biomedical Engineering, 2009
Brandon Ingalls	Biology, 2009
Roli Mandhana	Biological Engineering, 2007 - 2008
Amy Marshall	Biology, 2007 - 2008
Rebecca Kusko	Biology, summer 2006
Jason Deck	Biomedical Engineering, 2003 - 2005
Stephen Sung	Chemical Engineering, 2002 - 2003
Amy Lewis	Chemical Engineering, 2001 - 2002