PAMELA K. KREEGER, PH.D.

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EDUCATION

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
B.S.	Chemistry, Valparaiso University, 2000 *Summa cum laude*
Summer Program	Frontiers in Reproduction, Marine Biological Laboratory, 2002

RESEARCH EXPERIENCE

8/2005 – present	Post-doctoral Fellow, Biological Engineering Division, MIT Principal Investigator: Douglas A. Lauffenburger *Research Areas:* Quantitative investigations, both experimental and computational, of malignant transformation of the ovarian surface epithelium in ovarian cancer.
9/2000 – 7/2005	Chemical Engineering Graduate Student, Northwestern University Principal Investigator: Lonnie D. Shea *Research Areas*: Development of a three-dimensional system for *in vitro* ovarian follicle culture that allows for the examination of fundamental questions about the roles of cell-cell and cell-matrix interactions in follicle development.
5/1999-8/1999 and 5/2000-8/2000	Mechanical Engineering Intern, Fermi National Accelerator Laboratories Supervisor: Maurice Ball *Research Areas*: Examination of the causes of copper corrosion in a low conductivity water cooling system. This work resulted in the implementation of instrumentation to monitor conditions for determining maintenance needs.
5/1998-9/1998	Undergraduate Research Assistant,Valparaiso University Principal Investigator: A. Gilbert Cook *Research areas*: Synthesis and characterization of enamines and ketoamides to examine the role of thermodynamic versus kinetic control in chemical reactions.
5/1997-9/1997	Undergraduate Research Assistant,Valparaiso University Principal Investigator: Michael Bradley *Research areas*: Characterization of the dissolution of enteric coatings using fluorescence spectroscopy.

TEACHING EXPERIENCE

9/2003-12/2003	Teaching Apprenticeship Program, Undergraduate Equilibrium Separations, Northwestern University
4/2002-6/2002	Teaching Assistant, Undergraduate Kinetics and Reactor Design, Northwestern University
1/2001-3/2001	Teaching Assistant, Undergraduate Heat Transfer, Northwestern University
9/1997-5/2000	Teaching Assistant, Undergraduate General Chemistry, Valparaiso University

AWARDS

Anna Fuller Fund Fellowship in Molecular Oncology	2006-2007
Northwestern University Fellow	2004-2005
USDA Merit Travel Fellowship Award	2004
Gramm Travel Fellowship Award	2004
Alpha Lambda Delta Graduate Fellowship	2004
Student Travel Award, Biomedical Engineering Society	2002
Metz Scholarship in Reproductive Biology	2002
National Defense Science and Engineering Graduate Fellowship	2001-2004
National Science Foundation Fellowship (declined)	2001
Teaching Assistant of the Year, Department of Chemical Engineering	2001
Cabell Fellowship, Northwestern University	2000-2001

ACTIVITIES

Faculty Search Committee, Chemical and Biological Engineering	2002, 2004
Graduate Recruitment Committee, Chemical and Biological Engineering	2003
Co-President of Chemical Engineering Graduate Student Fellowship	2001

PUBLICATIONS

1. P.K. Kreeger, S.K. Bristol-Gould, C.G. Selkirk, S.M. Kilen, R.W. Cook, J.L. Kipp, L.D. Shea, K.E. Mayo, and T.K. Woodruff. "Empirical and Mathematical Evidence Supporting a Necessary and Sufficient Initial Pool of Ovarian Follicles." Submitted.

2. M. Xu, P.K. Kreeger, L.D. Shea, and T.K. Woodruff. "Live Births Following Follicle Maturation within 3-D Hydrogel Scaffolds". Tissue Engineering. In press.

3. 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.

4. 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.

5. 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.

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

7. 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 90-2, 2000.

PATENTS

T.K. Woodruff, S.A. Pangas, P.K. Kreeger, H. Saudye, R. Kazer, J. Zhang, and L.D. Shea. "Polymer Scaffolds for the Culture and Maturation of Ovarian Follicles." Patent pending.

PRESENTATIONS

1. 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: Mathematical Modeling Demonstrates Its Sufficiency for Adult Fertility." *ENDO*. Boston, MA. June 2006.

2. 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." *ENDO*. Boston, MA. June 2006.

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 for Chemical Engineers*. Cincinnati, OH. November 2005.

4. 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.

5. 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.

6. 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. March 2005 (poster presentation, selected for podium presentation)

7. 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 for Chemical Engineers*. Austin, TX. November 2004. (podium presentation)

8. 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 for Chemical Engineers*. Austin, TX. November 2004. (poster presentation)

9. 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. August 2004. USDA Merit Award. (poster presentation)

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

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

12. K.E. Mayo, S. Bristol, J. Kipp, J. Weck, S. 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.

13. 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. (poster presentation)

14. 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. (invited podium presentation)

15. 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.

16. 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 for Chemical Engineers*, San Francisco, CA. Nov. 2003. (podium presentation)

17. 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. (podium presentation)

18. 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. (poster presentation)

19. 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. (podium presentation)

20. P.K. Kreeger and L.D. Shea. "Tissue Engineering: General Principles and Application in Ovarian Biology." *Valparaiso University*. Valparaiso, IN. Mar. 2003. (invited podium presentation)

21. 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. (poster presentation).

22. 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. (podium presentation)

23. 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.

24. 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 for Chemical Engineers*. Reno, NV. Nov. 2001.

25. 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. (poster presentation)

STUDENTS MENTORED

Rebecca Kusko	Undegraduate in Biological Engineering, 2006-present
Ann Breckenkamp	Undergraduate in Chemical Engineering, 2006-present
Jason Deck	Undergraduate in Biomedical Engineering, 2003-2005
Melissa Chamberlin	Integrated Biological Sciences Program Rotation Student, 2003
Courtney Berkholtz	Integrated Biological Sciences Program Rotation Student, 2002
Stephen Sung	Undergraduate in Chemical Engineering, 2002 - 2003
Amy Lewis	Undergraduate in Chemical Engineering, 2001 - 2002

PROFESSIONAL SOCIETIES

American Institute for Chemical Engineers (AIChE)
Society for the Study of Reproduction (SSR)
European Society of Human Reproduction and Embryology (ESHRE)
Endocrine Society

REFERENCES

1. Douglas A. Lauffenburger, Ph.D.
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   Massachusetts Institute of Technology
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2. Lonnie D. Shea, Ph.D.
   Department of Chemical and Biological Engineering
   Northwestern University
   2145 Sheridan Rd, Tech E136
   Evanston, IL 60208
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   phone: 847-491-7043

3. Teresa K. Woodruff, Ph.D.
   Department of Neurobiology and Physiology
   Northwestern University
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