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1. EDUCATION AND EMPLOYMENT HISTORY

1.1 EDUCATION HISTORY

Ph.D., Biological Sciences **Northwestern University**, Evanston, IL	Jan 2003 – Jun 2007
M.S., Biological Systems Engineering **University of Nebraska**, Lincoln, NE	May 2001 – Dec 2002
B.S., Biological Systems Engineering Graduation with Honors and Highest Distinction **University of Nebraska**, Lincoln, NE	Aug 1997 – May 2001

1.2 EMPLOYMENT HISTORY

Biomedical Engineer and Associate Professor of Biological Systems Engineering, University of Nebraska, Lincoln, NE	July 2013 – Present
Associate Professor, Department of Surgery and Mary and Dick Holland Regenerative Medicine Program, Courtesy Appointment, University of Nebraska Medical Center, Omaha, NE	Aug 2013 – Present
Biomedical Engineer and Assistant Professor of Biological Systems Engineering, University of Nebraska, Lincoln, NE	Oct 2007 – Jun 2013
Graduate Research Assistant, Departments of Chemical and Biological Engineering and Interdepartmental Biological Sciences, Northwestern University, Evanston, IL	Jan 2003 – Jun 2007
Graduate Research Assistant, Department of Biological Systems Engineering, University of Nebraska, Lincoln, NE	Jan 2001 – Dec 2002

2. RESEARCH ACCOMPLISHMENTS

2.1 PUBLICATION RECORD

2.1.1 Published Peer Reviewed Journal Publications

1. Kasputis T2[b], Koenig M, Schmidt D, Sekora D, Rodenhausen KB, Eichhorn KJ, Uhlmann P, Schubert E, **Pannier AK**, Schubert M, Stamm M. 2013. Slanted columnar

[a]Based on UNL College of Engineering format with minor IANR modifications
[b]Subscripts "2" indicates PhD student co-authors
[c]Estimated percent contribution by A.K. Pannier
[d]Subscripts "1" indicates MS student co-authors

thin films prepared by glancing angle deposition functionalized with polyacrylic acid Guiselin polymer brushes. *Journal of Physical Chemistry, Part C.* 117(27):13971-13980.

2. Kelly AM[1d], Lammers A, Jones DD, Stowell R, Hoy R, Curtis E, **Pannier AK**. 2013. Implementation of a "rapid design challenge" in a cross-disciplinary senior capstone course and evaluation of device performance. *American Society for Engineering Education Conference Proceedings,* June 23-26, 2013, Atlanta, GA.

3. Martin TM[2], Plautz SA and **Pannier AK**. 2013. Network analysis of endogenous gene expression profiles after polyethyleneimine-mediated DNA delivery. *Journal of Gene Medicine.* 15(3-4):142-154.

4. Wysocki BJ, Martin TM[2], Wysocki TA, and **Pannier AK**. 2013. Modeling nonviral gene delivery as a macro-to-nano communication system. *Nano Communication Networks.* 4(1):14-22.

5. Kasputis T[2] and **Pannier AK**. 2012. The role of surface chemistry-induced cell characteristics on nonviral gene delivery. *Journal of Biological Engineering.* Sep 11;6(1):17.

6. Regier MC[1d], Taylor JD[1], Borcyk T, Yang Y, **Pannier AK**. 2012. Fabrication and characterization of DNA-loaded zein nanospheres. *Journal of Nanobiotechnology.* Dec 2;10:44.

7. Rodenhausen KB, Schmidt D, Kasputis T[2], **Pannier AK**, Schubert E, and Schubert M. 2012. Generalized ellipsometry in-situ quantification of organic adsorbate attachment within slanted columnar thin films. *Optics Express.* 20(5):5419-28.

8. Othman SF, Curtis ET, Plautz SA, **Pannier AK**, Butler SD, Xu H. 2012. Magnetic Resonance Elastography monitoring of tissue engineered constructs. *NMR in Biomedicine*. 25(3):452-63.

9. Sharp AT, **Pannier AK**, Wysocki BJ, Wysocki TA. 2012. A novel telecommunications-based approach to HIV modeling and simulation. *Nano Communication Networks.* 3(2): 129-137.

10. Plautz SA, Boanca G, Riethoven J-JM, **Pannier AK.** 2011. Microarray Analysis of Gene Expression Profiles in Cells Transfected with Nonviral Vectors. *Molecular Therapy* 19(12):2144-51.

11. Rodenhausen KB, Kasputis T[2], **Pannier AK**, Gerasimov JY, Lai RY, Solinsky M, Tiwald TE, Wang H, Sarkar A, Hofmann T, Ianno N, and Schubert M. 2011. Combined optical and acoustical method for determination of thickness and porosity of transparent organic layers below the ultra-thin lm limit. *Review of Scientific Instruments*. Oct; 82(10):103111.

12. Rodenhausen KB, Duensing BA[1], Kasputis T[2], **Pannier AK**, Hofmann T, Schubert M, Tiwald TE, Solinsky M, and Wagner M. 2011. *In-situ* monitoring alkanethiol self-assembled monolayer chemisorption with combined spectroscopic ellipsometry and quartz crystal microbalance techniques. *Thin Solid Films*. 519(9): 2817-2820.

13. Singh D[1], **Pannier AK**, Zempleni J**.** 2011. Identification of holocarboxylase synthetase chromatin binding sites using the DamID technology. *Anal Biochem*. 413(1):55-9.

14. Bellis AD, Bernabé BP, Weiss MS, Yarrington ME, Barbolina MV, **Pannier AK**, Jeruss JS, Broadbelt LJ, Shea LD. 2011. Cellular arrays for large-scale analysis of transcription factor activity. *Biotechnol Bioeng.* 108(2):395-403.

15. **Pannier AK**, Wieland JA, Shea LD. 2008. Incorporation of polyethylene glycol into self-assembled monolayers enhances substrate-mediated gene delivery by nonspecifically-bound complexes. *Acta Biomat.* 4:26-39.

16. **Pannier AK**, Ariazi EA, Bellis AD, Bengali Z, Jordan VC, Shea LD. 2007. Bioluminescence imaging for assessment and normalization in transfected cell arrays. *Biotechnol Bioeng.* 98:486-97.

17. **Pannier AK**, Anderson BC, Shea LD. 2005. Substrate-mediated delivery from self-assembled monolayers: Effect of surface ionization, hydrophilicity, and patterning. *Acta Biomat*. 1:511-522.

18. Bengali Z, **Pannier AK**, Segura T, Anderson BC, Jang JH, Mustoe TA, Shea LD. 2005. Gene delivery through cell culture substrate adsorbed DNA complexes. *Biotechnol Bioeng.* May 5; 90(3):290-302.

19. **Pannier AK**, Shea LD. 2004. Controlled release systems for DNA delivery. *Mol. Ther*. 10: 19-26.

20. **Pannier AK**, Arora V, Iversen PL, Brand. 2004. Transdermal delivery of phosphorodiamidate Morpholino oligomers across hairless mouse skin*. Int. J. Pharm*. 275:217-226.

21. **Pannier AK**, Brand, RM, Jones DD. 2003. Fuzzy modeling of skin permeability coefficients. *Pharm. Res.* 20: 143-148.

2.1.2 Peer Reviewed Journal Publications Accepted for Publication/In Press

1. Sargus-Patino CN[1], Wright EC, Plautz SA, Miles JR, Vallet JL, **Pannier AK**. 2013. In vitro development of pre-implantation porcine embryos using alginate hydrogels as a three-dimensional matrix. *Reprod Fertil Dev*.

2. Kasputis T[2], Pieper A, Schubert M and **Pannier AK**. 2014. Dynamic Analysis of DNA Nanoparticle Immobilization to Model Biomaterial Substrates using Combinatorial Spectroscopic Ellipsometry and Quartz Crystal Microbalance with Dissipation. *Thin Solid Films: ICSE-VI Proceedings.*

3. Wysocki BJ, Martin TM[2], Wysocki TA, **Pannier AK.** 2014. Simulation Supported Estimation of End-to-End Transmission Parameters in Non-Viral Gene Delivery. *IEEE International Conference on Communications*.

2.1.3 Peer Reviewed Journal Publications Submitted but not yet Accepted

1. Martin TM, Wysocki BJ, Beyersdorf JP, Wysocki TA, **Pannier AK**. 2014. Integrating Mitosis, Toxicity, and Transgene Expression in a Telecommunications Packet-Switched Network Model of Lipoplex-Mediated Gene Delivery. *Biotechnology and Bioengineering (under revision)*.

2. Martin TM, Wysocki BJ, Wysocki TA, **Pannier AK**. 2014. Identifying Intracellular Component Losses from a Model of Nonviral Gene Delivery. *IEEE Journal of Selected Areas in Communication: Molecular, Biological, and Multi-Scale Communications Series*.

2.1.4 Books and Book Chapters

1. Sargus-Patino CN[1], **Pannier AK**, and Miles JR. 2013. Alginate Hydrogels for In Vitro Culture Models of Organs and Embryos. In Dudley A (ed) *Organogenesis. Methods in Molecular Biology*. (invited and submitted)

2. **Pannier AK** and Segura T. 2013. Surface- and Hydrogel-Mediated Delivery of Nucleic Acid Nanoparticles. In: Ogris M and Oupicky D (eds) *Nanotechnology for Nucleic Acid Delivery*: *Methods in Molecular Biology*. 948:149-69.

2.1.5 Peer Reviewed Conference Proceedings/Abstracts

1. Kasputis T[2], Rodenhausen KB, Pieper A, Schmidt D, Sekora D, Franke-Schubert E, Schubert M, **Pannier AK**. 2013. Protein-loaded slanted columnar thin films as novel biomaterials for enhancing cell-surface interactions. American Institute of Chemical Engineers Annual Meeting, San Francisco, CA. November 3-8, 2013.

2. Martin TM[2], Plautz SA, Shea DM, **Pannier AK**. Temporal Gene Expression Profiling of Transfected Cells to Identify Molecular Factors Guiding Gene Delivery. American Institute of Chemical Engineers Annual Meeting, San Francisco, CA. November 3-8, 2013.

3. Martin TM[2], Kelly AM[1], Plautz SA, **Pannier AK**. Cellular and Molecular Factors Contribute to a Cell Shutdown After DNA Complex Delivery. American Institute of Chemical Engineers Annual Meeting, San Francisco, CA. November 3-8, 2013.

4. Kelly AM[1], Han Z, Zempleni J, **Pannier AK**. Enhancing Nonviral Gene Delivery to Human Mesenchymal Stem Cells through Upregulation of the Glucocorticoid Receptor. Annual Meeting of Biomedical Engineering Society, Seattle, WA, September 26-28, 2013.

5. Kasputis T[2], Schmidt D, Rodenhausen KB, Sekora D, Koenig, M, Eichhorn K, Uhlmann P, Stamm M, Schubert E, Schubert M, **Pannier AK**. Biomolecule Loading within Nanostructured Thin Films as Cell-Instructive Surfaces for Drug and Gene Delivery.6th International Conference on Spectroscopic Ellipsometry, Kyoto Research Park, Japan, May 26-31, 2013.

6. Rodenhausen KB, Schmidt D, Davis RS, Sekora D, Rajeev N, Kasputis T[2], **Pannier AK**, Schubert E, Schubert M. Detection of organic adsorption onto three-dimensional nanostructure layers with generalized ellipsometry 6th International Conference on Spectroscopic Ellipsometry, Kyoto Research Park, Japan, , May 26-31, 2013.

7. Cordonier EL, Teixeira Camara D, Han Z., **Pannier AK**, Zempleni J. Acetyl-CoA carboxylases are checkpoints in adipocyte differentiation. Experimental Biology, FASEB, Boston, MA, April 21, 2013.
8. Sargus CN[1], Wright EC, Miles JR, **Pannier AK.** Effect of alginate hydrogel biomechanical properties on the in vitro development of pre-implantation porcine embryos. Institute of Biological Engineering 2013 Annual Meeting, Raleigh, North Carolina, March 7-9, 2013.

9. Taylor JD[1], Regier MC[1], Jiang Q, **Pannier AK.** Zein: New polymer for nonviral gene delivery. Institute of Biological Engineering 2013 Annual Meeting, Raleigh, North Carolina, March 7-9, 2013.

10. Kasputis T[2], Pieper A, Schmidt D, Sekora D, Rodenhausen KB, Franke-Schubert E, Schubert M, and **Pannier AK**. Slanted Columnar Thin Film Substrates for Biomolecule Delivery and Cell Culture. Institute of Biological Engineering 2013 Annual Meeting, Raleigh, North Carolina, March 7-9, 2013.

11. Kasputis T[2], Koenig M, Schmidt D, Eichhorn KJ, Uhlmann P, Schubert M, Stamm M, **Pannier AK**. GLAD Sculptured Thin Films Functionalized with Polymer Brushes. 2012 American Institute of Chemical Engineers Annual Meeting, Pittsburgh, PA, October 28 - November 2, 2012.

12. Martin TM[2], Wysocki T, Wysocki B, and **Pannier AK**. Telecommunications Model of Lipoplex-Mediated Gene Delivery. 2012 American Institute of Chemical Engineers Annual Meeting, Pittsburgh, PA, October 28 -November 2, 2012.

13. Cordonier EL, Kasputis T[2], Mills JD[1], Han Z, **Pannier AK**, Zempleni J. Changes in the carboxylase profile are associated with early and late differentiation stages of osteoblast and adipocytes from human mesenchymal stem cells. Experimental Biology Meeting; San Diego, CA. April 21-25, 2012

14. Kasputis T[2], Koenig M, Schmidt D, Eichhorn KJ, Uhlmann P, **Pannier AK**, Schubert M, Stamm M. Fabrication and Characterization of GLAD Sculptured Thin Films Functionalized with Grafted-To Polymer Brushes. 7th Workshop Ellipsometry, Leipzig, Germany. March 5-7, 2012.

15. Rodenhausen KB, Schmidt D, Kasputis T[2], **Pannier AK**, Schubert E, and Schubert M. Generalized ellipsometry in-situ monitoring of fibronectin protein infiltration of sculptured thin films. 7th Workshop Ellipsometry, Leipzig, Germany. March 5-7, 2012.

16. Miles JR, Sargus CN[1], Plautz SA, Vallet JL, **Pannier AK.** Alginate hydrogels as three-dimensional extracellular matrix for in vitro elongation of porcine embryos. Institute of Biological Engineering 2012 Annual Meeting, Indianapolis, IN, March 1-3, 2012.

17. Miles JR, Sargus CN[1], Plautz SA, Vallet JL, and **Pannier AK**. 2012. Differential gene regulation of steroidogenic transcripts and estradiol production following in vitro pig embryo elongation in alginate hydrogel three-dimensional matrix. *Reprod. Fertil. Dev*. 24(1):162. International Embryo Transfer Society, Phoenix, AZ, January 7-10, 2012.

18. Gerasimov JY, Rodenhausen KB, Kasputis T[2], Schmidt D, Wang H, **Pannier AK**, Lai RY, Schubert M. A new parameter to evaluate biological thin films. 2011 American Vacuum Society Conference, Nashville, TN, October 30-November 4, 2011.

19. Gerasimov JY, Rodenhausen KB, Kasputis T[2], Schmidt D, Wang H, **Pannier AK**, Lai RY, Schubert M. Characterization of biological thin films with combinatorial spectroscopic ellipsometry and piezoelectric nanogravimetry. 22nd National NSF EPSCoR Conference, Coeur d'Alene, Idaho, October 24-27, 2011.

20. Martin TM[2], Plautz SA, Riethoven JJM, **Pannier AK**. Microarray Analysis of Gene Expression Profiles Characteristic of Transfected Cells. 2011 American Institute of Chemical Engineers Annual Meeting, Minneapolis, MN, October 16-21, 2011.

21. Kasputis T[2] and **Pannier AK**. Enhancing Nonviral Gene Delivery by Manipulating Cell-Material Interactions. 2011 American Institute of Chemical Engineers Annual Meeting, Minneapolis, MN, October 16-21, 2011.

22. Kasputis T[2], Schmidt D, Rodenhausen KB, **Pannier AK**, Schubert M. Real-time SE/QCM-D Characterization of Biomolecule Adsorption within Sculptured Thin Films. 2011 American Institute of Chemical Engineers Annual Meeting, Minneapolis, MN, October 16-21, 2011.

23. Regier MC[1], Borcyk T, Mills JD[1], Yang Y, **Pannier AK**. Zein: A Natural Protein for Polymeric Gene Delivery. 2011 Biomedical Engineering Society Annual Meeting, Hartford, CT, October 13-15, 2011.

24. Rodenhausen KB, Kasputis T[2], Gerasimov J, Wang H, **Pannier AK**, Lai R, Schubert M. Combinatorial spectroscopic ellipsometry and quartz crystal microbalance with dissipation to study organic ultra-thin film evolution. 6th Workshop Ellipsometry, Berlin, Germany, February 21-24, 2011.

25. Rodenhausen KB, Kasputis T[2], Gerasimov J, **Pannier AK**, Hoffman T, Lai R, Bartlett-Hunt S, Schubert M, Solinsky M, Wagner M. Combinatorial SE/QCM-D Approach for Studying Porous Organic Ultra-thin Film Evolution. 2010 Material Research Society Annual Fall Meeting, Boston, MA, November 29 –December 3, 2010.

26. Regier MC[1], Yang Y, **Pannier AK**. DNA-Loaded Particles for Nonviral Gene Delivery Prepared From Corn Protein (Zein). 2010 American Institute of Chemical Engineers Annual Meeting, Salt Lake City, UT, November 7-12, 2010.

27. Duensing BA[1], Kasputis T[2], **Pannier AK**. 2010. Properties of the Cell-Biomaterial Interface That Influence Nonviral Gene Delivery. 2010 American Institute of Chemical Engineers Annual Meeting, Salt Lake City, UT, November 7-12, 2010.

28. Plautz SA, Boanca G, Riethoven J-JM, **Pannier AK**. Gene Expression Profiling of Cells Transfected with Nonviral Vectors. 2010 Biomedical Engineering Society Annual Meeting, Austin, TX, October 6-9, 2010.

29. Sargus CN, Plautz SA, Miles JR, Vallet J, **Pannier AK**. In Vitro Elongation of Porcine Embryos Using Alginate Hydrogels as a Three-Dimensional Extracellular Matrix. 2010

Biomedical Engineering Society Annual Meeting, Austin, TX, October 6-9, 2010.

30. Plautz SA, Boanca G, and **Pannier AK**. Gene Expression Profiling of Cells Transfected with Nonviral Vectors: Engineering Delivery Systems that Prime Endogenous Signaling Pathways. Institute of Biological Engineering 2010 Annual Meeting, Cambridge, MA, March 4-6, 2010.

31. Plautz SA, Duensing BA1, Boanca G, **Pannier AK**. Intracellular Signaling Pathways in Nonviral Gene Delivery: Microarray Analysis of Gene Expression Profiles in Transfected Cells. 2009 American Institute of Chemical Engineers Annual Meeting, Nashville, TN, November 8 – 12, 2009.

32. Duensing BA1 and **Pannier AK**. Controlling Nonviral Gene Delivery through the Cell-Biomaterial Interface. 2009 American Institute of Chemical Engineers Annual Meeting, Nashville, TN, November 8 – 12, 2009.

33. Boanca G, Plautz SA, **Pannier AK**. Microarray Analysis of Intracellular Signaling Pathways in Nonviral Gene Transfer. 2009 American Society of Gene Therapy, San Diego, CA, May 27-30, 2009.

34. Duensing BA1 and **Pannier AK**. The Role of the Extracellular Microenvironment on Nonviral Gene Delivery: Extracellular Matrix Proteins and Surface Chemistry. Institute of Biological Engineering 2009 Annual Meeting, Santa Clara, CA, March 19-21, 2009.

35. Duensing BA1 and **Pannier AK**. Extracellular matrix protein orientation by adsorption on self-assembled monolayers controls nonviral gene delivery. 2008 Annual Meeting of the American Institute of Chemical Engineers, Philadelphia, PA, November 16-21, 2008.

36. **Pannier AK**, Bellis AD, Weiss MS, Bryce KS, Ariazi EA, Jordan VC, Jeruss JS, Shea JD. Transfected cell arrays for analysis of transcription factor activity. 2007 Breast Cancer Symposium, San Francisco, CA, September 7-8, 2007.

37. Bellis AD, **Pannier AK**, Shea LD. Transfected Cell Arrays for the High-Throughput Analysis Of Transcription Factor Activity. 2007 American Institute of Chemical Engineers Annual Meeting, Salt Lake City, UT, November 4-9, 2007.

38. **Pannier AK** and Shea LD. Incorporation of polyethylene glycol into self-assembled monolayers enhances substrate-mediated gene delivery by nonspecifically-bound complexes. 2006 American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 12-17, 2006.

39. **Pannier AK**, Bengali Z, Ariazi EA, Jordan VC, Shea LD. Transfected cell arrays for assessment of estrogen receptor activation in breast cancer cells. 2006 *American Society of Gene Therapy Annual Meeting*, Baltimore, MD, May 31-June 4, 2006.

40. **Pannier AK**, Houchin TL, Shea LD. Patterned tissue formation through spatially patterned gene delivery. 2006 Materials Research Society Spring Meeting, San Francisco, CA, April 17-21, 2006.

41. **Pannier AK** and Shea LD. Engineering substrate-mediated gene delivery with self-

assembled monolayers. 2005 Annual Meeting of the American Institute of Chemical Engineers, Cincinnati, OH, October 30 – November 4, 2005.

42. **Pannier AK**, Bengali Z, Ariazi EA, Jordan VC, Shea LD. Substrate-mediated gene delivery for assessment of signal transduction pathways in cancer cells. 2005 Annual Meeting of the American Society of Gene Therapy, St. Louis, MO, June 1-5, 2005.

43. **Pannier AK**, Bengali Z, Anderson BC, Shea LD. Patterned delivery of DNA complexes from self-assembled monolayers. 2004 Annual Meeting of the American Institute of Chemical Engineers, Austin, TX, November 7-12, 2004.

44. Bengali Z, Segura T, **Pannier AK**, Shea LD. 2004. Surface immobilization of DNA complexes for gene delivery. 2004 American Chemical Society Spring Meeting, Anaheim, CA, March 28–April 1, 2004.

45. Anderson BC, **Pannier AK**, Shea LD. Design and Mechanistic Characterization of Surface-Based Transgene Delivery Systems. 2003 Annual Meeting of the American Institute of Chemical Engineers, San Francisco, CA, November 16-21, 2003.

46. **Pannier AK**, Brand RM, Jones DD. Modeling Skin Permeability Coefficients with Fuzzy Logic. 8th Conference on Perspectives in Percutaneous Penetration, Antibes Juan-Les Pins, France, April 2-6, 2002.

47. **Pannier AK**, Iversen PL, Brand RM. Transdermal delivery of phosphorodiamidate morpholino oligonucleotides across hairless mouse skin: A structure activity study. 2002 Annual Meeting of the Institute of Biological Engineers, Baton Rouge, LA, Janury 17-19, 2002.

48. **Wild AK**, Denkinger DJ, Butler CL, Cushman AM, Kawahara RS. EGFP expression using the *vav* proto-oncogene promoter in zebrafish. 2000 Joint Meeting of American Society for Biochemistry and Molecular Biology and the American Society for Pharmacology and Experimental Therapeutics (*FASEB J*. May; 14(8):A1559), Boston, MA, June 4-8, 2000.

2.1.6 Conference Presentations

1. Martin TM2, Plautz SA, Beyersdorf JP, Wysocki BJ, Wysocki TA, **Pannier AK**. Pharmacokinetics modeling and pharmacogenomics screening of molecules in nonviral gene delivery. *Molecular Mechanisms of Disease Symposium*, Lincoln, NE, August 18, 2013.
2. Martin TM2, Wysocki T, Wysocki B, and **Pannier AK**. A model of transport and expression of DNA-nanoparticle complexes delivered to epithelial cells. Nanosciences Symposium: 2012 Nebraska Research & Innovation Conference, Lincoln, NE, October 9, 2012.

3. Kasputis T2, Koenig M, Schmidt D, Eichhorn KJ, **Pannier AK,** Schubert M, Stamm M , Uhlmann P. Slanted Columnar Thin Films Functionalized with Polymer Brushes. Nanosciences Symposium: 2012 Nebraska Research & Innovation Conference, Lincoln, NE, October 9, 2012.

4. Kasputis T2, Schmidt D, Sekora D, Rodenhausen KB, Schubert E, Schubert M, **Pannier AK**. Substrate-Mediated Gene Delivery from Nanostructured Slanted Columnar

Thin Films. University of Nebraska-Lincoln Life Sciences Poster Competition, Lincoln, NE September 25, 2012.

5. Han Z, Kasputis T2, Taylor J1, Zempleni J, **Pannier AK**. Biotin-depleted media inhibits adipocyte differentiation in human mesenchymal stem cells University of Nebraska-Lincoln Life Sciences Poster Competition, Lincoln, NE September 25, 2012.

6. Sargus CN1, Plautz SA, Miles J, **Pannier AK**. In Vitro Elongation of Porcine Embryos using Alginate Hydrogels as a Three-Dimensional Extracellular Matrix. 2012 Nebraska Academy of Sciences 122nd Annual Meeting, Lincoln, NE, April 20, 2012.

7. Sargus CN1, Plautz SA, Miles J, Vallet J, **Pannier AK.** Alginate hydrogels as a three-dimensional extracellular matrix for in vitro elongation of porcine embryos. 2012 UNL Research Fair Graduate Poster Session, Lincoln, NE, April 4, 2012.

8. Kasputis T2 and **Pannier AK**. Enhancing Nonviral Gene Delivery by Manipulating Cell-Material Interactions. College of Engineering Graduate Research Symposium. University of Nebraska-Lincoln, Lincoln, NE, April 15, 2011.

9. Kasputis T2, Schmidt D, Rodenhausen KB, **Pannier AK**, Schubert M. Real-time SE/QCM-D Characterization of Protein Adsorption within Sculptured Thin Films. College of Engineering Graduate Research Symposium. University of Nebraska-Lincoln, Lincoln, NE, April 15, 2011.

10. Martin TM2, Plautz SA, Riethoven JM, **Pannier AK**. Analysis of Microarray Gene Expression Profiles of Cells Transfected with Nonviral PEI Polyplexes. College of Engineering Graduate Research Symposium, University of Nebraska-Lincoln, Lincoln, NE, April 15, 2011.

11. Rodenhausen KB, Kasputis T2, Gerasimov JY, Wang H, Hofmann T, **Pannier AK**, Lai, RY, Tiwald TE, Schubert M. Hybrid in-situ spectroscopic ellipsometry and quartz crystal microbalance to study rigid, organic, ultra-thin films. College of Engineering Graduate Research Symposium and Poster Session, University of Nebraska-Lincoln, Lincoln, NE, April 15, 2011.

12. Kasputis T2 and **Pannier AK**. Enhancing Nonviral Gene Delivery by Manipulating Cell-Material Interactions. UNL Research Fair. University of Nebraska-Lincoln, Lincoln, NE, April 13, 2011.

13. Martin TM2, Plautz SA, Riethoven JM, **Pannier AK**. Analysis of Microarray Gene Expression Profiles of Cells Transfected with Nonviral PEI Polyplexes. UNL Research Fair, University of Nebraska-Lincoln, Lincoln, NE, April 13, 2011.

14. Singh D1, Zempleni J, **Pannier AK.** Development of Technologies to Monitor Chromatin Proteins in Small Cell Numbers for Applications in Assisted Reproductive Technology. 2010 UNMC Regenerative Medicine Symposium, Omaha, NE, May 24, 2010.

15. Berger S, Plautz SA, Reddy N, Yang Y, **Pannier AK**. Patterned Hydrogels for Myocardial Tissue Engineering using Zein Fiber-Templating. 2010UNMC Regenerative Medicine Symposium, Omaha, NE, May 24, 2010.

16. Regier MC[1], Gilkey AL, Duensing B[1], Yang Y, **Pannier AK**. Zein Microspheres for Oral Nonviral Gene Delivery and Tissue Engineering. 2010 UNMC Regenerative Medicine Symposium, Omaha, NE, May 24, 2010.

17. Sargus C, Plautz SA, Miles J, **Pannier AK**. In Vitro Elongation of Porcine Embryos using Alginate Hydrogels as a Three-Dimensional Extracellular Matrix. 2010 Nebraska Academy of Sciences 120th Annual Meeting, Lincoln, NE, April 23, 2010.

18. Gengenbach H, Duensing B[1], **Pannier AK**. Engineering the Cell-Biomaterial Interface for Nonviral Gene Delivery through Extracellular Matrix Protein Adsorption. 2010 UNL Undergraduate Research Conference, Lincoln, NE, April 8, 2010.

19. Berger S, Plautz SA, Reddy N, Yang Y, **Pannier AK**. Patterned Hydrogels for Myocardial Tissue Engineering using Zein Fiber-Templating. 2010 UNL Undergraduate Research Conference, Lincoln, NE, April 8, 2010.

20. Regier MC[1], Gilkey AL, Duensing B[1], Yang Y, **Pannier AK**. Zein Microspheres for Oral Nonviral Gene Delivery and Tissue Engineering. 2010 UNL Graduate Student Poster Session at Research Fair, Lincoln, NE, April 7, 2010.

21. Duensing BA[1] and **Pannier AK**. Controlling Nonviral Gene Delivery through the Cell-Biomaterial Interface. 2009 Mini Symposium on In-situ Quartz Crystal Microbalance and Spectroscopic Ellipsometry Characterization of Biological Materials, hosted by Department of Electrical Engineering, UNL and NCMN, Lincoln, NE, November 17, 2009.

22. Singh D[1], Zempleni J, **Pannier AK**. Development of technologies to monitor chromatin proteins in small cell numbers for applications in assisted reproductive physiology. Biotechnology and Bioinformatics Symposium, Lincoln, NE, October 9 - 11, 2009.

23. Singh D[1], **Pannier AK**, Zempleni J. Developing an Antibody-Independent Technology to Monitor Chromatin Proteins in Human Breast and Human Breast Cancer Cell Lines to Map Epigenetic Profiles. NSF EPSCoR Research Conference, Omaha, NE, September 29, 2009.

24. Sargus C and **Pannier AK**. Elongation of Porcine Embryos in vitro using Alginate Hydrogels as a Three-Dimensional Extracellular Matrix. 2009 Nebraska INBRE/BRIN Annual Meeting, Grand Island, NE, August 3-6, 2009.

25. Gilkey A and **Pannier AK**. Zein Microspheres for DNA Delivery. 2009 Nebraska Academy of Science Conference. Lincoln, NE, April 17, 2009.

26. Gengenbach H, Duensing BA[1], **Pannier AK**. Engineering the Cell-Biomaterial Interface for Nonviral Gene Delivery through Extracellular Matrix Protein Adsorption. 2009 UNL Undergraduate Research Conference, Lincoln, NE, April 16, 2009.

27. Gilkey A and **Pannier AK**. Zein microspheres for DNA delivery. 2008 Nebraska INBRE/BRIN Annual Meeting, Grand Island, NE, August 11-14, 2008.

28. Lounsbury D, Boanca G, Hassler C, Singh G, Saraf R , **Pannier AK**. Scanning Probe Microscopy for Imaging Local Ion Concentration on Gastric Cells. NIH NIDDK STEP-UP

2008 Annual Meeting, Washington, D.C., August 8, 2008.

2.1.7 Invited Talks

1. **Pannier AK**. The Effect of Soluble Uterine Factors on Porcine Embryo Development within a Three-Dimensional Alginate Matrix System. TERMIS-AM 2013 Meeting, Atlanta, GA, November 10-12, 2013.

2. **Pannier AK**. Nanotechnology for Nonviral Gene Delivery. WoPhys: University of Nebraska-Lincoln Conference for Undergraduate Women in Physical Sciences, Lincoln, NE, October 24, 2013.

3. **Pannier AK**. Unraveling the Mechanisms of Nonviral Gene Delivery through Gene Expression Profiling, Telecommunications Modeling, and Modifying the Cell Microenvironment. Department of Pharmaceutical Sciences Seminar, University of Nebraska Medical Center, Omaha, NE, October 11, 2013.

4. **Pannier AK** . Cell- Instructive Biomaterial Surfaces and Hydrogel Matrices for Tissue Engineering. Research Seminar in Department of Surgery, University of Nebraska Medical Center, Omaha, NE, July 24, 2013.

5. **Pannier AK**. Biomolecule Loading within Nanostructured Thin Films as Cell-Instructive Surfaces for Drug and Gene Delivery. "Design of Cell-Instructive Materials" Symposium at 2013 Materials Research Society Spring Meeting, April 1-5, 2013, San Francisco, CA.

6. **Pannier AK**. Enhancing Nonviral Delivery through Intracellular and Extracellular Mechanisms....and Corn? University of Nebraska-Lincoln School of Veterinary Medicine and Biomedical Sciences, February 20, 2012.

7. **Pannier AK**. Improving Nonviral DNA Delivery for Therapy of Cardiovascular Diseases. American Heart Association Midwest Affiliate Heart Walk Team Meeting, Lincoln, NE, January 11, 2012.

8. **Pannier AK**. The Biology of Transfection: Promoting Gene Delivery through Intracellular Priming, Extracellular Interactions....and Corn? Northwestern University Biotechnology Training Grant Seminar Series, Evanston, IL, December 16, 2011.

9. **Pannier AK**. Improving Nonviral DNA Delivery for Therapy of Cardiovascular Diseases. American Heart Association Midwest Affiliate Jump Rope for Heart and Hoops for Heart Fundraiser Team Meeting, Omaha, NE, April 20, 2011.

10. **Pannier AK**. (Nutritional Effects in) Tissue Engineering. Osher Lifelong Learning Institute at the University of Nebraska-Lincoln, Lincoln, NE, November 19, 2010.

11. Duensing BA[1], Plautz SA, and **Pannier AK**. Controlling Nonviral Gene Delivery through the Cell-Biomaterial Interface. University of Nebraska Medical Center Regenerative Medicine Symposium, Omaha, NE, May 24, 2010.

12. **Pannier AK**. Engineering Nonviral Gene Delivery Using Cell-Biomaterial Interfaces, Endogenous Pathway Priming and Corn? UNL Biomedical Engineering Seminar Series,

Lincoln, NE, April 14, 2010.

13. **Pannier AK**. Engineering Nonviral Gene Delivery and Biomaterials for Tissue Engineering Applications. Nebraska Gateway for Nutrigenomics Seminar Series, Lincoln, NE, October 14, 2009.

14. **Pannier AK.** Engineering Nonviral Gene Delivery to Mammalian Cells through Extracellular Interactions and Endogenous Signaling Pathways. University of Nebraska-Lincoln (UNL) Biotechnology / Life Sciences Seminar Series, Lincoln, NE, September 16, 2009.

15. **Pannier AK**. Biomaterials for Nonviral Gene Delivery and Tissue Engineering Applications. Nebraska INBRE Weekly Student Seminar, Lincoln, NE, June 8, 2009.

16. **Pannier AK**. Biomaterials for Nonviral Gene Delivery and Tissue Engineering Applications. UNMC Regenerative Medicine Retreat, Omaha, NE, May 15, 2009.

17. **Pannier AK**. Biomaterials for Nonviral Gene Delivery and Tissue Engineering Applications. Undergraduate CSEMS Seminar, University of Nebraska-Lincoln, February 16, 2009.

18. **Pannier AK**. Engineering Nonviral Gene Delivery for Tissue Engineering Applications. Research Seminar in Department of Animal Science, University of Nebraska, Lincoln, NE, October 29, 2008.

19. **Pannier AK**. Engineering Nonviral Gene Delivery for Tissue Engineering Applications. Research Seminar in Transplant Surgery, University of Nebraska Medical Center, Omaha, NE, August 6, 2008.

20. **Pannier AK**. Engineering Nonviral Gene Delivery for Tissue Engineering Applications. Undergraduate CSEMS Seminar, University of Nebraska-Lincoln, February 25, 2008.

21. **Pannier AK**. Substrate-Mediated Gene Delivery for Tissue Engineering and Diagnostic Applications. Alumni Lecture, Department of Biological Systems Engineering, University of Nebraska, Lincoln, NE, October 20, 2006.

2.1.8 Other Publications

1. Shea LD and **Pannier AK**. 2004. Controlled-release systems for non-viral vectors. *The Journal of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University.* 9:35-39.

2.2 GRANTSMANSHIP RECORD

2.2.1 Internally Funded Research Grants

1. Nebraska Agricultural Experiment Station Hatch Equipment Grant: Characterization of DNA-Loaded Nanoparticles using a Brookhaven Instruments Zeta Potential Analyzer for Enhanced Gene Delivery, 07/2013. The objective of this proposal is to secure funds for

the purchase of a Brookhaven Instruments Zeta Potential Analyzer (ZetaPALS with MAS) to characterize DNA nanoparticle size and charge. PI: **AK Pannier**; co-I: M Schubert.

2. UNUNL-UNMC Bioengineering for Human Health (Nebraska Tobacco Settlement Biomedical Research Enhancement Funds): Biomechanical and Gradient Factors that Promote Growth Plate Architecture in Alginate Hydrogel 3-D Matrices, 07/01/2013 to 06/30/2015. Major goal is *to* identify the chemical and mechanical signals that generate growth plate architecture. PIs: A Dudley, **AK Pannier**.

3. Nebraska Agricultural Experiment Station Hatch Equipment Grant: Assessing adipocyte and osteoblast differentiation using the iBox Scientia imaging system, 07/2012. The objective of this proposal is to secure funding for the purchase of an iBox Imaging system for monitoring the fate of cells labeled with fluorescent proteins. PI: J Zempleni; co-I: V Schlegel, **AK Pannier**.

4. Center for Nanohybrid Functional Materials (CNFM) Exploratory Grant: Nanohybrid Biomaterial Interfaces for Surface Mediated Gene Delivery, 10/1/2011- 09/30/2012. The major goal is to develop a system to load exogenous genetic material (i.e. DNA complexes) into nanostructured surfaces and subsequently deliver these complexes to cells adhered to the surfaces. PI: **AK Pannier**.

5. UNL Life Science Competitive Grants Program: Mechanisms of micronutrient control of epigenetic marks in stem cells, 07/01/2011 - 06/30/2013. The major goal is to characterize effects of biotin supply in media on the chromatin modifications in MSCs differentiating into bone and fat lineages. PI**: AK Pannier**; co-PIs: J Zempleni, D Wang.

6. FY2010 IANR Research Strategic Planning Grant: Enhancing Interdisciplinary Research Activities within Biological Engineering at the University of Nebraska-Lincoln, 07/01/2010 – 06/30/2011. The major goals are to conduct a site visit, host a symposium and organize a faculty/graduate seminar series. PD: **AK Pannier**; co-PDs: GR Bashford and S. Othman.

7. FY2010 IANR Seed Grant Program: Zein Microspheres for Nonviral Gene Delivery and Tissue Engineering,07/01/2010 – 06/30/2012. The major goal is to develop fabrication techniques to create zein nano/microspheres encapsulating plasmid DNA with precise particle sizes. PD: **AK Pannier**.

8. University of Nebraska-Lincoln Layman Seed Grant : Monitoring Protein Adsorption to Model Biomaterials with Combined Quartz Crystal Microbalance and Spectroscopic Ellipsometry, 07/01/2010 – 06/30/2013.. The major goal is to characterize monolayer of protein adsorbed to surfaces presenting four different chemistries. PI: **AK Pannier**; Collaborator: M. Schubert.

9. FY2010 IANR Enhancing Interdisciplinary Teams: Genetic Predisposition to Human Disease and Dietary Interventions, 06/01/2010 – 05/31/2013. The major goals are to identify biotin concentrations in culture media that allow for optimal cellular behavior within tissue engineering scaffolds, including cell adhesion, proliferation, and differentiation. PD: J Zempleni; co-PDs: **AK Pannier**, D Wang, P Black, L Harshman, V Schlegel, T Carr.

10. Nebraska Gateway for Nutrigenomics Seed Grant (Tobacco Settlement Funds):

Development of Antibody-Independent Technologies to Monitor Chromatin Proteins in Small Cell Numbers for Applications in Assisted Reproductive Technology, 01/01/2010 – 12/31/10. The major goal is to develop plasmid technology to monitor chromatin protein activity. PI: **AK Pannier**; co-PI: J Zempleni.

11. University of Nebraska-Lincoln Layman Seed Grant : Engineering Intracellular Signaling Pathways for Nonviral Gene Delivery**,** 06/01/2008 – 06/01/10. The major goal is to identify the key intracellular signaling pathways and molecules that modulate nonviral gene delivery to enable the development of more efficient nonviral delivery methods, designed to interact with the molecular signaling of the cells. PI: **AK Pannier**.

2.2.2 Externally Funded Research Grants

1. National Science Foundation (CMMI-1337856): MRI: Development of an Ion-Beam-assisted Glancing Angle Deposition Tool (iGLAD) for 3D Nanostructure Thin Film Preparation with in-situ Ellipsometry control, 10/01/2013 - 09/30/2016. The major goal is to create a new tool - iGLAD - for preparation of sculptured thin films (SCTFs), an emerging class of highly-ordered, nano-engineered materials with high surface area. A vast amount of novel applications is envisioned for such SCTFs. PI: E Schubert; co-PIs: AK Pannier, S Bartelt-Hunt, D Hage, T Hofmann, N Ianno, R Korlacki, R Lai, D Schmidt, M Schubert, A Sinitskiy.

2. National Science Foundation CAREER (CBET-1254415): Nanostructured Thin Films for Substrate-Mediated Gene Delivery, 07/01/2013 - 06/30/2018. Major goal is to design nanostructured, columnar thin films as new surfaces for substrate-mediated gene delivery, and to understand how nanotopography can prime molecular pathways within cells for enhanced transfection and develop an integrated teaching-research plan in biomaterials and gene delivery. PI: **AK Pannier**.

3. National Science Foundation (EPS 10040 94): Nebraska Research Infrastructure Improvement, EPSCoR RII Project: Nanohybrid Materials & Algal Biology, 10/15/2011 to 10/14/2015. The major goal is to develop nanostructured surfaces for biomolecule adsorption and gene delivery. PI: F. Choobineh; co-PI*:* 26 investigators, including **AK Pannier**.

4. National Science Foundation MRI (1126208): Development of Multifunctional CARS (Coherent Anti-Stokes Raman Spectroscopy) Imaging System, 09/01/2011 - 08/31/2014. The major goal is to develop a versatile, multifunctional coherent anti-Stokes Raman spectroscopy (CARS) imaging system that will be capable of nondestructive and noninvasive measurement for nanoscience, biology, and medical research with 3D confocality and nanoscale resolutions. PI: Y Lu; co-PIs: **AK Pannier**, S Ducharme, N Chandra, Y Zhou, P Black.

5. J.A Woollam Foundation Donation: SE/QCM-D To Monitor Self-Assembled Monolayer Formation and Protein Adsorption. Awarded on 08/13/2010. The major goal is to monitor surface characteristics using SE/QCM-D. PI: **AK Pannier**.

6. J.A. Woollam Co.(Contract): Monitoring Formation of Self-Assembled Monolayers and Subsequent Protein Adsorption using Combined Spectroscopic Ellipsometry (SE) and Quartz Crystal Microbalance with Dissipation (QCM-D), 05/15/2010-12/31/2011.The major goal is to use combined SE/QCM-D to monitor formation of self-assembled

monolayers of alkanethiols on gold and subsequent protein adsorption. PI: **AK Pannier**.

7. American Heart Association National Affiliate, (#10SDG2640217) Scientist Development Grant: Microarray Analysis of Gene Expression Profiles in Cells Transfected with Nonviral Gene Delivery Vectors, 01/01/2010 – 12/31/2013 (no cost share, 26-6221-0191-001). The major goals are to identify gene expression profiles in successfully transfected cell populations using microarray analysis and determine the effect of modulating expression of endogenous genes regulated in transfected cells on the efficiency of nonviral gene transfer. PI: **AK Pannier**.

8. Nebraska Research Initiative: Development of a Novel Scanning Probe Microscope to Image Biochemical Processes on the Surface of a Live Cell at <100 nm Resolution in Real Time, 02/10/2009 – 02/10/2011. The major goal is to develop scanning electronics to image both spatial display of ligand interaction and the (resulting) temporal evolution of reaction on a cell surface to enhance our understanding of cellular interactions and signaling. PI: R Saraf; co-PI: **AK Pannier**.

9. USDA CSREES-Nebraska, NEB-21-146: Engineering Nonviral Gene Delivery through Extracellular Interactions and Intracellular Signaling, 06/01/2008 – 09/30/13. The major goals are to identify intracellular signaling pathways modulated during successful nonviral gene transfer and extracellular environmental conditions that enhance nonviral gene delivery. PI: **AK Pannier**.

10. NSF Nebraska EPSCoR FIRST Award: Engineering the Extracellular Matrix for Nonviral Gene Delivery, 05/15/2008 – 05/14/2009. The major goal is to identify key extracellular matrix (ECM) components and architectural features that modulate nonviral gene delivery. PI: **AK Pannier**.

2.2.3 Externally Funded Research Grants Submitted/In Review

1. Nebraska Research Initiative: Development of DNA-Loaded Nanoparticles for Intestinal Gene Therapy and DNA Vaccination, 07/01/2014-06/30/2016. Major goal is to develop multilayered nanoparticles for oral delivery of DNA to treat inflammatory bowel disease and for vaccination. PI: **AK Pannier**, co-PI: D Brown, A Ramer-Tait.

2. NIH (R01): Dietary White to Brown Adipocyte Switches, 04/1/2014-3/31/2017. Major goal is to test hypothesis that the dietary PPARγ agonist EPA shifts the fate of pluripotent cells from the white to the brown phenotype, thereby creating a safe and cost-efficient strategy to ameliorate obesity and its symptoms through an intervention that is widely accepted by consumers. PI: J Zempleni**, co-I: AK Pannier,** T Carr, J Wood.

3. NIH (R01): Vaccine Strategies that Target Cytolytic CD4 T Cells to the Lung, 04/1/2014-3/31/2019. Major goal is goal of this project is to design intranasal CpG oligionucleotide administration that will generate cytolytic T cells that migrate to the lung, develop to memory and afford protection to heterosubtypic IAV challenge. PI: D Brown**, co-I: AK Pannier,** Q Li.

2.3 RESEARCH PATENTS AND AWARDS

2.3.1. Patents

1. Segura T, Shea LD, **Pannier AK**, Bengali Z, Jang JH, Chung P, and Anderson B. Controlled surface-associated delivery of genes and oligonucleotides. U.S. Patent No. 7,029,697. April 18, 2006.

2. **Pannier AK**, Ariazi EA, Jordan VC, and Shea LD. Cellular arrays. U.S. Patent Application: 11/809,772. Filing Date: June 1, 2007.

2.3.2 National and International Research Awards

1. NSF CAREER (2013)

2. American Heart Association Scientist Development Grant (2010)

3. *Acta Biomaterialia* Author Award (2005)

4. NIH Predoctoral Training Grant Fellow (Northwestern University, 2004)

5. NSF Graduate Research Fellow (2001)

6. Barry M. Goldwater Scholar (2000)

2.3.3 Regional and Local Research Awards

1. IANR Dinsdale Family Faculty Award (2012)

2. UNL Advance Ambassador (2012)

3. Gamma Sigma Delta Membership (2011)

4. IANR Research Travel Grant (2009)

5. Nebraska EPSCoR First Award (2008)

6. Mary and Charles C. Cooper/Emma I. Sharpless Graduate Research Fellow (UNL, 2001)

7. University of Nebraska Reichenbach Fellow (2001)

3. TEACHING ACCOMPLISHMENTS

3.1 PHD STUDENTS

3.1.1 PhD Students Completed

(none)

3.1.2 PhD Students in Progress

1. Kasputis, Tadas. Cell-microenvironmental effects on nonviral gene delivery and stem cell morphology; departmental, J.A. Woollam, and NSF EPSCoR funding; expected graduation May 2014.

2. Martin, Timothy M. Gene expression profiling of cells transfected with nonviral vectors; American Heart Association funding; expected graduation May 2014.

3.1.3 PhD Student Committees

1. Jiang, Qiuran. Department of Textiles, Clothing and Design (Y. Yang, advisor).

2. Furtaw, Michael. Department of Biological Systems Engineering (G. Bashford, advisor).

3. Gonzalez, Daniela. Department of Chemical and Biomolecular Engineering (G. Larsen, advisor).

4. Rodenhausen, K.Brian. Department of Chemical and Biomolecular Engineering (M. Schubert, advisor).

5. Ragusa, Jorge. Department of Chemical and Biomolecular Engineering (G. Larsen, advisor).

6. Sherman, Erica. Department of Mechanical and Materials Engineering (T. Wei, advisor).

7. Sargent, Kevin. Department of Animal Science (A. Cupp, advisor).

8. Booth, Christine. Department of Biochemistry (M. Simpson, advisor).

9. Gordon, Alek. Regenerative Medicine, UNMC (A. Dudley, advisor).

3.2 MS STUDENTS

3.2.1 MS Students Completed

1. Duensing, Beth A. Controlling Nonviral Gene Delivery through the Cell-Biomaterial Interface; funded by departmental funds; graduated May 2010.

2. Singh, Dipika. Development of an antibody-independent technology to monitor chromatin binding proteins (co-advised with J. Zempleni); funded by EPSCoR and Nebraska Gateway for Nutrigenomics; graduated December 2010.

3. Regier, Mary C. Zein microspheres for DNA delivery; funded by departmental and IANR Seed grant funds; graduated August 2011.

4. Taylor (Mills), Jessica. Zein-DNA nanospheres for cellular transfection; funded by departmental and IANR Seed grant funds; graduated August 2013.

5. Sargus-Patino, Catherine. Development of alginate hydrogels for in vitro culture of porcine embryos; funded by INBRE and departmental funds; graduated December 2013.

3.2.2 MS Students in Progress

1. Kelly, Abby. Intracellular nanoparticle trafficking through CARS microscopy; funded by NSF Graduate Fellowship; expected graduation May 2014.

2. Farris, Eric. Zein-chitosan layered nanoparticles for DNA delivery; funded by deparment; expected graduation December 2015.

3.2.3 MS Student Committees

1. Neal, Karen. Department of Chemical and Biomolecular Engineering (G. Larsen, advisor).

2. Curtis, Evan. Department of Biological Systems Engineering (S. Othman, advisor). M.S. 2011.

3.2.4 Total Number of Graduate Student Independent Projects Supervised

9 graduate students supervised (4 in progress).

3.3 UNDERGRADUATE STUDENTS

3.3.1 Undergraduate Students Supervised in Independent Research Activity

1. Beyersdorf, Jared. “Screening of Activators and Inhibitors of Nonviral Gene Delivery”. UCARE Project 2013-2014.

2. Trejo, Lindsey. “Alginate Fibers for Alignment of Chondrocytes”. UCARE Project, 2013-2014.

3. Paulson, Zachary. “Fiber-Templating to Produce Gels with Aligned Cells”, UNL NSF BME REU, 2013.

4. Pieper, Alex. “Probing Cellular Adhesive Forces on Surfaces Presenting Varying Topographical Characteristics.” UCARE Project 2012-2013.

5. Nguyen, Cattuong T. “Hydrogels as Tissue Engineering scaffolds.” UCARE Project 2012-2013.

6. Creasy, Olivia. “Differentiating hMSCs into Cardiomyocytes within Patterned PEG hydrogels.” UNL Graduate College Summer REU, 2012

7. Pely, Adam. “Patterned PEG hydrogels Formed through Fiber Templating.” UNL Graduate College Summer REU, 2011.

8. Krause, Monica. “Mechanical properties of alginate hydrogels for organ and embryo culture.” UCARE Project, 2011-2013.

9. Borcyk, Tyler. “Zein particles for Nonviral Gene Delivery.” UCARE Project, 2010-2012.

10. Kaufmann, Seely. “Ultrasonic Heating of Cells to Promote Nonviral Gene Delivery.”

UCARE Project, 2010-2011.

11. Dudley, Quentin. “The Role of Cell-Biomaterial Interfaces in Nonviral Gene Delivery.” UCARE Project 2009-2011.

12. Berger, Stephanie. “Fiber-Templating of PEG Hydrogels for Cardiac Tissue Engineering.” UCARE Project (2008-2010), ARD Honors Thesis Funding (2010-2011). Honors Thesis 2012.

13. Sargus, Catherine. “In Vitro Elongation of Porcine Embryos using Alginate Hydrogels as 3D Matrix.” INBRE Scholar, 2009-2011.

14. Lounsbury, Donna. “Scanning Probe Microscopy to Image Ion Flux in Gastric Cells.” UCARE Project, 2008.

15. Gilkey, Andrea. “Zein microspheres for DNA Delivery.” UCARE Project (2008), INBRE Scholar (2008-2010). Honors Thesis, 2010.

16. Gengenbach, Heidi. “Extracellular Effects on Nonviral Gene Delivery.” UCARE Project (2008-2009), ARD Honors Thesis Funding (2009-2010). Honors Thesis, 2010.

2.3.2 Average Number of Undergraduate Students Advised Per Year

Average of **4** undergraduate students advised in laboratory each year; average of **20** academic advisees each year.

2.3.3 Senior Projects Advised

1. Simeng Zhang, Daniel Mentor, “Pilot Plant Scale Up for Plasmid DNA Purification”, 2010.

2. Kathlyn Do, Yueying Zhang, “Implantable Radiation Shielding Device,” 2009.

3. Donna Lounsbury, Violetta Balayan, Harrison Hoffman, Mike Bierle, “Flow Chamber for Real Time Imaging of Hepatocytes, “ 2009.

4. Andrea Tuma, Dipika Singh, Erica Levorson, “Hydrogel Patch with Physical Guidance for Cardiomyocyte Growth,” 2008.

3.4 STAFF SUPERVISION

1. Jiang, Qiuran. Part-time Postdoctoral Research Associate. September 2012 – March 2013.

2. Han, Zhongji. Full-time Postdoctoral Research Associate (co-mentored with J. Zempleni). October 2011 – June 2013.

3. Plautz, Sarah A. Full time Research Technologist III. March 2009—present.

4. Boanca, G. Full time Research Technologist II. January 2008 – December 2008.

3.5 TEACHING AWARDS AND RECOGNITION

3.5.1 Regional and Local Teaching Awards

1. Mortar Board Professor of the Month (February 2013)
2. Honorary Member of Black Masque Chapter of Mortar Board (Faculty Inductee)

3.6 OTHER TEACHING ACCOMPLISHMENTS

1. UNL Chapter of the Society of Women Engineers, advisor, 2009 - present
2. Teaching Peer Review, Course Portfolio (2008-2009)
3. Developed three new courses in Biomaterials (BSEN 416/816), Tissue Engineering (BSEN 418/818) and Delivery of Nucleic Acids (BSEN 998)
4. Coordinator for new teaching lab in Department

4. SERVICE ACCOMPLISHMENTS

4.1 PROFESSIONAL SERVICE

4.1.1 Journal for which Papers have been Reviewed

1. *Macromolecular Bioscience*, 1/2008; 12/2008; 1/2009; 8/2009
2. *Biomacromolecules,* 5/200; 2/2009; 6/2009; 8/2009; 9/2010; 2/2012; 6/2012; 9/2012; 12/2012; 2/2013
3. *Bioengineering & Biotechnology,* 5/2008; 5/2013; 09/2013; 11/2013
4. *Journal of Biomaterials Science, Polymer Edition,* 5/2008
5. *Biochemical Engineering Journal,* 6/2009
6. *Tissue Engineering,* 2/2009; 12/2013
7. *ASABE Journal;* 8/2009
8. *Journal of Biomedical Materials Research: Part A,* 8/2009; 07/2012
9. *Gene Therapy,* 10/2009
10. *WIREs Nanomedicine & Nanobiotechnology,* 10/2009
11. *Microscopy Research & Technique,* 12/2009; 09/2011

12. *Molecular Pharmaceutics,* 2/2010; 4/2011; 1/2012; 12/2012

13. *Trends in Biotechnology,* 10/2010

14. *Acta Biomaterialia,* 9/2010; 2/2013; 4/2013; 09/2013

15. *Wound Healing Society Year Book (WHSYB)- Advances in Wound Care*, 6/2011

16. *Small,* 08/2011

17. *Soft Matter*, 09/2011

18. *Bioconjugate Chemistry*, 10/2011

19. *Journal of Nanobiotechnology,* 11/2012

20. *Journal of Biological Engineering;* 12/2012

21. *Langmuir;* 2/2103; 09/2013

22. *Polymer Chemistry;* 11/2013

4.1.2 Leadership Positions in International and National Organizations

1. American Institute of Chemical Engineers (AIChE) (chair/co-chair of technical sessions in Materials Engineering and Sciences Division, 2008, 2009, 2010, 2011, 2012, 2013)

2. The Institute of Biological Engineering (IBE) (National Councilor 2001-2002; Session Chair 2010, 2012, 2013; Graduate Student Poster Judge, 2012-2013; Vice Chair of Biomedical Engineering Community, 2012)

3. Biomedical Engineering Society (BMES), chair of technical session, 2013

4.1.3 Memberships in Professional Organizations

1. North American Colleges and Teachers of Agriculture (NACTA)

2. American Association for the Advancement of Science (AAAS)

3. American Society of Gene & Cell Therapy (ASGCT)

4. American Institute of Chemical Engineers (AIChE)

5. The Institute of Biological Engineering (IBE)

6. Biomedical Engineering Society (BMES)

7. Society of Women Engineers

8. Material Research Society (MRS)

9. Tissue Engineering and Regenerative Medicine International Society (TERMIS)

4.1.4 Research Review Panels

1. India Science & Technology Partnership (INSTP) at Smithsonian Institution (4/2010)
2. NSF Biomaterials Program (3/2010; 5/2011)
3. NIH (ad hoc mail reviewer), (6/2009)
4. Kentucky Science and Engineering Foundation (4/2009; 4/2013)
5. University of Nebraska-Lincoln Office of Research (Layman Funds, 1/2009 and 11/2013)
6. Society for Biomaterials (Engineering Therapeutic Delivery from Biomaterial Scaffolds) (12/2010)
7. NSF CBET Program (12/2012; 10/2013)

4.2 UNIVERSITY SERVICE

4.2.1 Leadership Positions on University-Wide Committees

1. UNL's Nebraska Gateway for Nutrigenomics, member of management team (January 2010 – present).

4.2.2 Memberships on University-Wide Committees

1. Member, IANR Liaison Committee, University of Nebraska, Lincoln, NE (August 2013 – present).
2. Faculty Member, Chancellors Commission on the Status of Women (2013 – present).
3. Member, UNL Research Advisory Council (2013 – present).
4. Member, Nebraska Center for Materials and Nanoscience, University of Nebraska, Lincoln, NE (July 2009 – present).
5. Member, Center for Drug Delivery and Nanomedicine, University of Nebraska Medical Center, Omaha, NE (August 2008 –present).
6. Member and Investigator, Center for Nanohybrid Functional Materials, University of Lincoln, NE (July 2012 – present).
2. Life Sciences Undergraduate Curriculum Advisory Council, University of Nebraska-Lincoln (August 2010 – to present).
3. NeSIS Search Committee for Four Functional Coordinators, University of Nebraska System (May 2011 – June 2011).

4. UNMC Regenerative Medicine Program Steering Committee (August 2009 – December 2010).

5. UNL Chancellor's Life Science Advisory Committee on Instrumentation (September 2009 – December 2009).

4.3 COLLEGE SERVICE

4.3.1 Memberships on College-Wide Committees

1. UNL College of Engineering Continuous Improvement of Teaching and Learning Committee (October 2013 – present)

2. Search Committee for University of Nebraska-Lincoln Biological Process Development Facility Director, UNL (March 2012 – July 2013).

3. Search Committee for Assistant Professor in Molecular Genetics in the Department of Nutrition and Health Sciences, UNL (October 2011 – December 2011).

4.4 UNIT SERVICE

1.4.1 Memberships on Unit Committees

1. Website Oversight Committee, Department of Biological Systems Engineering, UNL (August 2012 – present).

2. CIPA (Continuous Improvement and Assessment) Committee, Chair, Department of Biological Systems Engineering, UNL (October 2011 – present).

3. Facilities Committee, Department of Biological Systems Engineering, UNL (August 2011 – July 2013)

4. Safety Committee, Department of Biological Systems Engineering, UNL (January 2009 – July 2012).

5. Search Committee for Department Head, Department of Biological Systems Engineering, UNL (December 2011—August 2012).

6. Curriculum Committee, Department of Biological Systems Engineering, UNL, (August 2009 – 2011).

7. Social Committee, Department of Biological Systems Engineering, UNL (August 2007 – 2011).

4.5 OTHER SERVICE ACCOMPLISHMENTS

1. College of Engineering NSF S.U.C.C.E.S.S. Scholar program (November 2009 – present).

2. Nebraska INBRE Scholars Program Mentor (2008 – present).

3. Bright Lights Workshop Coordinator (2009-2013).

4. LPS (Lincoln Public Schools) Summer Visit Workshop for High School Science Teachers (2008).