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Education

The University of Utah, Salt Lake City, Utah 1997- 2003
Ph.D. Bioengineering
Dissertation: “Glycosaminoglycan Hydrogels for Wound Healing”
Advisor: Glenn D. Prestwich, Ph.D.

University of Michigan, Ann Arbor, Michigan 1993 - 1997
B.S.E Materials Science and Engineering (*magna cum laude*)

Research and Professional Experience

Assistant Research Professor 2015 - present
Center for Biofilm Engineering, Montana State University, Bozeman, Montana

Research Scientist 2006 - 2014
Center for Biofilm Engineering, Montana State University, Bozeman, Montana

Senior Manager Scientist I 2005 - 2006
Bacterin International Inc., Belgrade, Montana

Research Scientist 2004 - 2005
Organ Recovery Systems, Charleston, South Carolina

Graduate Research Assistant 1997 - 2003
The University of Utah, Salt Lake City, Utah

Research Assistant 1996 - 1997
University of Michigan, Veterans Administration Hospital, Ann Arbor, Michigan

Publications

R.V. Dutra de Oliveira, F.S.S Bonafé, D.M.P Spolidorio, C.Y. Koga-Ito, A.L. de Farias, K.R. Kirker, G.A. James, F.L. Brighenti. “*Streptococcus mutans* and *Actinomyces naeslundii* Interaction in Dual-Species Biofilm.” *Microorganisms* 8(2):194 (2020).

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- J. Woods, L. Boegli, K.R. Kirker, A.M. Agostinho, A.M. Durch, E. deLancy Pulcini, P.S. Stewart, and G.A. James, “Development and Application of a Polymicrobial in vitro Wound Biofilm Model” *J Appl Micro* 112:9898-1006 (2012).
- L.E. Miller, D.J. Jacofsky, K.R. Kirker, K.L Fitzpatrick, G.A. Juda, and J.E. Block, “Rationale, Characteristics, and Clinical Performance of the OsteoSponge®: A Novel Allograft for Treatment of Osseous Defects” *Orthop Res Rev* 2012(4):9-17 (2012).
- K.R. Kirker, G.A. James, P. Fleckman, J.E. Olerud, and P.S. Stewart, “Differential Effects of Planktonic and Biofilm MRSA on Human Fibroblasts” *Wound Repair Regen* 20(2):253-261 (2012).
- C. Lipp, K.R. Kirker, A. Agostinho, G.A. James, and P.S. Stewart, “Testing Wound Dressings Using a New *In Vitro* Wound Model” *J Wound Care* 19(6):220-227 (2010).
- K.R. Kirker, S.T. Fisher, and G.A. James, D McGhee, and C.B. Shah, “Efficacy of Kendall™ AMD Antimicrobial Foam Dressing Against MRSA” *Wounds* 21(9):229-233 (2009).
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- G.D. Prestwich, X.Z. Shu, Y. Liu, S. Cai, J.F. Walsh, C.W. Huges, S. Ahmad, K.R. Kirker, B. Yu, R.R. Orlandi, A.H Park, S.L. Thibeault, S. Duflo, and M.E. Smith, “Injectable Synthetic Extracellular Matrices for Tissue Engineering and Repair,” *Adv Exp Med Biol* 585:125-133 (2006).
- S. Scott, K.R. Kirker, K. Fitzpatrick, and J. Shelby, “OsteoSponge™: A Novel Osteoinductive Bone Allograft Material,” White paper, Bacterin International (2006).
- K.R. Kirker, Y. Luo, S.E. Morris, J. Shelby, and G.D. Prestwich, “Glycosaminoglycan Hydrogels for Wound Healing.” *Hyaluronan: Structure, Metabolism, Biological Activities, Therapeutic Applications* (E.A. Balazs and V.C. Hascall, eds.), Matrix Biology Institute, New Jersey, pp. 397-400 (2005).

G.D. Prestwich, X.Z. Shu, Y. Liu, K.R. Kirker, H. Li, J. Shelby, S.E. Morris, and S.D. Gray
“In Situ Crosslinkable Synthetic Extracellular Matrices for Tissue Repair and Prevention of
Surgical Adhesions.” *Hyaluronan: Structure, Metabolism, Biological Activities,
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“Composite Articular Cartilage Engineered on Chondrocyte-Seeded Aliphatic Polyurethane
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K.R. Kirker, Y. Luo, S.E. Morris, J. Shelby, and G.D. Prestwich, “Glycosaminoglycan
Hydrogel Films as a Supplemental Wound Dressing Material for Donor Sites,” *J Burn
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K.R. Kirker, Y. Luo, J.H. Nielson, J. Shelby, and G.D. Prestwich, “Glycosaminoglycan
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Y. Luo, K.R. Kirker, and G.D. Prestwich, “Modification of Natural Polymers: Hyaluronic
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Polytetrafluoroethylene,” *Biomaterials*, 21(1): 31-36 (2000).

G.D. Prestwich, Y. Luo, M.R. Ziebell, K.P. Vercruyse, K.R. Kirker, and J.S. MacMaster,
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G.D. Prestwich, Y. Luo, K.R. Kirker, M.R. Ziebell, and J. Shelby, “Hyaluronan Biomaterials
for Targeted Drug Delivery and Wound Healing,” *HA 2000*, Woodhead Publishing Ltd.,
Abington, UK (2000).

Y. Luo, K.R. Kirker, and G.D. Prestwich, “Hyaluronic Acid Hydrogel Film: A New
Biomaterial for Drug Delivery and Wound Healing,” *HA 2000*, Woodhead Publishing Ltd.,
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Patents

- N.J. Shelby, S.M. Scott, B.P. Luchsinger, G.A. Juda, K.R. Kirker, J. Hernandez, D.L Holmes. “Process for Demineralization of Bone Matrix with Preservation of Natural Growth Factors.” (2019). US Patent No. 10,478,525.
- N.J. Shelby, S.M. Scott, B.P. Luchsinger, G.A. Juda, K.R. Kirker, J. Hernandez, D.L Holmes. “Process for Demineralization of Bone Matrix with Preservation of Natural Growth Factors.” (2015). US Patent No. 9,114,191.
- N.J. Shelby, S.M. Scott, B.P. Luchsinger, G.A. Juda, K.R. Kirker, J. Hernandez, D.L Holmes. “Process for Demineralization of Bone Matrix with Preservation of Natural Growth Factors.” (2015). US Patent No. 8,992,964.
- G.D. Prestwich, X.Z. Shu, Y. Luo, K.R. Kirker, and Y. Liu. “Crosslinked Compounds and Methods of Making and Using Thereof.” (2014). US Patent No. 8,859,523
- N.J. Shelby, S.M. Scott, B.P. Luchsinger, G.A. Juda, K.R. Kirker, J. Hernandez, D.L Holmes. “Process for Demineralization of Bone Matrix with Preservation of Natural Growth Factors.” (2013). US Patent No. 8,574,825.
- G.D. Prestwich, K.R. Kirker, S. Gray, X.Z. Shu, H. Li, and Y. Liu. “Anti-Adhesion Composites and Methods and use Thereof.” (2012). US Patent No. 8,324,184
- G.D. Prestwich, X.Z. Shu, Y. Luo, K.R. Kirker, and Y. Liu. “Crosslinked Compounds and Methods of Making and Using Thereof.” (2011). US Patent No. 7,928,069

Grants

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| National Institute of Arthritis and Musculoskeletal and Skin Diseases
1R03AR060995-01A1
Title: <i>Staphylococcus aureus</i> Biofilms Mediate Keratinocyte Apoptosis
Role: Co-Principal Investigator | 2012 - 2015 |
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Poster/Invited Speaker

- P. Secor, K.R. Kirker, G.A. James, P. Fleckman, J. Olerud, and P.S. Stewart, “The Impact of *S. aureus* Biofilm on Human Keratinocytes.” (Poster) American Society for Microbiology Biofilms Conference, Cancun, Mexico (2009).
- C. Lipp, K.R. Kirker, A. Agostinho, G.A. James, and P.S. Stewart, “Testing Wound Dressings Using A New *In Vitro* Wound Model.” (Poster) Society for Advancement of Wound Care/Wound Healing Society, Dallas, TX (2009).
- S. Nielsen-Preiss, J. Gillette, K.R. Kirker, Annexin A2 and Lipid Microdomains Regulate Matrix Vesicle-associated ALP Activity Required for Osteoblastic Mineralization.” (Poster) American Society for Cell Biology, San Francisco, CA (2008).

- K.R. Kirker, P. Secor, G.A. James, P. Fleckman, J.E. Olerud, and P.S. Stewart
“*Staphylococcus aureus* Biofilms Prevent Scratch Wound Closure *In Vitro*.” (Poster)
Society for Advancement of Wound Care/Wound Healing Society, San Diego, CA (2008).
- K. Fitzpatrick, Y-I. Yang, K.R. Kirker, M. Massey, and J. Shelby. “Extracellular Matrix Molecules Enhance Allograft Skin Viability.” (Poster) Society for Biomaterials Annual Meeting, Pittsburg, PA (2006).
- Y-I. Yang, K.R. Kirker, M. Massey, and J. Shelby. “Adult-Derived Adipose Stem Cells for Bone Regeneration.” (Poster) Society for Biomaterials Annual Meeting, Pittsburg, PA (2006).
- K.R. Kirker. “The Use of Adult-Derived Adipose Stem Cells for Bone Regeneration.” (Invited Speaker) BioInterface 2005, Minneapolis, MN (2005).
- I. Erickson, Y-I. Yang, K. Fitzpatrick, K.R. Kirker, M. Massey, and J. Shelby. “Improved Viability of Adipose-Derived Adult Stem Cells After Cryopreservation Using Hyaluronan as a Media Supplement.” (Poster) BioInterface, Minneapolis, MN (2005).
- K. Fitzpatrick, Y-I. Yang, K.R. Kirker, M. Massey, and J. Shelby. “Enhanced Viability of Stored Human Skin Tissue.” (Poster) BioInterface, Minneapolis, MN (2005).
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- K.R. Kirker, Y. Luo, J.H. Nielson, J. Shelby, and G.D. Prestwich. “Glycosaminoglycan Hydrogel films: New Biomaterials for Wound Healing.” (Poster) Gordon Research Conference on Biomaterials: Biocompatibility and Tissue Engineering, Holderness, NH (2001).

Journal Peer Reviewer

Biofouling
Bioorganic & Medicinal Chemistry Letters
International Journal of Molecular Sciences
International Scholarly Research Notices
Journal of Applied Polymer Science
Journal of Diabetes Research
Journal of Pathogens
Journal of Wound Care
Journal of Tissue Engineering and Regenerative Medicine