

CURRICULUM VITAE

Jennifer Melander

Jennifer R. Melander, Ph.D.

I.Ph.D. Oral Biology and Engineering
B.S., M.S. Biological Systems Engineering

Contact Information

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Current Appointment

Assistant Professor, Department of Biological Systems Engineering

EDUCATION

2006-2010:

Interdisciplinary Ph.D.

Coordinating Discipline: Oral Biology, Co-Discipline: Engineering
University of Missouri-Kansas City (UMKC)
Dissertation title: Evaluation of a Silorane System for use in Stabilization of Traumatic Bone Injuries
Advisor: Dr. J. David Eick

2003-2005:

Master of Science

Agricultural and Biological Systems Engineering
University of Nebraska-Lincoln (UNL)
Thesis title: Adaptive Reconstruction of Ultrasonic Signals for Imaging Teeth
Advisor: Dr. Gregory Bashford

1999-2003:

Bachelor of Science

Biological Systems Engineering, emphasis in Biomedical Engineering
University of Nebraska-Lincoln

TEACHING EXPERIENCE

August 2012 – present:

Instructor, UNL.

BSEN 317: Introduction to Biomedical Engineering (3 semesters)
BSEN 225: Engineering Properties of Biological Materials (2 semesters)
BSEN 496: Independent Study/Biology for Engineers (1 semester)

June 2010-July 2012:

Adjunct Instructor, UMKC School of Computing and Engineering.

ME 111: Essential Engineering (1 semester)
co-taught with Dr. Deb O'Bannon
CE 275: Engineering Statics (3 semesters)
ME 285: Engineering Dynamics (3 semesters)

January 2007-May 2007:

Teaching Assistant, UMKC School of Dentistry.

BISC 739: Biomaterials for the Dental Specialist.
Professor: Dr. Mary Walker

January 2004-May 2005: **Teaching Assistant**, Biological Systems Engineering Department, UNL.
BSEN 311: Biomedical Signals and Systems.
BSEN 414: Medical Imaging Systems.
BSEN 317: Introduction to Biomedical Engineering.
Professor: Dr. Gregory Bashford

RESEARCH EXPERIENCE

June 2010-July 2012: **Postdoctoral Fellow**
Oral Biology Department, University of Missouri-Kansas City
Research Area: Development of a silorane-based bone cement
Advisor: Dr. J. David Eick

August 2006-May 2010: **Graduate Research Assistant, I.Ph.D. Program**,
Oral Biology Department, University of Missouri-Kansas City
Advisor: Dr. J. David Eick

May 2006-July 2006: **Short-Term Research Training Program in Dental and Craniofacial Bioengineering**
Oral Biology Department, University of Missouri-Kansas City
Research Area: Water-compatible photoinitiators and nano-phase separated dentin adhesives
Advisors: Drs. Paulette Spencer, Anil Misra and Qiang Ye

August 2003-August 2005: **Graduate Research Assistant, M.S. Studies**
Biological Systems Engineering Department, University of Nebraska-Lincoln
Advisor: Dr. Gregory Bashford

May 2002-August 2002: **Student Research Assistant**
Eppley Cancer Research Institute, University of Nebraska Medical Center
Research Area: Development of Transfection Protocol for Tapasin Mutations into Fibroblast Cells
Advisor: Dr. Joyce Solheim

LEADERSHIP & SERVICE

February 2015 – present **Extension Professional Orientation & Campus Visit Host**
University of Nebraska-Lincoln

June 2014 – present **Coordinator, National Center for Agricultural Literacy**
University of Nebraska-Lincoln

July 2014 – present **Committee Member, K-12 Workshop Committee**
K-12 and Precollege Engineering Division
American Society of Engineering Education

July 2014 – present **Secretary, New Engineering Educators Division**
American Society of Engineering Education

January 2014 – present **Faculty Advisor, Pregnancy Center on Campus**
University of Nebraska-Lincoln

June 2013 – present **Faculty Advisor, Alpha Zeta**
University of Nebraska-Lincoln

August 2012 – present	Junior Faculty Advisor, Biomedical Engineering Society (BMES) University of Nebraska-Lincoln
April 2010-August 2010	Search Committee for Department of Oral Biology Chair UMKC School of Dentistry
March 2009-March 2010	Student Representative on Advanced Education Committee UMKC School of Dentistry
August 2007-August 2011	Coordinator of Professional Development Seminar UMKC School of Dentistry
Manuscript Reviewer:	International Journal of Dentistry Transactions of the American Society of Agricultural and Biological Engineering

RESEARCH AND DESIGN SUPERVISION

M.S. students

August 2014 – present	Molly Brandt National Center for Agricultural Literacy Evaluation Development
April 2013 – July 2013	Jessica Taylor Zein: Novel Natural Polymer for Nanoparticle- and Film-Mediated Gene Delivery
July 2009 – July 2010	Dr. Benjamin Frandsen D.D.S., Master of Science in Oral Biology, UMKC Effect of Topical Fluoride Prophylactic Agents on the Mechanical Properties of Fiber Reinforced Polymer (FRP) Orthodontic Wires

Dental students

December 2009 – February 2010	Alex Mitts and Philip Tong Shin 4 th year dental students, Table Clinic, UMKC Effect of Elastomeric Impression Material Stiffness/Hardness on Impression Removal Difficulty
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B.S. students

January 2015 – present	Katie Meiergerd Biological Systems Engineering, UNL K-12 Engineering outreach activity development
October 2014 – present	Whitney Schultz Mechanized Systems Management, UNL National Center for Agricultural Literacy
October 2014 – present	Jared Beyersdorf, Ted Kocher, Kelli Rice and Emily Harrison McKenzie's Mobility Team Senior Design Project, faculty consultant Biological Systems Engineering, UNL
May 2014 – present	Mackenzie Miller Biological Systems Engineering, UNL Wear-TEC teacher trainings and student workshops

August 2013 – May 2014	Nikolai Reitz Biological Systems Engineering, UNL UCARE: Development and Validation of E-Textile Activities to Teach Elementary Students the Engineering Design Process
May 2013 – August 2013	Maggie Clay Biological Systems Engineering, UNL Mad Science Mondays at the Edgerton Explorit Center Aurora, NE
October 2012 – May 2013	Monica Krause, Jared Ostdiek, and Katelyn Stanley Abdominal Pressure Sensing Dressing Senior Design Project, faculty consultant Biological Systems Engineering, UNL
June 2012 – July 2012	Grant Meyer Mechanical Engineering, UMKC Material Properties of Experimental Biopolymers for Dental and Orthopaedic Applications
February 2012 – July 2012	Daniel Rodman Chemistry, UMKC Material Properties of Experimental Biopolymers for Dental and Orthopaedic Applications
March 2011 – July 2012	Ryan Holmes Civil Engineering, UMKC Material Properties of Experimental Biopolymers for Dental and Orthopaedic Applications
September 2011 – May 2012	Beth Cowles, Liz Hungerford, and Tyler Borcyk Bone Cement Mixing Device Senior Design Project, client Biological Systems Engineering, UNL
January 2011 – May 2011	Aaron Dorsett Mechanical Engineering, UMKC Mechanical Testing of Silorane Bone Cement
August 2010 – May 2011	Johnathon McCoy, Allison Mettler, Cady Sargus, and Ted Kocher Placement Guide for Internal Silorane Fracture Stabilization Senior Design Project, client Biological Systems Engineering, UNL
July 2002 – May 2003	Hajira Ahmad Biological Systems Engineering, UNL

RESEARCH

Grants Submitted/In-preparation

National Science Foundation
Title: WearTEC + C
Planned submission to NSF STEM+C program on 4/14/15
Role: Co-PI

Grants Currently Funded

National Science Foundation
Title: Ne Wearable Technologies/WearTEC
Period: 10/1/14 – 9/30/17
Amount Received: \$984,189
Role: Co-PI

Nebraska Coordinating Commission for Postsecondary Education
Title: Nebraska Blast!
Period: 2/18/14 – 5/15/15
Amount Received: \$78,130
Role: Co-PI

Grants Previously Funded

Nebraska Department of Education
Title: Biomedical Engineering Workshop
Period: 6/1/14 – 9/30/14
Amount Received: \$500
Role: PI

National 4-H Council
Title: 4-H Challenge Youth to be Solution
Period: 1/27/14 – 12/31/14
Amount Received: \$15,000
Role: Co-PI

Grants Not Funded

National Science Foundation
Title: REU Site: STEM Ed
Period: 6/1/15 – 5/31/18
Amount Requested: \$387,525
Role: Participant

National Science Foundation DRK-12
Title: Project SENSE (Sensors for Engineering and Science Exploration)
Period: 7/1/13 – 6/30/17
Amount Requested: \$2,953,460
Role: Co-PI

Manuscripts

Melander JR, Adams KA. Cross-Disciplinary Outreach Activity to Help Engineering Students Develop Communication Skills. (in preparation)

Melander JR, Holmes RR, Weiler RA, Miller BD, Schuman T, Kilway KV, and Eick JD. Expanding monomers decrease polymerization stress of methacrylate composites. (in preparation)

Weiler RA, Miller BD, **Melander JR**, Nalvarte EL, Bonewald LF, Eick JD, and Kilway KV. An investigation of initiation systems for a silorane co-monomer. (in preparation)

Yao X, Carleton SM, Kettle AD, Phillips CL, **Melander JR**, and Wang Y. Gender-dependence of bone structure and properties in adult osteogenesis imperfecta murine model. *Annals of Biomedical Engineering*. 2013. 41(6); 1139-1149.

Walker MP, Alderman N, Petri C, **Melander J**, and McGuire J. Correlation of impression removal force with elastomeric impression material rigidity and hardness. *J Prosthodont* 2013. 22(5); 362-366.

Eick JD, Barragan-Adjemian C, Rosser J, **Melander JR**, Dusevich V, Weiler RA, Miller BD, Kilway KV, Dallas MR, Bi L, Nalvarte EL, and Bonewald LF. Silorane resin supports proliferation, differentiation and mineralization of MLO-A5 bone cells *in vitro* and bone formation *in vivo*. *J Biomedical Materials Research Part B*. 2012. 100B; 850-861.

Melander JR, Weiler RA, Miller BD, Schuman T, Kilway KV, Day DE, Velez M, and Eick JD. Estimation of properties of a photoinitiated silorane-based composite with potential for orthopaedic applications. *J Biomedical Materials Research Part B*. 2012. 100B(1); 163-169.

Melander JR, Dunn WP, Link M, Wang Y, Xu C, and Walker MP. Comparison of flexural properties and surface roughness of nanohybrid and microhybrid dental composites. *General Dentistry*. 2011. 59(5). 342-347.

Velez M, He Y, Day DE, Schuman TP, Kilway KV, **Melander JR**, Weiler RA, Miller BD, Nalvarte EL, and Eick JD. Processing of yttrium aluminosilicate (YAS) glasses for dental composites. *Ceramica*. 2011. 57(341); 1-9.

DiMartino A, Doné K, Judkins T, Morse J, **Melander J**, Oleynikov D, and Hallbeck S. Ergonomic laparoscopic tool handle design. *Human Factors and Ergonomics Society Annual Meeting Proceedings*. 2004. 48(12); 1354-1358.

Book Chapter

Dusevich VM, **Melander JR**, and Eick JD. (2013). SEM in dental research. In Heide Schatten (Ed.), *Scanning Electron Microscopy for the Life Sciences* (pp 211-235). Cambridge, UK: Cambridge University Press.

Theses

Doctoral: "Evaluation of a Silorane System for use in Stabilization of Traumatic Bone Injuries" University of Missouri-Kansas City, MO, USA 2010.

Masters: "Adaptive Reconstruction of Ultrasonic Signals for Imaging Teeth" University of Nebraska-Lincoln, NE, USA 2005.

Abstracts

Melander JR, Weiler RA, Miller BD, Kilway KV, and Eick JD. Handling Properties and Exothermicity of Chemically Initiated Silorane Biomaterial. 89th Annual Meeting & Exhibition of the International Association for Dental Research. *J Dent Res* 90 Spec Issue: 3540, 2011

Walker MP, Mitts DA, Shin TP, **Melander JR**, and McDonald SK. Effect of Elastomeric Impression Material Stiffness/Hardness on Impression Removal Difficulty. 89th Annual Meeting & Exhibition of the International Association for Dental Research. J Dent Res 90 Spec Issue: 392, 2011

Weiler RA, **Melander JR**, Miller BD, Kilway KV, Bonewald LF, and Eick JD. Physical Properties of Filled Chemically Initiated Silorane Biomaterials. 89th Annual Meeting & Exhibition of the International Association for Dental Research. J Dent Res 90 Spec Issue: 1186, 2011

Miller BD, Weiler RA, **Melander JR**, Nalvarte EL, Kilway KV, Bonewald LF, and Eick JD. Biocompatibility of a Chemically Initiated Silorane Resin. 89th Annual Meeting & Exhibition of the International Association for Dental Research. J Dent Res 90 Spec Issue: 2514, 2011

Melander J, Ghotbi A, Thiagarajan G, McDonald S, and Walker MP. Assessment of Modifications to Notched Triangular Prism Method. J Dent Res 89 Spec Issue: 1234, 2010.

Melander J, Weiler RA, Miller B, Kilway K, and Eick JD. Flexural Properties of Mixed-Initiator Silorane Bone Stabilizer. J Dent Res 89 Spec Issue: 1107, 2010.

Kilway, KV, Weiler RA, **Melander J**, Miller BD, Schuman T, Velez M, Day D, Bonewald, L, and Eick JD. Investigation of Mixed Initiated Cationic Polymerization of a Silorane Resin. J Dent Res 89 Spec Issue: 1038, 2010.

Eick JD, Weiler RA, Sylvester D, Hendricks K, **Melander JR**, and Kilway KV. Optimization and Investigation of Acid-Catalyzed Polymerization of SilMix®. J Dent Res 88 Spec Issue: 2412, 2009.

Melander JR, Weiler RA, Kilway KV, and Eick JD. Properties of chemically initiated silorane bone stabilizers. J. Dent Res 88 Spec Issue: 2562, 2009.

Melander JR, Walker MP, Fricke B and Dunn, WP. Development/Preliminary Validation of a Modified Notchless Triangular Prism Protocol. J Dent Res 87 Spec Issue: 0132, 2008.

Spencer P, Ye Q, Wang Y, Walker MP, Misra A, Marangos O, Kostoryz EL, **Melander JR**, and Gorman N. Structure/Property Relationships in Environmentally Stressed Dentin Adhesives. J Dent Res 86 Spec Issue: 0117, 2007.

Ye Q, Wang Y, **Melander JR**, Gorman N, Marangos O, Misra A, and Spencer P. Water-compatible Photoinitiators and Nano-Phase Separated Dentin Adhesives. J Dent Res 87 Spec Issue: 2009, 2007.

Bashford GR, Morse JL and **Melander JR**. Novel Fusion Algorithms for Medical Ultrasound Tomography. Proc. SPIE 5559, 392, 2004.

PROFESSIONAL PRESENTATIONS

Invited Talks

“The Diagnosis and Treatment of Biopolymer Stress” Oral Biology Seminar, Department of Oral Biology, School of Dentistry, University of Missouri-Kansas City, February 15, 2012

“Silorane Composites for Orthopaedic Applications” Oral Biology Seminar, Department of Oral Biology, School of Dentistry, University of Missouri-Kansas City, June 1, 2011

“Stabilization of Bone Fractures using a Silorane Composite” Alumni Presentation, Department of Biological Systems Engineering, University of Nebraska-Lincoln, April 7, 2010

Conference Proceedings

*Adams KA, **Melander JR**. Preparing Pre-Service Teachers to Make Connections between Science and Engineering Concepts through Teamwork with Engineering Students. Oral Presentation, 122nd ASEE Annual Conference & Exposition, Seattle, WA, June 2015.

Melander JR, Curtis E, Adams KA, and Arthurs L. "A Cross-Disciplinary, Service Learning-Based Approach to Enhance Communication Skills." Oral Presentation, ASABE 2014 Annual International Meeting, Montreal, QC, CA, July 2014.

***Melander JR**, Holmes RR, Yao X, Weiler RA, and Eick JD. "Measuring Strain in Bone Cement with Carbon Nanotubes." Poster Presentation, ASME 2012 Summer Bioengineering Conference, Fajardo, PR, June 2012.

*Holmes RR, **Melander JR**, Weiler RA, Schuman TS, Kilway KV, and Eick JD. "Polymerization Stress and the Influence of TOSU Addends on Methacrylate Composites." Poster Presentation, ASME 2012 Summer Bioengineering Conference, Fajardo, PR, June 2012.

***Melander JR**, Holmes RR, Weiler RA, Miller BD, Kilway KV, Schuman TS, and Eick JD. "TOSU Addends Maintain Mechanical Properties while Decreasing Polymerization Stress." Poster Discussion Presentation, 41st Annual Meeting & Exhibition of the American Association of Dental Research, Tampa, FL, March 2012.

***Melander JR**, Weiler RA, Miller BD, Kilway KV, and Eick JD. "Improving the Strength of a Silorane Bone Cement." Poster Presentation, Missouri Musculoskeletal Conference, July 2011.

***Melander JR**, Weiler RA, Miller BD, Kilway KV, and Eick JD. "Flexural Properties of Silorane Bone Cement." Poster Presentation, ASME 2011 Summer Bioengineering Conference, Farmington, PA, June 2011.

***Melander JR**, Weiler RA, Miller BD, Kilway KV, and Eick JD. "Handling Properties and Exothermicity of Chemically Initiated Silorane Biomaterial." Poster Presentation, 89th Annual Meeting & Exhibition of the International Association for Dental Research, San Diego, CA, March 2011.

*Walker MP, Mitts DA, Shin TP, **Melander JR**, and McDonald SK. "Effect of Elastomeric Impression Material Stiffness/Hardness on Impression Removal Difficulty." Oral Presentation, 89th Annual Meeting & Exhibition of the International Association for Dental Research, San Diego, CA, March 2011.

*Weiler RA, **Melander JR**, Miller BD, Kilway KV, Bonewald LF, and Eick JD. "Physical Properties of Filled Chemically Initiated Silorane Biomaterials." Poster Presentation, 89th Annual Meeting & Exhibition of the International Association for Dental Research, San Diego, CA, March 2011.

*Miller BD, Weiler RA, **Melander JR**, Nalvarte EL, Kilway KV, Bonewald LF, and Eick JD. "Biocompatibility of a Chemically Initiated Silorane Resin." Poster Presentation, 89th Annual Meeting & Exhibition of the International Association for Dental Research, San Diego, CA, March 2011.

*Kilway KV, Weiler RA, **Melander JR**, Miller BD, Bi LX, Schuman TP, Day DE, Bonewald LF, and Eick JD. "Development of a novel biomaterial for orthopaedic applications." Oral Presentation, 2010 Midwest Regional Meeting of the American Chemical Society, Wichita, KS, October 2010.

***Melander JR**, Weiler RA, Miller BD, Kilway KV, and Eick JD. "Model of Silorane Composite for Bone Stabilization Application." Oral Presentation, ASME 2010 Summer Bioengineering Conference, Naples, FL, June 2010.

***Melander JR**, Ghotbi A, Thiagarajan G, McDonald S, and Walker MP. "Assessment of Modifications to Notched Triangular Prism Method." Oral Presentation, 39th Annual Meeting & Exhibition of the American Association of Dental Research, Washington, DC, March 2010.

Melander JR, Weiler RA, Miller B, Kilway K, and *Eick JD. "Flexural Properties of Mixed-Initiator Silorane Bone Stabilizer." Poster Presentation, 39th Annual Meeting & Exhibition of the American Association of Dental Research, Washington, DC, March 2010.

*Kilway, KV, Weiler RA, **Melander JR**, Miller BD, Schuman T, Velez M, Day D, Bonewald, L, and Eick JD. "Investigation of Mixed Initiated Cationic Polymerization of a Silorane Resin." Poster Presentation, 39th Annual Meeting & Exhibition of the American Association of Dental Research, Washington, DC, March 2010.

***Melander JR**, Weiler RA, Miller B, Kilway KV, and Eick JD. "Properties of Chemically Activated Silorane Polymers for Use as Bone Stabilizers." Poster Presentation, 2009 Biomedical Engineering Society Annual Fall Meeting, Pittsburgh, PA, October 2009.

Eick JD, Weiler RA, Sylvester D, Hendricks K, **Melander JR**, and *Kilway KV. "Optimization and Investigation of Acid-Catalyzed Polymerization of SilMix®." Poster Presentation, 86th Annual Meeting & Exhibition of the International Association for Dental Research, Miami, FL, April 2009.

***Melander JR**, Weiler RA, Kilway KV, and Eick JD "Properties of chemically initiated silorane bone stabilizers." Poster Presentation, 86th Annual Meeting & Exhibition of the International Association for Dental Research, Miami, FL, April 2009.

***Melander JR**, Walker MP, Fricke B and Dunn, WP. "Development/Preliminary Validation of a Modified Notchless Triangular Prism Protocol." Oral Presentation, 37th Annual Meeting & Exhibition of the American Association for Dental Research, Dallas, TX, April 2008.

*Spencer P, Ye Q, Wang Y, Walker MP, Misra A, Marangos O, Kostoryz EL, **Melander JR**, and Gorman N. "Structure/Property Relationships in Environmentally Stressed Dentin Adhesives." Oral Presentation, 36th Annual Meeting & Exhibition of the International Association for Dental Research, New Orleans, LA, March 2007.

*Ye Q, Wang Y, **Melander JR**, Gorman N, Marangos O, Misra A, and Spencer P. "Water-compatible Photoinitiators and Nano-Phase Separated Dentin Adhesives." Poster Presentation, 36th Annual Meeting & Exhibition of the International Association for Dental Research, New Orleans, LA, March 2007.

***Melander JR** and Bashford GR. "Ultrasonic Detection of Tooth Fracture." Oral Presentation, Heartland Biomedical Engineering Symposium, Omaha, NE, April 18, 2005.

*Bashford GR, Morse JL, and **Melander JR**. "Novel fusion algorithms for medical ultrasound tomography." 49th SPIE Annual Meeting: Advanced Signal Processing Algorithms, Architectures, and Implementations. Denver, CO, August 2004.

*indicates presenter

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

2013 – present:	Member of American Society of Agricultural and Biological Engineers (ASABE)
2013 – present:	Member of American Society of Engineering Education (ASEE)
2013 – present:	Member of North American Colleges & Teachers of Agriculture (NACTA)
2009 – 2012:	Member of American Society of Mechanical Engineers (ASME)
2006 – 2012:	Member of International Association of Dental Research (IADR)
2001 – 2004:	Member of Biomedical Engineering Society (BMES)

HONORS AND AWARDS

2015 UNL Parents Recognition Award
2011 Inducted into Tau Beta Pi, Engineering Honor Society
2009 Dean's Doctoral Fellowship, University of Missouri-Kansas City

COMMUNITY SERVICE

January 2008-May 2010

Science and Math Placement Instructor – W.E.B. DuBois Learning Center, Kansas City, MO

- Tutor inner city students (grades 2–12) in science and math twice a week