Dr. Cassandra M. Birrenkott
South Dakota School of Mines and Technology
Department of Mechanical Engineering
501 East Saint Joseph Street
Rapid City, SD 57701
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Email: cassandra.birrenkott@sdsmt.edu

EDUCATION

South Dakota School of Mines & Technology	B.S., Metallurgical Engineering	2007
University of Illinois at Urbana-Champaign	Ph.D., Materials Science & Engineering	2012

Ph.D. DISSERTATION

"Multiscale Characterization of Mechanochemical Reactions in Mechanophore-Crosslinked Polymers Under Shear Loading" (Nancy R. Sottos, Chair)

PROFESSIONAL EXPERIENCE

2018 - current	Associate Professor, Department of Mechanical Engineering, SDSM&T
2012 - 2018	Assistant Professor, Department of Mechanical Engineering, SDSM&T
2007 - 2012	Graduate Research Assistant, Materials Science & Engineering Department, University of Illinois at Urbana-Champaign
2006	Research Assistant, Pacific Northwest National Laboratory
2004-2006	Research Assistant, Advanced Material Processing Center, SDSM&T
2004	Research Assistant, Oak Ridge National Laboratory

RESEARCH AWARDS

- "Submersible Vehicles and Submarines Teaching Module: Development and Implementation"
  - Sponsor: Diversity Task Force for SD EPSCoR
  - Grant Period: June 7, 2013 – December 31, 2013
  - Budget: $4,910
  - PIs: Cassandra Degen, Mark Bedillion, Karim Muci-Kuchler, Marius Ellingsen

- "Novel Routes to Achieve Self-Healing Elastomeric Polymers"
  - Sponsor: Nelson Research Grant, SDSM&T Foundation
  - Grant Period: July 1, 2013 – June 30, 2014
  - Budget: $4,620
  - PIs: Cassandra Degen

- "Composite and Nanocomposite Advanced Manufacturing Center (CNAM Center)"
  - South Dakota Research Infrastructure Center Programs
  - Grant Period: August 2013 – August 2018
  - Budget: $2,311,511
  - PIs: David Salem, Co-PIs: Hao Fong, Marc Robinson, Haiping Hong, William Cross
  - Involved faculty: Kevin Hadley, Cassandra Degen

- "Basic Small-Scale Submarine for Educational and Outreach Activities"
  - Sponsor: NASA Project Innovation Grant
  - Grant Period: July 1, 2013 – May 25, 2014
  - Budget: $20,000
  - PIs: Mark Bedillion, Karim Muci-Kuchler, Cassandra Degen

- "John T. Vucurevich Foundation Culture and Attitude Scholarship Program"
  - Sponsor: John T. Vucurevich Foundation
  - Grant Period: August 2015 - December 2016
  - Budget: $125,000
  - PIs: Michael West, Jon Kellar, Stuart Kellogg, Jennifer Karlin, Paula Jensen, Cassandra Degen

- "Promoting System-Level Thinking in Undergraduate Engineering Courses"
  - Sponsor: Office of Naval Research (ONR) STEM Program
  - Grant Period: October 1, 2015 - September 30, 2017
  - Budget: $303,224
  - PIs: Karim Muci-Kuchler, Mark Bedillion, Cassandra Degen, Marius Ellingsen, Shaobo Huang

- "Combined Mechanical and Optical Experimental Setup (CMOES)"
  - Sponsor: DOD Defense University Research Instrumentation Program (DURIP)
  - Grant Period: July 2016 – February 2018
  - Budget: $268,828
  - PIs: Cassandra Degen, Marius Ellingsen, Marc Robinson, Kurt Katzenstein, Grant Crawford

- "Physics-Based Modeling to Advance Research of Innovative Composite Joining Technologies"
  - Sponsor: South Dakota Board of Regents Competitive Research Grant Program
  - Grant Period: August 2016 – May 2018
  - Budget: $99,425
  - PIs: Cassandra Degen, Albert Romkes

- "S-STEM: Culture and Attitude II"
  - Sponsor: NSF DUE - Strand 2: S-STEM: Design & Dev - Type 1 Single Ins
  - Grant Period: January 2017 – January 2022
  - Budget: $982,625
  - PIs: Mike West (PI), Shaobo Huang (co-PI), Paula Jensen (co-PI), Jon Kellar, Cassandra Degen, Jennifer Benning, Andrea Brickey, Kelli McCormick, Lisa Carlson (senior personnel)

- "Incorporating System Thinking and Systems Engineering Concepts in Undergraduate Engineering Courses"
  - Sponsor: FY17 Funding Opportunity Announcement (FOA) for Navy and Marine Corps Science, Technology, Engineering & Mathematics (STEM) Education, Outreach and Workforce Program, N00014-17-S-F002
  - Grant Period: January 2018 – January 2020
  - Budget: $246,708
  - PIs: Karim Muci-Kuchler, Mark Bedillion (Carnegie Mellon University), Cassandra Degen, Clifford Whitcomb (Naval Postgraduate School), Marsha Lovett (Carnegie Mellon University)

- "ORGANIZATIONAL: South Dakota School of Mines and Technology Women's Mentoring Program"
  - Sponsor: NSF HRD - PRES AWDS FOR EXCELL IN SCI
  - Grant Period: N/A
  - Budget: $10,000 **(Pending)**
  - Awardees: Lisa Carlson, Cassandra Degen, Paula Jensen

- "REU Site: Back to the Future"
  - Sponsor: National Science Foundation Research Experience for Undergraduates (REU)
  - Grant Period: March 2018 - March 2021
  - Budget: $356,710
  - PIs: Michael West (PI), William Cross (co-PI), Cassandra Degen, Scott Wood (senior personnel)

- "Coupling Experimental and Computational Methods to Predict the Strength of Ultrasonic Spot Welds in Thermoplastic Matrix Composites"
  - Sponsor: Research Interests of the Air Force Office of Scientific Research
  - Grant Period: May 2019 – April 2022
  - Budget: ~$300,000 **(White Paper in Progress)**
  - PIs: Cassandra Degen, Albert Romkes

RESEARCH EXPERIENCE

Assistant & Associate Professor, Mechanical Engineering Department, South Dakota School of Mines and Technology, Rapid City, SD

- Fabrication and analysis of expanded 3D thermoplastic structures using ultrasonic spot welding
- Effects of ultrasonic welding on microscopic properties including fiber orientation of thermoplastic matrix composite materials
- Novel manufacturing and characterization techniques of polymer and composite structures
- Incorporation of multifunctionality in structural components
- Inclusion of systems thinking and systems engineering concepts in traditional mechanical engineering product development courses
- Increasing diversity in under-represented engineering programs through a Culture & Attitude scholarship program
- Development and characterization of a mechano-responsive ink for security printing applications

Graduate Research Assistant, Materials Science & Engineering Department, University of Illinois at Urbana-Champaign, Champaign, IL

- Investigation of the use of shear mechanical force to induce local chemical reactions within bulk polymeric materials
- Development of novel *in situ* fluorescence imaging techniques and analysis
- Characterization of a wide range of viscoelastic materials
- Knowledge of polymer and composite processing techniques
- Lab steward of a TA Instruments AR-G2 rheometer and RSA III dynamic mechanical analyzer

Research Assistant, Pacific Northwest National Laboratory, Richland, WA

- Superplastic Forming of friction stir welded aluminum structures
- Metallurgy of 3D aluminum structures
- Mechanical testing and analysis of 3D aluminum structures

Research Assistant, Advanced Material Processing Center, South Dakota School of Mines and Technology, Rapid City, SD

- Friction stir welding, metallurgy, and testing of built-up structures
- Friction stir welding and metallurgy of SPF structures for PNNL
- Radiography of friction stir welds
- Metallurgical characterization of friction stir spot welds

Research Assistant, Oak Ridge National Laboratory, Oak Ridge, TN

- Friction stir welding of 304 stainless steel
- Friction stir processing of magnesium alloys
- Metallography including preparing specimens and analyzing microstructure
- Mechanical testing such as tensile tests and hardness tests

TEACHING EXPERIENCE

Assistant Professor August 2012 – August 2018
Associate Professor August 2018 - present

Department of Mechanical Engineering
South Dakota School of Mines and Technology, Rapid City, SD

- Courses taught: Introduction to Mechanical Engineering (ME 110), Statics of Mechanisms (ME 210), Introduction to Solid Mechanics (ME 216), Mechanical Systems Design I (ME 477), Mechanical Systems Design II (ME 479), Mechanics of Viscoelastic Solids (ME 499/599, ME444/544), Mechanics of Viscoelastic Solids Lab (ME444L/544L)

South Dakota School of Mines and Technology IDEA Surveys (5 point scale)

Year/Course	Course Title/Credit Hours	Excellent Teacher	Excellent Course
2019			
ME 316-M002 (Spring)	Solid Mechanics (3 cr.)	4.3 (raw) 4.3 (adj.)	4.3 (raw) 4.3 (adj.)
ME 444/544-M001 (Spring)	Mechanics of Viscoelastic Solids (3 cr.)	4.3 (raw) 4.4 (adj.)	4.1 (raw) 4.2 (adj.)
ME 444L/544L-M051 (Spring)	Mechanics of Viscoelastic Solids Lab (1 cr.)	4.7 (raw) 4.7 (adj.)	4.7 (raw) 4.7 (adj.)
ME 444L/544L-M052 (Fall)	Mechanics of Viscoelastic Solids Lab (1 cr.)	4.7 (raw) 4.7 (adj.)	4.4 (raw) 4.5 (adj.)
2018			
ME 110-M002 (Fall)	Introduction to Mechanical Engineering (2 cr.)	4.7 (raw) 4.7 (adj.)	4.2 (raw) 4.2 (adj.)
ME 110L-M052 (Fall)	Introduction to Mechanical Engineering Lab (0 cr.)	4.3 (raw) 4.4 (adj.)	3.4 (raw) 3.4 (adj.)
ME 444/544-M001 (Fall)	Mechanics of Viscoelastic Solids (3 cr.)	4.9 (raw) 4.9 (adj.)	4.6 (raw) 4.9 (adj.)
ME 444L/544L-M051 (Fall)	Mechanics of Viscoelastic Solids Lab (1 cr.)	5.0 (raw) 5.0 (adj.)	5.0 (raw) 5.0 (adj.)
ME 110-M002 (Spring)	Introduction to Mechanical Engineering (2 cr.)	4.1 (raw) 4.2 (adj.)	4.0 (raw) 4.2 (adj.)
ME 110L-M052 (Spring)	Introduction to Mechanical Engineering Lab (0 cr.)	4.3 (raw) 4.3 (adj.)	4.0 (raw) 4.0 (adj.)
ME 444/544-M001 (Spring)	Mechanics of Viscoelastic Solids (3 cr.)	N/A	N/A
ME 444L/544L-M051 (Spring)	Mechanics of Viscoelastic Solids Lab (1 cr.)	N/A	N/A
ME 444L/544L-M052 (Spring)	Mechanics of Viscoelastic Solids Lab (1 cr.)	N/A	N/A
ME 798-M089 (Spring)	Thesis (2 cr.)	N/A	N/A
ME 898D-M087 (Spring)	Dissertation (2 cr.)	N/A	N/A
2017			
ME 110-M003 (Fall)	Introduction to Mechanical Engineering (2 cr.)	4.7 (raw) 4.7 (adj.)	4.2 (raw) 4.2 (adj.)
ME 110L-M053 (Fall)	Introduction to Mechanical Engineering Lab (0 cr.)	4.2 (raw) 4.3 (adj.)	3.2 (raw) 3.2 (adj.)
ME 210-M001 (Fall)	Statics of Mechanisms (3 cr.)	4.8 (raw) 4.9 (adj.)	4.3 (raw) 4.6 (adj.)

ME 479-M003 (Fall)	Mechanical Systems Design II (2 cr.)	5.0 (raw) 5.0 (adj.)	4.5 (raw) 4.5 (adj.)
ME 789-M089 (Fall)	Thesis (2 cr.)	N/A	N/A
ME 798-M082 (Summer)	Thesis (2 cr.)	N/A	N/A
ME 477-M001 (Summer)	Mechanical Systems Design I (2 cr.)	N/A	N/A
ME 210-M002 (Spring)	Statics of Mechanisms (3 cr.)	4.4 (raw) 4.4 (adj.)	4.1 (raw) 4.1 (adj.)
ME 479-M080 (Spring)	Mechanical Systems Design II (2 cr.)	N/A	N/A
ME 499/599-M001 (Spring)	Mechanics of Viscoelastic Solids (3 cr.)	4.7 (raw) 4.7 (adj.)	4.3 (raw) 4.3 (adj.)
ME 798-M089 (Spring)	Thesis (3 cr.)	N/A	N/A
2016			
ME 477 (Fall)	Mechanical Systems Design I (2 cr.)	N/A	N/A
ME 210-M001 (Fall)	Statics of Mechanisms (3 cr.)	4.7 (raw) 4.5 (adj.)	4.5 (raw) 4.3 (adj.)
ME 110L-M053 (Fall)	Introduction to Mechanical Engineering Lab (0 cr.)	N/A	N/A
ME 110-M003 (Fall)	Introduction to Mechanical Engineering (2 cr.)	4.8 (raw) 4.6 (adj.)	4.6 (raw) 3.9 (adj.)
ME 499/599-M001 (Spring)	Mechanics of Viscoelastic Solids (3 cr.)	N/A	N/A
ME 210-M001 (Spring)	Statics of Mechanisms (3 cr.)	4.5 (raw) 4.3 (adj.)	4.3 (raw) 4.0 (adj.)
ME 491-M081 (Spring)	IND: Applications in CAD/MDG (3 cr.)	N/A	N/A
2015			
ME 216-M002 (Fall)	Introduction to Solid Mechanics (3 cr.)	4.3 (raw) 4.3 (adj.)	4.1 (raw) 4.2 (adj.)
ME 210-M002 (Fall)	Statics of Mechanisms (3 cr.)	4.3 (raw) 4.1 (adj.)	4.0 (raw) 3.5 (adj.)
ME 216-M002 (Spring)	Introduction to Solid Mechanics (3 cr.)	4.2 (raw) 4.2 (adj.)	4.1 (raw) 3.9 (adj.)
ME 210-M001 (Spring)	Statics of Mechanisms (3 cr.)	4.0 (raw) 3.9 (adj.)	3.7 (raw) 3.5 (adj.)
2014			
ME 216-M001 (Spring)	Introduction to Solid Mechanics (3 cr.)	3.8 (raw) 3.8 (adj.)	3.8 (raw) 3.5 (adj.)
ME 216-M002 (Spring)	Introduction to Solid Mechanics (3 cr.)	4.4 (raw) 4.2 (adj.)	4.2 (raw) 3.9 (adj.)
ME 479 (Spring)	Mechanical Systems Design II (2 cr.)	N/A	N/A
ME 798 (Spring)	Thesis (2 cr.)	N/A	N/A
ME 216-M002 (Fall)	Introduction to Solid Mechanics (3 cr.)	4.8 (raw) 4.7 (adj.)	4.6 (raw) 4.5 (adj.)
ME 210-M002 (Fall)	Statics of Mechanisms (3 cr.)	4.4 (raw) 4.4 (adj.)	4.2 (raw) 4.2 (adj.)
ME 479 (Fall)	Mechanical Systems Design II (2 cr.)	N/A	N/A
ME 789 (Fall)	Thesis (2 cr.)	N/A	N/A
2013			
ME 216 (Spring)	Introduction to Solid Mechanics (3 cr.)	4.1 (raw) 4.1 (adj.)	3.9 (raw) 3.9 (adj.)
ME 798 (Spring)	Thesis (1 cr.)	N/A	N/A
ME 110 (Fall)	Introduction to Mechanical Engineering (2 cr.)	4.1 (raw) 4.1 (adj.)	4.0 (raw) 3.7 (adj.)
ME 216 (Fall)	Introduction to Solid Mechanics (3 cr.)	3.4 (raw) 3.2 (adj.)	3.6 (raw) 3.3 (adj.)
ME 798 (Fall)	Thesis (3 cr.)	N/A	N/A
2012			
ME 110 (Fall)	Introduction to Mechanical Engineering (2 cr.)	4.0 (raw) 3.9 (adj.)	4.0 (raw) 3.7 (adj.)

Racheff Teaching Assistant Fellow January 2011 - May 2011
Materials Science & Engineering Department
University of Illinois at Urbana-Champaign, Urbana, IL

- Lab TA for MSE 308 (Materials Laboratory II)
- Responsible for weekly laboratory sessions
- Evaluated progress of 72 students through bi-weekly laboratory reports
- Topics covered: mechanical properties, thermal diffusion, polymer crystallization, creep, viscosity, photovoltaic energy conversion

NSF Building Future Faculty Program April 2011
North Carolina State University, Raleigh, NC

- Attended workshops on teaching, mentoring, academic life, and presentation skills
- Met with professors in the Materials Science & Engineering Department at NC State
- Networked with diverse future faculty from a wide variety of schools and disciplines

Teaching Assistant for Mechanics of Polymers January 2009 - May 2011
Materials Science & Engineering Department
University of Illinois at Urbana-Champaign, Urbana, IL

- Held weekly office hours to assist students with homework assignments
- Assessed student progress through weekly homework

PUBLICATIONS

Journal Publications

1. **Degen, C.M.**, May, P.A., Moore, J.S., White, S.R., Sottos, N.R. "Time-Dependent Mechanochemical Response of SP-Cross-Linked PMMA", Macromolecules 2013, 46, 8917-8921.

2. Silberstein, M.N., Min, K., Cremar, L.D., **Degen, C.M.**, Martinez, T.J., Aluru, N.R., White, S.R., Sottos, N.R. "Modeling mechanophore activation within a crosslinked glassy matrix", Journal of Applied Physics 2013, 114, 023504.

3. **Kingsbury, C.M.**, May, P.A., White, S.R., Moore, J.S., Sottos, N.R. "Shear Activation of Mechanophore-Crosslinked Polymers", J. Mater. Chem., 2011, 21, 8381-8388.

4. Santella, M., Frederick, A., **Degen, C.**, Pan, T. "The Use of Friction-Stir Technology to Modify the Surfaces of AM60B Magnesium Die Castings", JOM 2006, 58, 56-61.

5. **Degen, C.M**., Grady, M.E., May, P.A., White, S.R., Moore, J.S., Sottos, N.R. "Localization of Spiropyran Activation", *In Preparation* for ACS Applied Materials & Interfaces.

6. **Degen, C.M**., Gurung, N. "3D Thermoplastic Sandwich Structures for Impact Absorption", *In Preparation* for the Journal of Sandwich Structures and Materials.

Peer Reviewed Conference Proceedings and Presentations

7. **Degen, C.M.,** Muci-Kuchler, K.H., Bedillion, M.D., Huang, S., Ellingsen, M.D. "Measuring the Impact of a New Mechanical Engineering Sophomore Design Course on Students' Systems Thinking Skills", ASME 2018 International Mechanical Engineering Congress and Exposition, November 9-15, 2018, Pittsburgh, PA.

8. **Degen, C.M**., Muci-Kuchler, K.H., Bedillion, M.D., Lovett, M. "Extending Systems Thinking Skills to an Introductory Mechanical Engineering Course", 2019 ASEE Annual Conference & Exposition, June 16-19, 2019, Tampa, FL. Abstract submitted.

9. Bedillion, M.D., Muci-Kuchler, K.H., **Degen, C.M.,** Lovett, M. “Teaching Systems Thinking in a Capstone Mechatronic Design Course”, 2019 ASEE Annual Conference & Exposition, June 16-19, 2019, Tampa, FL. Abstract submitted.

10. Casey, C., Dulal, R., Clouse, D., **Degen, C.M.**, Kellar, J. “Development of a Mechano-Responsive Ink for Security Printing”, Society for Imaging Science and Technology Printing for Fabrication 2017, November 5-9, 2017, Denver, CO.

11. Newkirk, J.R., **Degen, C.M.**, Romkes, A. “Characterization of Thermoplastic Matrix Composite Joints for the Development of a Computational Framework”, 2017 SEM XIII International Congress, June 12-15, 2017, Indianapolis, IN.

12. Jensen, P.H., West, M., Kellar, J.J., Kellogg, S.D., Karlin, J., **Degen, C.M.** “Culture and Attitude: A scholarship, mentoring and professional development program to increase the number of women graduating with engineering degrees”, 2017 ASEE Annual Conference & Exposition, June 25-28, 2017, Columbus, OH.

13. **Degen, C.M.**, Huang, S., Ellingsen, M.D., Muci-Kuchler, K.H., Bedillion, M.D., Ziadat, J. “Leveraging a Newly Developed Sophomore Design Course to Increase Students’ Career Awareness”, 2017 ASEE Annual Conference & Exposition, June 25-28, 2017, Columbus, OH.

14. Muci-Kuchler, K.H., Bedillion, M.D., Huang, S., **Degen, C.M.**, Ellingsen, M.D., Nikshi, W.M., Ziadat, J. “Incorporating Basic Systems Thinking and Systems Engineering Concepts in a Mechanical Engineering Sophomore Design Course”, 2017 ASEE Annual Conference & Exposition, June 25-28, 2017, Columbus, OH.

15. Huang, S., **Degen, C.M.**, Muci-Kuchler, K.H., Ellingsen, M.D. “Increasing Student Awareness of Non-Traditional Career Paths in Mechanical Engineering”, ASME 2016 International Mechanical Engineering Congress and Exposition, November 11-17, 2016, Phoenix, AZ.

16. Muci-Kuchler, K.H., Bedillion, M.D., **Degen, C.M.**, Elllingsen, M.D., Huang, S. “Incorporating Basic Systems Thinking and Systems Engineering Concepts in a Sophomore-Level Product Design and Development Course”, ASME 2016 International Mechanical Engineering Congress and Exposition, November 11-17, 2016, Phoenix, AZ.

17. Ziadat, J., Ellingsen, M.D., Muci-Kuchler, K.H., Huang, S., **Degen, C.M.** “Using Practical Examples to Motivate the Study of Product Development and Systems Engineering Topics”, ASME 2016 International Mechanical Engineering Congress and Exposition, November 11-17, 2016, Phoenix, AZ.

18. Gurung, N., **Degen, C.M.** “Fabrication of 3D thermoplastic sandwich structures utilizing ultrasonic spot 8welding”, 2016 SEM XIII International Congress, June 6-9, 2016, Orlando, FL.

19. **Degen, C.M.**, Kjerengtroen, L., Valseth, E., Newkirk, J.R. “Impact and Lap Shear Properties of Ultrasonically Spot Welded Composite Lap Joints”, 2016 SEM XIII International Congress, June 6-9, 2016, Orlando, FL.

20. Carlson, L., Huang, S., **Degen, C.M.**, Fosland, S. “More than Increased Numbers: A Mentoring Program for Females in Science and Engineering”, 2016 American Society of Engineering Education (ASEE) Annual Conference & Exposition, June 26-29, 2016, New Orleans, LA.

21. Huang, S., Muci-Kuchler, K.H., Bedillion, M.D., Ellingsen, M.D., **Degen, C.M.** “Systems Thinking Skills of Undergraduate Engineering Students”, 2015 IEEE Frontiers in Education (FIE) Conference, October 21-24, 2015, El Paso, TX.

22. Huang, S., **Degen, C.M.**, Ellingsen, M.D., Bedillion, M.D., Muci-Kuchler, K.H. “Investigating the Impact of an Outreach Activity on High School Students’ Attitude towards STEM Disciplines”, 2015

American Society of Engineering Education (ASEE) Annual Conference, June 14-17, 2015, Seattle, WA.

23. **Degen, C.M.**, Ellingsen, M.D., Bedillion, M.D., Muci-Kuchler, K.H. "Effective Strategies for Generating Awareness and Interest in Science and Engineering among Underrepresented Youth", 2014 American Society of Engineering Education (ASEE) Annual Conference, June 15-18, 2014, Indianapolis, IN.

24. **Kingsbury, C.M.**, May, P.A., White, S.R., Moore, J.S., Sottos, N.R. "Shear Activation of Mechanophore-Linked PMMA", 3rd International Conference on Self-Healing Materials, June 27-29, 2011, Bath, UK.

25. **Kingsbury, C.**, Davis, D., White, S., Moore, J., Sottos, N. "Shear Activation of Mechanophore Linked PMMA", 47th Annual Technical Meeting of the Society of Engineering Science, October 3-6, 2010, Ames, IA.

26. **Kingsbury, C.**, Hamilton, A., Davis, D., White, S., Moore, J., Sottos, N. "Tensile and Shear Activation of Mechanophore Linked Elastomeric Polymers", Materials Research Society Fall Meeting, November 30 - December 4, 2009, Boston, MA.

27. Santella, M., Pan, T., **Degen, C.** "Surface Modification of AM60B Using Friction Stir Processing", TMS 2007 Annual Meeting & Exhibition, February 25 - March 1, 2007, Orlando, FL.

28. Grant, G.J., Herling, D.R., Arbegast, W.J., Allen, C.D., and **Degen, C.M.** "Superplastic Forming of Aluminum Multisheet Structures Fabricated Using Friction Stir Welding and Refill Friction Stir Spot Welding." 6th International Symposium on Friction Stir Welding, October 10-13, 2006 Saint-Sauveur, Canada, vol. 52, no. 4, TWI Limited, Cambridge, United Kingdom.

Books and Book Chapters

29. Newkirk, J.R., **Degen, C.M.** and Romkes, A., "Characterization of Thermoplastic Matrix Composite Joints for the Development of a Computational Framework"*, Mechanics of Composite and Multi-functional Materials, Volume 6: Conference Proceedings of the Society for Experimental Mechanics Series,* P.R. Thakre et al., Editors. 2018, Springer International Publishing. DOI: 10.1007/978-3-319-63408-1_3.

30. **Degen, C.M.** and N. Gurung, "Fabrication of 3D Thermoplastic Sandwich Structures Utilizing Ultrasonic Spot Welding, in Joining Technologies for Composites and Dissimilar Materials"*, Volume 10: Proceedings of the 2016 Annual Conference on Experimental and Applied Mechanics* G.L. Cloud, E. Patterson, and D. Backman, Editors. 2017, Springer International Publishing: Cham. p. 49-58.

31. **Degen, C.M.,** Kjerengtroen, L., Valseth, E., Newkirk, J.N., "Impact and Lap Shear Properties of Ultrasonically Spot Welded Composite Lap Joints", *Volume 10: Proceedings of the 2016 Annual Conference on Experimental and Applied Mechanics* G.L. Cloud, E. Patterson, and D. Backman, Editors. 2017, Springer International Publishing: Cham. p. 59-70.

Student Thesis Publications

32. Valseth, E. (2015). *Impact and Lap Shear Properties of Ultrasonically Spot Welded Composite Lap Joints*. Mechanical Engineering Master of Science thesis, South Dakota School of Mines and Technology, Rapid City, SD.

33. Gurung, N. (2014). *Fabrication and Analysis of 3D Polycarbonate Ultrasonic Welded Structures*. Mechanical Engineering Master of Science thesis, South Dakota School of Mines and Technology, Rapid City, SD.

ADVISING

M.S. Thesis Students Advised

Student Name	Thesis Title	Graduation
Carter Barkley (MS ME)	Response of Thermoplastic Matrix Composite Joints to Various Loading Conditions	expected May 2021
Joseph Newkirk (MS ME)	Physics-Based Modeling to Advance Research of Innovative Composite Joining Technologies	May 2018 (now employed Raven Industries)
Rohit Dulal (MS MES) (co-advised with Jon Kellar)	Mechanochemical Polymeric Inks for Security Printing	May 2017 (now employed at Mastel Precision Surgical Instruments)
Eirik Valseth (MS ME) (co-advised with Lidvin Kjerengtroen)	Impact and Shear Properties of Ultrasonically Spot Welded Composites	Graduated May 2015 (now Ph.D. student at SDSM&T)
Navaraj Gurung (MS ME)	Fabrication and Analysis of 3D Polycarbonate Ultrasonic Welded Structures	Graduated Dec. 2014 (now Test Engineer at General Motors)

Undergraduate Research Assistants

Student Name	Project Title	Dates
Aaron Bost (ME)	Promoting System-Level Thinking in Undergraduate Engineering Courses	June 2017 - Aug. 2017
Chandler Casey (ME, University of Notre Dame)	Development of a Mechano-Responsive Ink for Security Printing	June 2017 – Aug. 2017
A. Natalie Lillig (Materials and Mechanical Engineering, Irving Valley College)	Correlation of Bond Area and Ultrasonic Spot Welding Parameters	June 2017 – Aug. 2017
Ethan Powell (ME)	Development of laboratories for Mechanics of Viscoelastic Solids	June 2017 – Aug. 2017
John Siefert (ME)	Bond Area Analysis of Ultrasonic Spot Welds in Thermoplastic Matrix Composite Materials	Jan. 2017 – May 2017
Joseph Newkirk (ME)	Ultrasonic Spot Welding of Thermoplastic Matrix Composite Materials	Feb. 2016 – Jan. 2017
Delaney Clouse (Polymer Science and Engineering, University of Southern Mississippi)	Analysis of Poly(dimethylsiloxane) Printability for Security Printing Applications	June 2016 – Aug. 2016
Colton Shipper (Pre-Engineering, Casper Community College)	Retention of the piezoelectric β-phase of PVDF during ultrasonic spot welding	June 2015 - Aug. 2015
Austin Steffen (ME)	Effects of Ultrasonic Spot Welding on HDPE Microscopic Polymer Structure	Jan. 2015 - July 2015
Roye Schwab (ME)	Effects of Ultrasonic Spot Welding on Microscopic Polymer Structure	May 2014 – Dec. 2014
Morgan Knehans (Met.E., University of Alabama)	Depth Control and Relation to Quality of Ultrasonic Spot Welds in Polycarbonate	May 2014 – Aug. 2014
Mayra Muci-Casteneda (ChemE)	Effects of Ultrasonic Spot Welding on Microscopic Polymer Structure	Oct. 2012 – May 2014
Alexandra Ling (ME)	Novel Routes to Achieve Self-Healing	Jan. 2013 – May 2014

	Elastomeric Polymers	
Kimberly DeBoer (Civ.E., Dordt College)	(SDSM&T REU) Feasibility of Joining Techniques for Thermoplastic and Thermoset Polymers	May 2013 – Aug. 2013
Heather Goka (ME)	Development of Submarine and Submersible teaching modules	Aug. 2013 – Dec. 2013
Colton Fuhrmann (ME)	Development of Submarine and Submersible teaching modules	May 2013 – Aug. 2013

CONSULTING

Pella Corporation	Prediction of polymer creep	Fall 2013

JOURNAL REVIEWER

- ASEE Conference Proceedings 2014-2017
- NSF Proposal Review, DMR Polymers Program Fall 2012
- Macromolecules 2013-2014
- Langmuir 2013
- IMECE conference proceedings 2013, 2015
- ASEE conference proceedings 2013
- ACS Macro Letters 2014

HONORS AND AWARDS

- SD Mines Alumni Association Outstanding Recent Graduate – Fall 2018
- University of Illinois at Urbana-Champaign Materials Science and Engineering Alumni Association Young Alumnus Award nominee (results still pending MatSE Alumni Board votes) - Fall 2017
- Hardrocker athletics soccer professor recognition award – Fall 2017
- Mechanical Engineering Department nominee for the 2017 SD Mines Research Award
- Hardrocker athletics soccer professor recognition award – Fall 2015
- Materials Science and Engineering Department Racheff Teaching Fellowship – Spring 2011
- 2nd place, Society of Engineering Science graduate student paper competition, Ames, IA – 2010
- SURGE Fellowship, University of Illinois – 2007
- NASA South Dakota Space Grant Consortium stipend – 2006
- ASM International William Park Woodside Founder's scholarship – 2006
- Tau Beta Pi National Engineering Honors Society scholarship – 2006
- SD Engineering Society Bill Craig scholarship – 2006
- SDSM&T Riter-Aldrich Award – 2005
- SD Board of Regents Scarborough scholarship – 2005
- ASM International Nicholas J. Grant scholarship – 2005
- SDSM&T Frank Richardson scholarship – 2005
- SDSM&T Presidential Scholar – 2003

PROFESSIONAL AFFILIATIONS

- American Society of Mechanical Engineers (ASME)
- Society of Experimental Mechanics (SEM)
- American Association of Engineering Education (ASEE)
- Society of Women Engineers (SWE)

SERVICE

- Organizer for topic on Systems Engineering and Sustainable Engineering Education at ASME IMECE 2016 conference
- Reviewer for ASEE and ASME conference proceedings
- Committee member for SD Mines M.S. (9) and Ph.D. (5) students
- Served on search committees for Mechanical Engineering faculty, SDSM&T Vice President of Research, and Mechanical Engineering Department Head
- NSF review panelist
- SDSM&T University Workload Committee
- Served as a panelist of SD EPSCoR's "Preparing for Life After Graduate School" workshop in Pierre, SD, May 28, 2015
- Served as judge at the South Dakota Undergraduate Research Symposium in Pierre, SD, July 2016 and July 2017
- Advisor for SD Alpha Chapter of Tau Beta Pi Engineering Honors Society
- Advisor to SDSM&T's Women in STEM Living Learning Community
- Advisor to SDSM&T's Outdoor Pursuits Living Learning Community
- Academic advisor to ~400 Mechanical Engineering students since 2012
- Chaperoned Mechanical Engineering women at the annual Society of Women Engineer's conference, 2012 (Houston) and 2013 (Baltimore)
- Chaperoned Tau Beta Pi officers at the annual Tau Beta Pi convention, Providence, RI, 2015
- Hosted numerous department tours (over 90 since 2012)
- Go to Mines Days and Go Women Breakfasts (12 since 2012)
- Attended Sanford Underground Research Facility Cultural Advisory Committee meeting, Spring 2013
- Hosted hand-on activity for SDSM&T Girls Day, 2013, 2014, 2016, 2017
- Speaker for the Women in Science conference, 2013, 2014, 2016, 2017
- Judge for Poster Session at SDSM&T Undergraduate Research Symposium, Spring 2013
- Advisor to summer 2013, 2014, 2015, 2016, 2017 undergraduate research students through SDSM&T's REU: Back to the Future program
- Advisor to summer 2017 undergraduate research student through SDSM&T's SPACT REU program
- Participated in summer 2013 and 2014 GEARUP UNITE program
- Taught a 2 day summer camp at United Tribes Technical College, Bismarck, ND, Summer 2013
- Gave a research presentation to Mechanical Engineering women at the annual breakfast, Fall 2013
- SDSM&T Women's/Wellness committee member
- SD Mines WiSE Mechanical Engineering faculty point of contact, 2017
- University undergraduate curriculum committee department representative
- Redesign of Introduction to Mechanical Engineering course committee member
- Participated in ABET evaluation for courses taught

COLLABORATORS AND OTHER AFFILIATIONS

Graduate Research Advisor
Dr. Nancy R. Sottos (University of Illinois at Urbana-Champaign)

Collaborators
Dr. Scott R. White, Dr. Jeffrey S. Moore (University of Illinois at Urbana-Champaign)
Dr. Michael Santella (Oak Ridge National Laboratory)
Dr. Glenn Grant (Pacific Northwest National Laboratory)
Dr. Clifford Whitcomb (Naval Postgraduate School)
Dr. Zhong Hu, Dr. Todd Letcher (South Dakota State University)
Dr. Mark Bedillion, Dr. Marsha Lovett (Carnegie Mellon University)
Dr. Clifford Whitcomb (Naval Postgraduate School)
Dr. Marius Ellingsen (VRC Metal Systems)
Dr. Karim Muci-Kuchler, Dr. Shaobo Huang, Dr. David Salem, Dr. Kurt Katzenstein, Dr. Marc Robinson, Dr. Grant Crawford, Dr. Albert Romkes, Dr. Jon Kellar, Dr. Michael West, Dr. Jennifer Benning, Dr. Andrea Brickey, Paula Jensen, Dr. Scott Wood, Dr. Stuart Kellogg, Kelli McCormick (SDSM&T)