

**Dr. Cassandra M. Birrenkott**

Leslie A. Rose Department of Mechanical Engineering  
 South Dakota School of Mines and Technology  
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**EDUCATION**

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

**PROFESSIONAL EXPERIENCE**

2025 - current	Alva L. Addy Professor, Leslie A. Rose Dept. of Mechanical Eng., South Dakota Mines, Rapid City, SD
2025 - current	Professor, Leslie A. Rose Dept. of Mechanical Eng., South Dakota Mines, Rapid City, SD
2018 - 2025	Associate Professor, Dept. of Mechanical Eng., South Dakota Mines, Rapid City, SD
2012 - 2018	Assistant Professor, Dept. of Mechanical Eng., South Dakota Mines, Rapid City, SD
2007 - 2012	Graduate Research Assistant, Materials Science & Eng. Dept., University of Illinois at Urbana-Champaign, Urbana-Champaign, IL
2006	Research Assistant, Pacific Northwest National Laboratory, Richland, WA
2004-2006	Research Assistant, Advanced Material Processing Center, South Dakota Mines, Rapid City, SD
2004	Research Assistant, Oak Ridge National Laboratory, Oak Ridge, TN

**ADDITIONAL ACADEMIC OR PROFESSIONAL EDUCATION AND PARTICIPATION**

- TA Instruments Dynamic Mechanical Analysis and Rheology training course, March 2009
- NSF Building Future Faculty program, North Carolina State University, April 2011
- Pella Corporation consulting, Prediction of polymer creep, Fall 2013
- American Society of Engineering Education LGBTQ+ Level 2 Safe Zone Ally Training Workshop, November 2022
- ELEVATE Rapid City's Leadership Institute (ELI), August 2022 – May 2023
- KEEN Integrating Curriculum with Entrepreneurial Mindset 1.0 (ICE 1.0), July 2023
- Executive Leadership in Academic Technology, Engineering, and Science (ELATES), May 2023 – March 2024
- Medtronic, Expert Witness, 2023 – present
- KEEN Design Your Academic Life workshop, July 2025
- International Digital Image Correlation Society's DIC 101 course, November 2025
- Member of the American Society of Mechanical Engineers (ASME), Society of Experimental Mechanics (SEM), American Association of Engineering Education (ASEE), Society of Women Engineers (SWE)

**RESEARCH ADVISEES**

- 9 M.S., 20+ undergraduate students

**SELECT RESEARCH AWARDS**

- "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

- “SD-FIRST: A program aimed to increase recruitment, retention, and success of first-generation students”
  - Sponsor: NSF DUE S-STEM Track 2: Design and Development (Single Institution)
  - Grant Period: August 2020 – July 2025
  - Budget: \$998,819
  - PIs: **Cassandra Birrenkott**, Lisa Carlson, Jon Kellar, Michael West
- “Driving Toward Innovation and Intellectual Diversity – Evidence-Based STEAM Program Development”
  - Sponsor: NSF DUE IUSE – Engaged Student Learning: Level 1
  - Grant Period: July 2020 – June 2023
  - Budget: \$300,000
  - PIs: Jon Kellar, **Cassandra Birrenkott**, Katrina Donovan, Michael West, Matthew Whitehead
- “Development of Online Modules to Teach Systems Thinking to Undergraduate Engineering Students”
  - Sponsor: FY17 Funding Opportunity Announcement (FOA) for Navy and Marine Corps Science, Technology, Engineering & Mathematics (STEM) Education, Outreach and Workforce Program, N00014-20-S-F005
  - Grant Period: June 2021 – May 2024
  - Budget: \$702,078
  - PIs: Karim Muci-Kuchler, **Cassandra Birrenkott**, Mark Bedillion (Carnegie Mellon University), Marsha Lovett (Carnegie Mellon University), Clifford Whitcomb (Naval Postgraduate School)

## **TEACHING EXPERIENCE**

**Alva L. Addy Professor**

*August 2025 - present*

**Associate Professor**

August 2018 – August 2025

**Assistant Professor**

August 2012 – August 2018

*Leslie A. Rose Department of Mechanical Engineering, South Dakota Mines, Rapid City, SD*

- Courses taught: Introduction to Mechanical Engineering (ME 110), Statics of Mechanisms (ME 210), Introduction to Solid Mechanics (ME 216), Solid Mechanics (ME 316), 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), Applied Engineering Analysis I (ME/BME 673)
- Average course IDEA surveys since 2012 (5-point scale):
  - Excellent Teacher = 4.3 (raw), 4.3 (adj.)
  - Excellent Course = 4.1 (raw), 4.0 (adj.)

**Racheff Teaching Assistant Fellow**

January 2011 - May 2011

*Materials Science & Engineering Department, University of Illinois at Urbana-Champaign, Urbana, IL*

**NSF Building Future Faculty Program**

April 2011

*North Carolina State University, Raleigh, NC*

**Teaching Assistant for Mechanics of Polymers**

January 2009 - May 2011

*Materials Science & Engineering Department, University of Illinois at Urbana-Champaign, Urbana, IL*

## **SELECT PUBLICATIONS**

### **Journal Publications**

1. Barkley, K.M., Arner, J.S., Pike, T.A., Diwakar, P., & **Birrenkott, C.M.** (2023). Correlation of surface and interfacial temperature during differential ultrasonic spot welding. *Journal of Advanced Joining Processes*, 7, 100142.
2. Grady, M.E., **Birrenkott, C.M.**, May, P.A., White, S.R., Moore, J.S., Sottos, N.R. “Localization of Spiropyran Activation”, *Langmuir* 2020, <https://dx.doi.org/10.1021/acs.langmuir.0c00568>
3. **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.

4. 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.
5. **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.

#### **Peer Reviewed Conference Proceedings and Presentations**

1. Barkley, K.M., Arner, J.S., Pike, T.A., Diwakar, P., **Birrenkott, C.M.** (2023). Employing Experimental and Analytical Methods to Understand the Ultrasonic Welding Process for Thermoplastic Polymers to Guide Joint Design, Proceedings of the 2023 SEM Annual Conference and Exposition on Experimental and Applied Mechanics, Orlando, FL, June 5–8, 2023.
2. **Birrenkott, C.M.**, Jensen, A., Kellar, J.J., West, M., Carlson, L., Herrera, J., Moore, M. (2023). First-generation student success and the SD-FIRST program, 2023 ASEE Annual Conference and Exposition, Baltimore, MD, June 25 – 28, 2023.
3. Donovan, K.J., West, M., Kellogg, S.D., Cross, W., **Birrenkott, C.M.** (2023) Investigating Creativity, Confidence, and an Entrepreneurial Mindset through Curricular Modification and Community Engagement, 2023 ASEE Annual Conference and Exposition, Baltimore, MD, June 25 – 28, 2023.
4. Muci-Kuchler, K.H.; **Birrenkott, C.M.**; Bedillion, M.D.; Lovett, M. and Whitcomb, C. "Incorporating Systems Thinking and Systems Engineering Concepts in a Freshman-Level Mechanical Engineering Course". 2020 ASEE Virtual Conference, June 22 to 26, 2020.
5. Jensen, P.H., West, M., Kellar, J., Kellogg, S., Brickey, A., **Birrenkott, C.**, Benning, J., McCormick, K. "Systems Approach to Increasing the Number of Engineers, Especially Women, by Implementing Curricular and Co-curricular Best Practices", Proceedings of the American Society for Engineering Management 2019 International Annual Conference, October 23-26, 2019, Philadelphia, PA.

#### **SELECT HONORS, AWARDS, AND SERVICE**

- 2025 Tau Beta Pi Outstanding Advisor Award
- Awarded South Dakota Mines' acceptance as a member of the FirstGen Forward Network
- ASEE Systems Engineering Division's (SED) Best Paper for the 2025 ASEE Conference for paper
- Helpline Center Black Hills Spirit of Volunteerism Award – April 2023
- ASEE Systems Engineering Division's (SED) Best Paper for the 2020 ASEE Conference for paper
- South Dakota Mines Alumni Association Outstanding Recent Graduate – Fall 2018
- Hardrocker athletics soccer professor recognition award – Fall 2015 and Fall 2017
- Organizer for topic on Systems Engineering and Sustainable Engineering Education at ASME IMECE 2016 conference
- Panelist for SD EPSCoR's "Preparing for Life After Graduate School" workshop, Pierre, SD, May 2015
- Speaker for the Women in Science conference, 2013, 2014, 2016, 2017
- Advisor to summer 2013, 2014, 2015, 2016, 2017 undergraduate research students through SDSM&T's REU: Back to the Future program
- Taught a 2-day summer camp at United Tribes Technical College, Bismarck, ND, Summer 2013
- South Dakota Mines Mechanical Engineering Dept. transfer student advisor
- Chief Advisor for South Dakota Alpha Chapter of Tau Beta Pi Engineering Honors Society since 2014
- South Dakota Mines University Promotion and Tenure Committee (member 2021 – 2027, scribe 2022 – 2023, chair 2023 – 2024)
- South Dakota Mines Mechanical Engineering Dept. Graduate Curriculum Committee
- South Dakota Mines Mechanical Engineering Dept. Promotion and Tenure Committee
- South Dakota Mines Mechanical Engineering Dept. Performance Standards Committee Chair, 2022
- South Dakota Mines Judge's Tea Rocker Royalty Interviews and Selection, 2023 – 2025
- Girl Scouts Annual Cookies, Corks, and Brews organizing committee member, 2020 – 2025
- Stevens High School Physics project panelist and judge