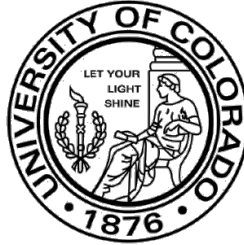


## Christopher Michael Yakacki

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### Education

2007	PhD	University of Colorado Boulder	Mechanical Engineering
2004	MS	University of Colorado Boulder	Mechanical Engineering
2004	BS	University of Colorado Boulder	Mechanical Engineering

### Professional Experience

2017 - Present	<u>Associate Professor</u> , The University of Colorado Denver Department of Mechanical Engineering (primary appointment)
2013 - Present	<u>Assistant Professor</u> , The University of Colorado Denver Department of Ophthalmology (secondary appointment)
2012 – 2017	<u>Assistant Professor</u> , The University of Colorado Denver Department of Mechanical Engineering (primary appointment)
2009 – 2011	<u>Adjunct Professor</u> , The Georgia Institute of Technology, Atlanta, GA School of Materials Science and Engineering
2009 – 2011	<u>Principal Scientist</u> , MedShape, Inc., Atlanta, GA Research and Development
2007 – 2009	<u>Affiliate Researcher</u> , The Georgia Institute of Technology, Atlanta, GA School of Materials Science and Engineering
2007 – 2008	<u>Post-Doctoral Scientist</u> , MedShape, Inc., Atlanta, GA Research and Development
2003 – 2007	<u>T-32 Professor Training Fellow</u> , The University of Colorado Boulder Department of Mechanical Engineering Advisors: Ken Gall, Robin Shandas, H. Jerry Qi, Kristi Anseth, Stephanie Bryant, John Carroll
2002 – 2004	<u>Engineering Outreach Fellow</u> , The University of Colorado Boulder College of Engineering and Applied Science Advisors: Jaclyn Sullivan, Malinda Schaefer-Zarske
2001 – 2002	<u>Undergraduate Research Assistant</u> , The University of Colorado Boulder Department of Mechanical Engineering Advisor: Professor Rishi Raj

### Awards/Honors

2016	<i>Graduate School Dean's Mentoring Award</i> Given for excellence in mentoring graduate students
2015	<i>Excellence in Research and Creative Activities Award</i> Given by University of Colorado for Downtown Campus Faculty

- 2015 *CEAS Outstanding Faculty in Research Award*  
Given by College of Engineering and Applied Sciences for excellence in research
- 2014 *New Inventor of the Year*  
Given by University of Colorado's Technology Transfer Office
- 2011 *Tibbetts Award Winner*  
Given in recognition as a model of excellence for the NSF SBIR program
- 2010 *Medical Design Excellence Award*  
Award given for innovation by the Medical Device & Diagnostic Industry
- 2009 *Biomedical Materials Highlights 2008*  
Publication [5] selected as one of the top reviewed & downloaded articles in 2008
- 2006 *Academic Rewards for College Scientists (ARCS), Colorado Chapter Scholarship*  
Scholarship given for excellence in graduate research and academic achievement
- 2006 *Modern Marvels 'Invent Now Challenge' Top 100 (Honorable Mention)*  
ShapeLoc listed as a Top 100 invention for 2005 (4200+ applicants)
- 2005 *Academic Rewards for College Scientists (ARCS), Colorado Chapter Scholarship*  
Scholarship given for excellence in graduate research and academic achievement
- 2005 *ASME Summer Bioengineering Student Finalist*  
Awarded 2<sup>nd</sup> Place in the Ph.D. Student Paper Competition
- 2004 *College of Engineering: Undergraduate Service Award*  
College award given to a graduating student for service promoting engineering
- 2004 *Outstanding Mechanical Engineering Senior Award*  
Departmental Award given to one mechanical engineering student per semester
- 2004 *Academic Rewards for College Scientists (ARCS), Colorado Chapter Scholarship*  
Scholarship given for excellence in graduate research and academic achievement
- 2004 *National Institute of Health (NIH) T-32 Professor Training Fellowship*  
Fellowship to train Ph.D. candidates for a career in academia
- 2003 *Academic Rewards for College Scientists (ARCS), Colorado Chapter Scholarship*  
Scholarship given for excellence in graduate research and academic achievement
- 2003 *NSF Engineering Outreach Graduate Fellowship*  
Fellowship to exploit engineering as a vehicle to integrate STEM in K-12
- 2003 *Outstanding Academic Achievement Award*  
Award given for completing engineering curriculum with distinction
- 2002 O Robertson Engineering Scholarship

## **Funded Grants**

### 2018

25. **PI: Yakacki CM**, "Ultra-Dissipative Helmet Liners Using Liquid-Crystal Elastomer Foams" *Advanced Industries Accelerator and State of Colorado*. **\$165,000** (7/1/2018-7/31/2020)
24. **PI: Yakacki CM**, "HeadHealth TECH III: Ultra-Dissipative Padding Made from Liquid-Crystal Elastomers" *National Football League and the Football Research Institute*. **\$121,949** (3/1/2018-2/28/2019)

23. **PI: Yakacki CM**, “Ultra-Dissipative Liquid-Crystal Elastomer Foams” *National Football League 1<sup>st</sup> and Future Pitch Competition*. **\$50,000**. (2/3/2018)
- 2017
22. PI: Nguyen TD, **Subaward PI: Yakacki CM**, “Extreme Dissipation Behavior of Main-Chain Liquid Crystal Elastomers and Structures” *Army Research Office*. W911NF1710165. **\$195,164 subaward**. (3/7/2017 – 3/6/2020)
21. **PI: Yakacki CM**, “REU: CAREER: A Two-Stage Processing Approach to Shape-Switching Liquid-Crystalline Elastomers for Biomedical Applications” *National Science Foundation*. CMMI-1559610. **\$16,000**. (12/1/2016 – 11/30/2017)
- 2016
20. **PI: Yakacki CM**, “REU: CAREER: A Two-Stage Processing Approach to Shape-Switching Liquid-Crystalline Elastomers for Biomedical Applications” *National Science Foundation*. CMMI-1559610. **\$16,000**. (12/1/2016 – 11/30/2017)
19. **PI: Yakacki CM**, “I-Corps: Liquid Crystalline Elastomers for Orthopedic Applications” *National Science Foundation*. IIP-1654807. **\$50,000** (10/1/2016 – 10/1/2017)
- 2015
18. **PI: Yakacki CM**, “REU: CAREER: A Two-Stage Processing Approach to Shape-Switching Liquid-Crystalline Elastomers for Biomedical Applications” *National Science Foundation*. CMMI-1559610. **\$10,000**. (11/5/2015 – 1/4/2016)
17. **PI: Yakacki CM**, “Smart Polymer Actuators for Drug Delivery Application” *Nano Labs*. AWD-160249. **\$46,851**. (7/16/2015 – 7/15/2016)
16. **PI: Yakacki CM**, “BDEG: Development and Biological Evaluation of Porous, Patient-Specific Interbody Fusion Cages” *State of Colorado, University of Colorado, and Solvay Specialty Polymers*. AWD-144059. **\$118,362**. (7/1/2015 – 11/30/2016)
- 2014
15. **PI: Yakacki CM**, “Polarized Microscopy to Characterize Liquid Crystalline Elastomers” *Center for Faculty Development: University of Colorado Denver*. **\$10,000**. (7/1/2014 – 6/15/2015)
14. **PI: Yakacki CM**, “CAREER: A Two-Stage Processing Approach to Shape-Switching Liquid-Crystalline Elastomers for Biomedical Applications” *National Science Foundation*. CMMI-1350436. **\$470,410**. (5/1/2014 – 4/30/2019)
13. **PI: Yakacki CM**, “Porous, Patient Specific Interbody Fusion Cages with Enhanced Loading Characteristics to Reduce Subsidence” *National Institutes of Health*. 1R21AR065713-01. **\$348,355**. (3/26/2014 – 3/31/2017)
12. PI: Abosch A, Role: Co-Investigator, “Medical Device Fellowship” *The Children’s Hospital Denver*. **\$25,000**. (6/15/2014 – 6/14/2014)
- 2013
11. **PI: Yakacki CM**, “Unrestricted Research Support” *Solvay Advanced Polymers*. **\$22,500**. (7/16/2013)
- 2012
10. **PI: Yakacki CM**, “Designing Smart, Active Polymeric Materials for Biomedical Applications” *University of Colorado Denver 2012 Pilot Research Mentor Program*. **\$3,000**. (10/16/2012 – 6/31/2013)

9. PI: Griffis JC, **Subaward PI: Yakacki CM**, “Development of a Surgical and Transcatheter Polymeric Heart Valve” *National Institutes of Health*. 1R41HL114256. **\$10,000 Subaward** (\$150,000 total). (7/1/2012 – 6/30/2013)

#### 2011

8. PI: Nguyen TD, Role: Industry PI, “GOALI: Mechanical Activation of Amorphous Shape Memory Polymers” *National Science Foundation*. CMMI-1130358. \$297,988. (9/1/2011 – 8/31/2014)
7. **PI: Yakacki CM**, “i6 Supplement: Expandable Shape-Memory Polymers for Suture Anchors” *National Institutes of Health*. 3R44AR056154-03S1. **\$100,000**. (8/1/2011 – 7/31/2012)
6. **PI: Yakacki CM**, “Unrestricted Research Support” *Solvay Advanced Polymers*. **\$10,000**. (7/1/2011)

#### 2010

5. **PI: Yakacki CM**, “Unrestricted Research Support” *Solvay Advanced Polymers*. **\$11,250**. (5/24/2010)

#### 2009

4. **PI: Yakacki CM**, “Phase II: Expandable Shape-Memory Polymers for Suture Anchors” *National Institutes of Health*. 2R44AR056154-02. **\$839,860**. (4/7/2009 – 4/7/2011)

#### 2008

3. **PI: Yakacki CM**, “Phase Ib: Multi-Activated Shape-Memory Polymers for Cast Immobilization” *National Science Foundation*. NSF 0740668. **\$49,052**. (6/1/2008 – 12/1/2008)
2. **PI: Yakacki CM**, “Phase I: Expandable Shape-Memory Polymers for Suture Anchors” *National Institutes of Health*. NIH R43AR056154-01. **\$97,534**. (4/7/2008 – 10/7/2008)
1. **PI: Yakacki CM**, “Phase I: Multi-Activated Shape-Memory Polymers for Cast Immobilization” *National Science Foundation*. NSF 0740668. **\$99,857**. (1/1/2008 – 6/1/2008)

#### **Peer Reviewed Publications, Exhibitions, Performances, etc.** (Students/Postdocs Underlined)

#### 2018

51. Ula SW, Traugutt NA, Volpe RH, Patel RR, Yu K, **Yakacki CM**, “Liquid Crystal Elastomers: An Introduction and Review of Emerging Technologies” *Liquid Crystals Reviews*, (In Press).
50. Hanzon DW, Lu H, **Yakacki CM**, Yu K, “Influence of mechanically-induced dilation on the shape-memory behavior of amorphous polymers at large deformation”, *Mechanics of Time-Dependent Materials* (2018) pp. 1-21.
49. Patel RR, Noshchenko A, Carpenter RD, Baldini T, Frick CP, Patel VV, **Yakacki CM**, “Evaluation and Prediction of Human Lumbar Vertebrae Endplate Mechanical Properties Using Indentation and Computed Tomography”, *Journal of Biomechanical Engineering* (2018) 140(10), 101011.
48. Dominy N, Mills S, **Yakacki CM**, Roscoe P, Carpenter RD. “New Guinea bone daggers were engineered to preserve social prestige” *Royal Society Open Science* (2018), 5(4), 172067.

47. Ahn H, Patel RR, Hoyt AJ, Lin AS, Torstrick FB, Guldberg RE, Frick CP, Carpenter RD, **Yakacki CM**, Willett NJ. "Biological Evaluation and Finite-Element Modeling of Porous poly (para-phenylene) for Orthopaedic Implants" *Acta Biomateriala*. (2018) 72: 352-361.
46. Alzahrani AA, Saed MO, **Yakacki CM**, Song HB, Sowan N, Walston JJ, Shah PK, McBride MK, Stansbury JW, Bowman CN, "Fully Recoverable Rigid Shape Memory Foam Based on Copper-Catalyzed Azide-Alkyne Cycloaddition (CuACC) Using a Salt Leaching Technique" *Polymer Chemistry* (2018) 1 (9): 121-130.
45. Hanzon D, Traugutt NA, McBride M, Bowman CN, **Yakacki CM**, Yu K, "Adaptable Liquid Crystal Elastomers with Transesterification-Based Bond Exchange Reactions" *Soft Matter* (2018), 14, 951-960.
44. Brinckmann SA, Lakhera N, Laursen CM, **Yakacki CM**, Frick CP. "Characterization of poly(para-phenylene)-MWCNT solvent-cast composites" *AIMS Materials Science*, 2018, 5(2): 301-319.
- 2017
43. Yuan C, Roach DJ, Dunn CK, Mu Q, Kuang X, **Yakacki CM**, Wang TJ, Yu K, Qi J, "3D Printed reversible shape changing soft actuators assisted by liquid crystal elastomers" *Soft Matter* (2017) 13 (33): 5558-5568.
42. Merkel DR, Laursen CM, **Yakacki CM**, Rorrer RA, Frick CP, "Characterization and mechanical testing of polydopamine-adhered electroless copper films" *Surface & Coatings Technology* (2017) 331: 221-220.
41. Saed MO, Volpe RH, Traugutt NA, Visvanathan R, Clark NA, **Yakacki CM**, "High Strain Actuation Liquid Crystalline Elastomers via Modulation of Mesophase Structure" *Soft Matter* (2017) 13(41): 7537-7547.
40. Traugutt NA, Volpe RH, Bollinger MS, Saed MO, Torbati AH, Yu K, Dadivanyan N, **Yakacki CM**, "Liquid-Crystal Order During Synthesis Affects Main-Chain Liquid-Crystal Elastomer Behavior" *Soft Matter* (2017) 13: 7013-7025.
39. Yu K, Yang H, Dao B, Shi Q, **Yakacki CM**, "Dissolution of Covalent Adaptable Network Polymers in Organic Solvent" *Journal of the Mechanics and Physics of Solids*, (2017) Online View. DOI: 10.1016/j.jmps.2017.08.006
38. Chatham LS, Patel VV, **Yakacki CM**, Carpenter RD, "Interbody Spacer Material Properties and Design Conformity for Reducing Subsidence During Lumbar Interbody Fusion" *Journal of Biomechanical Engineering* (2017) 139: 051005
37. Saed M, Torbati AH, Starr C, Visvanathan R, Clark NA, **Yakacki CM**, "Thiol-acrylate Main-chain Liquid-crystalline Elastomers with Tunable Thermomechanical Properties and Actuation Strain" *Journal of Polymer Science: Part B: Polymer Physics* (2017) 55 (2): 157-168. DOI: 10.1002/polb.24249
- 2016
36. Frick CP, Merkel DR, Laursen CM, Brinckmann SA, **Yakacki CM**, "Copper-Coated Liquid-Crystalline Elastomer via Bioinspired Polydopamine Adhesion and Electroless Deposition" *Macromolecular Rapid Communications* (2016) 37 (23): 1912-1917 DOI: 10.1002/marc.201600363
35. Azoug A, Vasconcellos V, Dooling J, Saed M, **Yakacki CM**, Nguyen TD, "Viscoelasticity of the Polydomain-monodomain Transition in Main-chain

Liquid-crystal Elastomers" *Polymer* (2016) 98: 165-171 DOI: 10.1016/j.polymer.2016.06.022

34. Anderson R, Pacaccio DJ, **Yakacki CM**, Carpenter RD, "Finite Element Analysis of a Pseudoelastic Compression-Generating Intramedullary Ankle Arthrodesis Nail" *Journal of the Mechanical Behavior of Biomedical Materials* (2016) 62: 83-92 DOI: 10.1016/j.jmbbm.2016.04.037
33. Saed M, Torbati A, Nair DP, **Yakacki CM**, "Synthesis of Programmable Main-Chain Liquid-Crystalline Elastomers Using a Two-Stage Thiol-Acrylate Reaction" *Journal of Visualized Experiments* (2016) 107: e53546 DOI: 10.3791/53546
32. Collins DA, **Yakacki CM**, Lightbody D, Patel R, Frick CP, "Shape-Memory Behavior of High-Strength Amorphous Thermoplastic Poly(*para*-phenylene)" *Journal of Applied Polymer Science* (2016) 133(3): 42903 DOI: 10.1002/app.42903

## 2015

31. Xiao R, **Yakacki CM**, Guo J, Frick CP, Nguyen TD, "A Predictive Parameter for the Shape Memory Behavior of Thermoplastic Polymers" *Journal of Polymer Science Part B: Polymer Physics* (2015) DOI: 10.1002/polb.23981
30. **Yakacki CM**, Saed M, Nair DP, Gong T, Reed SM, Bowman CN, "Tailorable and Programmable Liquid-Crystalline Elastomers Using a Two-Stage Thiol-Acrylate Reaction" *RSC Advances* (2015) 5, 18997-19001 DOI: 10.1039/C5RA01039J
29. Hoyt AJ, **Yakacki CM**, Fertig RS, Carpenter RD, Frick CP, "Monotonic and Cyclic Loading Behavior of Porous Scaffolds made from Poly(*para*-phenylene) for Orthopedic Applications" *Journal of the Mechanical Behavior of Biomedical Materials* (2015) 41: 136-148.

## 2014

28. Alzahrani A, Nair D, Smits D, Saed M, **Yakacki CM**, Bowman CN, "Photo-CuAAC Induced Wrinkle Formation in a Thiol-acrylate Elastomer via Sequential Click Reactions" *Chemistry of Materials* (2014) 26: 5303-5309.
27. Frick CP, DiRienzo AL, Safranski DL, Saed M, Losty EJ, **Yakacki CM**, "High-Strength Poly(*para*-phenylene) as an Orthopedic Biomaterial" *Journal of Biomedical Materials Research: Part A* (2014) 102A: 3122-3129
26. DiRienzo AL, **Yakacki CM**, Frensemeier M, Schneider AS, Safranski DL, Frick CP, "Porous Poly(*para*-phenylene Scaffolds for Load-Bearing Orthopedic Applications" *Journal of the Mechanical Behavior of Biomedical Materials* (2014) 30: 347-357

## 2013

25. Martin AC, Lakhera N, DiRienzo AL, Safranski DL, Schneider AS, **Yakacki CM**, Frick CP, "Amorphous-to-Crystalline Transition of Polyetheretherketone-Carbon Nanotube Composites via Resistive Heating" *Composites Science and Technology* (2013) 89: 110-119
24. Lakhera N, Graucob A, Schneider AS, Kroner E, Arzt E, **Yakacki CM**, Frick CP, "Effect of Viscoelasticity on the Spherical and Flat Adhesion Characteristics of Photopolymerizable Acrylate Polymer Networks" *International Journal of Adhesion and Adhesives* (2013) 44: 184-194
23. Xiao R, Lakhera N, Choi J, **Yakacki CM**, Frick CP, Nguyen TD, "Modeling the Glass Transition of Amorphous Networks for Shape-Memory Behavior" *Journal of the Mechanics and Physics of Solids* (2013) 61(7): 1612-1635.

22. **Yakacki CM**, "Shape-Memory and Shape-Changing Polymers" *Polymer Reviews*, (2013) 53 (1): 1-5
21. Schneider AS, Kiener D, **Yakacki CM**, Maier HJ, Gruber PA, Tamura N, Kunz M, Minor AM, Frick CP, "Influence of Bulk Pre-Straining on the Size Effect of Nickel Compression Pillars" *Materials Science and Engineering: A* (2013) 559: 147-158
- 2012
20. Choi J, Ortega AM, Xiao R, **Yakacki CM**, Nguyen TD, "Effect of Physical Aging on the Shape-Memory Behavior of Amorphous Networks" *Polymer* (2012) 53 (12): 2453-2464
19. **Yakacki CM**, Ortega AM, Frick CP, Lakhera N, Xiao R, Nguyen TD, "Unique Recovery Behavior in Amorphous Shape-Memory Polymer Networks" *Macromolecular Materials and Engineering*, (2012) 297(12) 1160-1166.
18. Smith KE, Garcia M, McAnuff K, Lamell R, **Yakacki CM**, Griffis J, Higgs BG, Gall K, "Anterior Cruciate Ligament Fixation: Is Radial Force a Predictor of the Pullout Strength of Soft-Tissue Interference Devices?" *The Knee* (2012) 19 (6): 786-792
17. Ortega AM, **Yakacki CM**, Dixon SA, Likos R, Greenberg AR, Gall K, "Effect of Crosslinking and Long-Term Storage on the Shape-Memory Behavior of (Meth)Acrylate-Based Shape-Memory Polymers" *Soft Matter* (2012) 8: 7381-7392
16. Lakhera N, **Yakacki CM**, Nguyen TD, Frick CP, "Partially Constrained Recovery of (Meth)Acrylate Shape-Memory Polymer Networks" *Journal of Applied Polymer Science* (2012) 126(1): 72-82
- 2011
15. **Yakacki CM**, Nguyen TD, Likos R, Lamell R, Guigou D, Gall K, "Impact of Shape-Memory Programming on Mechanically-Driven Recovery in Polymers" *Polymer* (2011) 52(21): 4947-4954
14. **Yakacki CM**, Gall K, Dirschl D, Pacaccio DJ, "Pseudoelastic Intramedullary Nailing for Tibiotalocalcaneal Arthrodesis" *Expert Review of Medical Devices* (2011) 8(2): 159-166
- 2010
13. Nguyen T, **Yakacki CM**, Brahmabhatt PD, Chambers ML, "Modeling the Relaxation Mechanisms of Amorphous Shape Memory Polymers" *Advanced Materials* (2010) 22(31): 3411-3423
12. **Yakacki CM**, Poukalova M, Guldberg RE, Lin A, Saing M, Gillogly SD, Gall K, "The Effect of Trabecular Microstructure on the Pullout Strength of Suture Anchors" *Journal of Biomechanics* (2010) 43(10): 1953-1959
11. Poukalova M, **Yakacki CM**, Guldberg RE, Lin A, Saing M, Gillogly SD, Gall K, "Pullout Strength of Suture Anchors: Effect of Mechanical Properties of Trabecular Bone" *Journal of Biomechanics* (2010) 43(6): 1138-1145
10. **Yakacki CM**, Khalil HF, Dixon SA, Gall K, Pacaccio DJ, "Compression Forces of Internal and External Ankle Fixation Devices with Simulated Bone Resorption" *Foot and Ankle International* (2010) 31(1): 76-85
- 2009
9. **Yakacki CM**, Griffis J, Gall K, "Bearing Area: A New Indication for Suture Anchor Pullout Strength?" *Journal of Orthopaedic Research* (2009) 27(8): 1048-1054

8. **Yakacki CM**, Satarkar N, Gall K, Likos R, Hilt JZ, "Shape-Memory Polymer Networks with Fe<sub>3</sub>O<sub>4</sub> Nanoparticles for Remote Activation" *Journal of Applied Polymer Science* (2009) 112(5): 3166-3176

#### 2008

7. Ortega AM, Kasprzak S, **Yakacki CM**, Shandas R, Greenberg AR, Gall K, "Structure-Property Relationship in Photopolymerizable Networks Demonstrating Shape Memory Behavior" *Journal of Applied Polymer Science* (2008) 110(3): 1579-1572
6. **Yakacki CM**, Shandas R, Safranski D, Ortega AM, Sassaman K, Gall K, "Strong, Tailored, Biocompatible Shape-Memory Polymer Networks" *Advanced Functional Materials* (2008) 18(16): 2428-2435
5. **Yakacki CM**, Lyons MB, Rech B, Gall K, Shandas R, "Cytotoxicity and Thermomechanical Behavior of Biomedical Shape-Memory Polymer Networks Post-Sterilization" *Biomedical Materials* (2008) 3(1): 015010
4. **Yakacki CM**, Willis S, Luders C, Gall K, "Deformation Limits in Shape Memory Polymer Networks" *Advanced Engineering Materials* (2008) 10: 112-119.

#### 2007

3. Qi HJ, Nguyen TD, Castro F, **Yakacki CM**, Shandas R, "Finite Deformation Thermo-Mechanical Behavior of Thermally Induced Shape Memory Polymers" *Journal of Mechanics and Physics of Solids* (2007) 56(5): 1730-1751
2. **Yakacki CM**, Shandas R, Lanning C, Rech B, Eckstein A, Gall K, "Unconstrained Recovery Characterization of Shape-Memory Polymers Networks for Cardiovascular Applications" *Biomaterials* (2007) 28(14): 2255-2263

#### 2005

1. Gall K, **Yakacki CM**, Liu Y, Shandas R, Willett N, and Anseth KS: "Thermomechanics of the Shape Memory Effect in Polymers for Biomedical Applications" *Journal of Biomedical Materials Research A*. (2005) 73A(3): 339-348

#### **Peer Reviewed Books and Book Chapters**

##### 2013

2. Smith KE, Frick CP, Safranski DL, **Yakacki CM**, Gall K, "Book Chapter: Active Materials" *Biomedical Technology and Devices, Second Edition* (2013) Chapter 16: 393-432

##### 2010

1. **Yakacki CM**, Gall K, "Book Chapter: Shape-Memory Polymers for Biomedical Applications" *Advances in Polymer Science* (2010) 226: 147-175

#### **Peer Reviewed Book Reviews**

n/a



## Other Indicators of Scholarly and Creative Activity

### Issued Patents

9. 9,884,941 – Systems and Methods of Creating Liquid Crystal Polymers Using Stepped Reactions (2/6/2018)
8. 9,750,923 – Wireless communications system integrating electronics into orally ingestible products for controlled release of active ingredients (9/5/2017)
7. 9,731,045 – Shape memory polymer (8/15/2017)
6. D681,811 – Suture anchor device (5/7/2013)
5. D649,248 – Suture anchor device (11/22/2011)
4. D625,816 – Suture anchor device (10/19/2010)
3. D625,815 – Installation device for a suture anchor and a suture (10/19/2010)
2. D605,764 – Installation device for a suture anchor and a suture (12/8/2009)
1. D605,763 – Suture anchor device (12/8/2009)

### Provisional Patent Applications

1. CU3483 – Imaging Table-to-Head Frame Adapter (1/15/2014)

### TeachEngineering.org Contributions

- |      |   |
|------|---|
| 2007 | 3 Published Lesson Plan and Activity Contributions  |
| 2006 | 4 Published Lesson Plan and Activity Contributions  |
| 2004 | 28 Published Lesson Plan and Activity Contributions |

## Non-Peer Reviewed Publications, Exhibitions, Performances, etc.

### 2014

2. **Yakacki CM**, “Overcoming Challenges in Mechanically Actuating Liquid Crystalline Elastomers” *iMechanica.org*. Invited Journal Club Entry: July 2014.

### 2012

1. **Yakacki CM**, “Entrepreneurship in materials interview: Chris Yakacki” *Materials Views*. September 2012.

## Non-Peer Reviewed Books and Book Chapters

n/a

## Non-Peer Reviewed Book Reviews

n/a

## Peer Reviewed Presentations at Meetings/Conferences (i.e. Conference Proceedings)

### 2013

7. Dirienzo AL, **Yakacki CM**, Safranski DL, Frick CP, "Tensile Behavior of Porous Scaffolds Made from Poly(Para Phenylene)" *Biomedical Sciences Instrumentation*, (2013) 49: 157-164.
6. **Yakacki CM**, "The Mechanical Properties and Degree of Crystallinity of Biomedical-Grade PEEK from Two Manufacturers" *ANTEC 2013*, Cincinnati, OH
5. Lakhera N, Graucob A, Schneider A, Kroner E., **Yakacki CM**, Frick CP, "Thermally Switchable Adhesion of Photopolymerizable Acrylate Polymer Networks" *Biomedical Sciences Instrumentation*, (2013) 49: 141-148.

### 2011

4. Frick CP, Lakhera N, **Yakacki CM**, "Thermo-mechanical Behavior of (Meth)Acrylate Shape-Memory Polymer Networks" *Materials Research Society (MRS)*, San Francisco, CA

### 2009

3. Ortega AM, **Yakacki CM**, Dixon S, Greenberg A, Gall K, "Effect of chemical crosslinking on the free-strain recovery characteristics of amorphous shape-memory polymers" *Materials Research Society (MRS)*, San Francisco, CA

### 2005

2. **Yakacki CM**, Shandas R, Lanning C, Gall K, "Free Recovery Effects of Shape-Memory Polymers for Cardiovascular Stents" *Materials Research Society (MRS)*, Boston, MA

### 2004

1. **Yakacki CM**, Gall K, Shandas R, Ortega A, Willett N, and Greenberg AR, "Optimizing the Thermomechanics of Shape-Memory Polymers for Biomedical Applications" *Materials Research Society (MRS)*, Boston, MA

## Non-Peer Reviewed Presentations at Meetings/Conferences (presenter underlined)

### 2017

61. Yakacki CM, "Shape-Shifting and Dissipating Liquid-Crystalline Elastomers for 3D Printing and Biomedical Applications" Singapore University of Technology and Design (12/4/2017) Invited Seminar Talk
60. Yakacki CM, "Liquid Crystalline Elastomers for Biomedical Applications" *ILCEC*, Houston, TX.
59. Yakacki CM, Saed MO, Volpe RH, Tragutt N, Visvanathan R, Clark NA, "Tailoring Phase and Transition Behavior in Main-Chain Liquid-Crystalline Elastomers by Controlling Spacer Length" *IMRC*, Cancun, Mexico.

### 2016

58. Yakacki CM, Saed MO, Torbati AH, "Main-Chain Liquid-Crystal Elastomers with Tailored Thermomechanical Properties" *SMART 2016*, Dallas, TX.
57. Yakacki CM, Saed MO, "Effect of Crosslinker and Flexible Spacer Chemistry on Thermomechanics and Actuation in Main-Chain Liquid-Crystalline Elastomers" *ASME IMECE*. Phoenix, AZ.
56. Yakacki CM, "Main-Chain Liquid-Crystal Elastomers with Tailored Thermomechanical Properties" Johns Hopkins University – Hopkins Extreme Materials Institute (10/7/2016) Invited Seminar Talk

55. Yakacki CM, Saed MO, Torbati AH, Volpe RH, Bollinger MS, Frick CP, Merkel DR, "A Thiol-Acrylate Main-Chain Liquid-Crystalline Elastomer Platform for Multifunctional Applications" *International Conference Smart Materials, Structures and Systems (CIMTEC)*, Perugia, Italy
54. Yakacki CM, "Main-Chain Liquid-Crystalline Elastomers Using a Two-Stage Thiol-Acrylate Reaction" Duke University, Raleigh, NC (4/12/2016) Invited Seminar Talk
53. Yakacki CM, "Main-Chain Liquid-Crystalline Elastomers Using a Two-Stage Thiol-Acrylate Reaction" University of California San Diego, San Diego, CA (3/14/2016) Invited Seminar Talk
52. Yakacki CM, Volpe R, Saed MO, Torbati AH, Merkel D, Frick CP, "Main-Chain Liquid-Crystalline Elastomers using a Two-Stage Thiol-Acrylate Reaction for Shape-Switching Biomedical Applications" ACS, San Diego, CA.
51. Yakacki CM, "Main-Chain Liquid-Crystalline Elastomers Using a Two-Stage Thiol-Acrylate Reaction" University of Rochester, Rochester, NY (2/10/2016) Invited Seminar Talk
- 2015
50. Yakacki CM, Saed MO, "Thermomechanics of Thiol-Acrylate Main-Chain Liquid-Crystalline Elastomers", *ASME IMECE*. Houston, TX.
49. Yakacki CM, Frick CP, Collins DA, "Shape Memory Behavior of Poly(*para*-phenylene)" *ASME IMECE*. Houston, TX.
48. Yakacki CM, "Shape Changing and Mechanically Anisotropic Liquid Crystalline Elastomer Materials for Biomedical Applications" *Kent State University. Liquid Crystal Institute Seminar*. Kent, OH (10/13/2015) Invited Seminar Talk
47. Yakacki CM, "Shape Changing and Mechanically Anisotropic Liquid Crystalline Elastomer Materials for Biomedical Applications" *University of Colorado Denver. CEAS Seminar*. Denver, CO
- 2014
46. Yakacki CM, Frick CP, Carpenter RD, Hoyt A, Fertig R, "Synthesis and Characterization of High-Strength Orthopaedic Scaffolds using Poly(*para*-phenylene) and Image-Based Finite-Element Analysis" *ASME IMECE*. Montreal, Canada.
45. Yakacki CM, "Characterization of Thiol-Acrylate Main-Chain Liquid Crystalline Elastomers" *ASME IMECE*. Montreal, Canada.
44. Yakacki CM, "The Role of Smart Materials for Biomedical Applications" *University of Colorado: Mini-STEM Program*. Denver, CO
- 2013
43. Yakacki CM, Saed M, Reed D, Gong T, Bowman C, "A Two-Stage Reaction to Mechanically Orient Mesogens in Liquid-Crystalline Elastomers" *ASME IMECE*, San Diego, CA
42. Yakacki CM, "Shape-Memory Polymers for Orthopaedic Soft-Tissue Fixation", *Syracuse University, Dept. of Biomedical Engineering*, Syracuse, NY (9/20/13) Invited Seminar Talk.
41. Yakacki CM, "The Mechanical Properties and Degree of Crystallinity of Biomedical Grade PEEK", *ANTEC – Society of Plastics Engineers*, Cincinnati, OH

40. Yakacki CM, "Shape-Memory Polymers for Orthopaedic Soft-Tissue Fixation", *Texas A&M, Dept. of Biomedical Engineering*, College Station, TX (4/22/13) Invited Seminar Talk.
- 2012
39. Yakacki CM, Ortega AM, Frick CP, Nguyen TD, "Unique Thermomechanical Considerations Regarding the Recovery Behavior of Shape-Memory Polymers for Biomedical Applications" *ASME IMECE*, Houston, TX
38. Yakacki CM, Gall K, Nguyen TD, "Mechanically-Driven Recovery in Amorphous Polymer Networks Programmed for Shape Memory" *International Conference Smart Materials, Structures and Systems (CIMTEC)*, Montecatini Terme, Italy
- 2011
37. Yakacki CM, Nguyen TD, Likos R, Lamell R, Gall K, "Mechanical Activation of the Shape-Memory Effect in Polymers" *ASME 2011 International Mechanical Engineering Congress and Exposition*, Denver, CO
36. Yakacki CM, "Shape-Memory and Self-Reinforcing Polymers as Implantable Biomaterials" *Medical Design and Manufacturing East (MD&M)*, New York, NY
35. Yakacki CM, Gall K, Patel R, Dirschl D, Pacaccio DP, "A Pseudoelastic Approach to Sustain Compression in Bone Fractures and Fusions in Response to Bone Resorption" *Society for Biomaterials*, Orlando, FL
34. Yakacki CM, Likos R, Lamell R, Guigou D, Gall K, "Mechanical Activation of the Shape-Memory Effect in Polymers for Biomedical Applications" *Society for Biomaterials*, Orlando, FL
33. Yakacki CM, Griffis J, Gall K, "Development of Shape-Memory Polymer Medical Devices – From Academia to Industry" *Society for Biomaterials*, Orlando, FL
32. Yakacki CM, "Shape-Memory Polymers for Biomedical Applications" *Atlanta Chapter of ASM International*, Atlanta, GA
31. Yakacki CM, "Development of Shape-Memory Polymer for Biomedical Applications from Academia to Industry: Experiences of a CU Graduate" *The University of Colorado at Boulder*, Boulder, CO
30. Yakacki CM, "Shape-Memory and Self-Reinforcing Polymers as Implantable Biomaterials" *Medical Design and Manufacturing West (MD&M)*, Anaheim, CA
29. Yakacki CM, "Shape-Memory Polymers for Biomedical Applications: From Academia to Industry" *The University of Minnesota*, Minneapolis, MN
28. Brahmabhatt P, Chambers M, Yakacki CM, "Novel Self-Reinforcing Polyphenylenes as Implantable Biomaterials" *Orthopaedic Research Society (ORS)*. Long Beach, CA
- 2010
27. Yakacki CM, "Shape-Memory Materials for Biomedical Applications: From Academia to Industry" *The Georgia Institute of Technology (Materials Science and Engineering)*, Atlanta, GA
26. Yakacki CM, Gall K, Pacaccio D, "The Need for Sustained Compression in Foot and Ankle Devices" *Orthopaedic Research Society (ORS)*. New Orleans, LA

25. Yakacki CM, Poukalova M, Guldborg RE, Lin A, Saing M, Gillogly SD, Gall K, "The Influence of Trabecular Microstructure on the Pullout of Suture Anchors" *Orthopaedic Research Society (ORS)*. New Orleans, LA
24. Yakacki CM, Griffis J, Poukalova M, Evans N, Brahmabhatt PD, Gall K, "The Design and Pullout Strength of a Novel Shape-Memory PEEK Suture Anchor" *Orthopaedic Research Society (ORS)*. New Orleans, LA
- 2009
23. Yakacki CM, Poukalova M, Guldborg RE, Lin A, Gall K, "The Effect of Trabecular Microstructure and Mechanical Properties on the Pullout Strength of Suture Anchors" *ASME Summer Bioengineering Conference*. Lake Tahoe, CA
22. Yakacki CM, Smith K, Ortega AM, Gall K, "The Role of the Glass Transition on the Deformation and Recovery of Shape-Memory Polymer Networks" *Materials Research Society (MRS)*, San Francisco, CA 2008
21. Yakacki CM, "Developing of Shape-Memory Polymer Devices" *University of Wyoming (Mechanical Engineering)*, Laramie, WY
20. Yakacki CM, Satarkar N, Gall K, Likos R, Hilt JZ, "Fe<sub>3</sub>O<sub>4</sub> Filled Shape-Memory Polymer Networks for Inductive Heating" *Society of Engineering Science (SES)*, Champagne, IL
19. Gall K, Yakacki CM, Griffis J, "Shape Memory Polymers for Soft Tissue Fixation in ACL Reconstruction" *Society for Biomaterials*, Atlanta, GA
- 2007
18. Yakacki CM, Shandas R, Lyons M, Gall K, "Thermomechanics and Cytocompatibility of the Shape-Memory Effect in Biomedical Polymers Post-Sterilization" *Society of Engineering Science (SES)*, College Station, TX
17. Gall K, Yakacki CM, Ortega AM, Greenberg A, "Designing Shape Memory Polymers Networks for Biomedical Applications" *Materials Research Society (MRS)*, Boston, MA (invited)
16. Yakacki CM, Ortega AM, Shandas R, Gall K, "Tailored Recovery of Biocompatible Shape-Memory Polymer Networks" *Photopolymerization Fundamentals*, Breckenridge, CO
15. Yakacki CM, "Thermomechanics and Recovery of Tailored Shape-Memory Polymer Thermosets for Biomedical Applications" *The Max Planck Institute*, Stuttgart, Germany
14. Yakacki CM, Shandas R, Lyons MB, Ortega AM, Gall K, "Feasibility and Cytocompatibility of Poly(ethylene glycol) Dimethacrylate Crosslinked Networks for Orthopedic Graft Fixation and Vascular Repair" *Materials Research Society (MRS)*, San Francisco, CA
13. Ortega AM, Kasprzak S, Yakacki CM, Greenberg AR, Gall K, "Structure-Property Relationship in Photopolymerizable Polymer Networks Demonstrating Shape Memory Behavior" *Materials Research Society (MRS)*, San Francisco, CA
- 2006
12. Qi H, Yakacki CM, Shandas R, Gall K, Bergstrom J, Bischoff J, "Thermo-Mechanical Finite Deformation Behavior of Shape Memory Polymers" *Society of Engineering Science (SES)*, University Park, PA

11. Yakacki CM, Shandas R, Lanning C, Gall K, "Shape-Memory Effect in Polymer Networks – Influence of the Glass Transition Temperature and Crosslink Density" *Society of Engineering Science (SES)*, University Park, PA
  10. Yakacki CM, Gall K, Lanning C, Shandas R, "In-Vitro Recovery of Shape-Memory Polymer Stents" *ASME Summer Bioengineering Conference*, Amelia Island, FL
  9. Yakacki CM, "In-Vitro Recovery of Shape-Memory Polymer Stents" *Graduate Engineering Annual Research Symposium (GEARS)*, University of Colorado, Boulder, CO
- 2005
8. Yakacki CM, Gall K, Ortega A, Willett N, Shandas R, "Optimized Thermomechanics of a Shape Memory Polymer Stent to Recover at Body Temperature" *ASME Summer Bioengineering Conference*, Vail, CO (**2nd Place Finalist**)
  7. Yakacki CM, Gall K, Shandas R, Ortega A, Willett N, Greenberg AR, "Optimizing the Thermomechanics of Shape Memory Polymers for Biomedical Applications" *Mechanics of Materials (McMat)*, Baton Rouge, LA
  6. Yakacki CM, "Thermomechanics and Manufacturing of Shape Memory Polymers for Biomedical Applications" *Graduate Engineering Annual Research Symposium (GEARS)*, University of Colorado, Boulder, CO
- 2004
5. Yakacki CM, Gall K, Ortega A, Willett N, Greenberg AR, Shandas R, Anseth KS, "Thermomechanics of the Shape Memory Effect in Polymers for Biomedical Applications" *Materials Research Society (MRS)*, Boston, MA
  4. Yakacki CM, "Thermomechanics of Shape Memory Polymers for Biomedical Applications" *Industry Advisory Council (IAC)*, Boulder, CO (invited)
  3. Yakacki CM, Gall K, Liu Y, Shandas R, Anseth KS, "Thermomechanics of the Shape Memory Effect in Polymers for Biomedical Applications" *Society of Engineering Science (SES)*, Lincoln, NE
  2. Yakacki CM, "Creating Opportunity for Lafayette Youth, A Lafayette Schools Pre-Engineering Continuum, Boulder Valley School District with the University of Colorado" *University of Colorado*, Boulder, CO (invited)
  1. Yakacki CM, "Thermomechanics of Shape Memory Polymers" *Graduate Engineering Annual Research Symposium (GEARS)*, University of Colorado, Department of Mechanical Engineering, Boulder, CO

### **Seminars/Workshops Presented**

n/a

### **Professional Organizations**

- |                |   |
|----------------|---|
| 2012 – Present | <i>Member, Society of Plastics Engineers</i>            |
| 2012 – Present | <i>Member, Motorcycle Road-Racing Association</i>       |
| 2011 – Present | <i>Member, American Society of Mechanical Engineers</i> |

2010 – Present

*Member, Society for Biomaterials*

### **Publications/Creative Works in Preparation**

1. Materials Science: The Musical – A Mixolydian Medley (in progress)

### **Courses Taught**

#### 2016

18. MECH 5024: Mechanical Behavior of Materials (Spring)  
University of Colorado Denver – Instructor Rating (6.0/6.0)
17. MECH 2024: Introduction to Materials Science (Spring)  
University of Colorado Denver – Instructor Rating (5.7/6.0)

#### 2015

16. MECH 5001: Introduction to Research (Fall)  
University of Colorado Denver – Instructor Rating (5.9/6.0)
15. MECH 2024: Introduction to Materials Science (Fall)  
University of Colorado Denver – Instructor Rating (5.3/6.0)
14. MECH 5238: Polymers: Physics, Synthesis, and Characterization (Spring)  
University of Colorado Denver – Instructor Rating (5.8/6.0)
13. MECH 3024: Introduction to Materials Science (Spring)  
University of Colorado Denver – Instructor Rating (5.3/6.0)

#### 2014

12. MECH 5001: Introduction to Research (Fall)  
University of Colorado Denver – Instructor Rating (5.9/6.0)
11. MECH 5024: Mechanical Behavior of Materials (Fall)  
University of Colorado Denver – Instructor Rating (5.2/6.0)
10. MECH 3024: Introduction to Materials Science (Spring)  
University of Colorado Denver – Instructor Rating (5.6/6.0)

#### 2013

9. MECH 5238: Polymers: Physics, Synthesis, and Characterization (Fall)  
University of Colorado Denver – Instructor Rating (5.2/6.0)
8. MECH 3024: Introduction to Materials Science (Spring)  
University of Colorado Denver – Instructor Rating (5.0/6.0)

#### 2012

7. MECH 5024: Mechanical Behavior of Materials (Fall)  
University of Colorado Denver – Instructor Rating (4.7/6.0)
6. MECH 3024: Introduction to Materials Science (Spring)  
The University of Colorado Denver – Instructor Rating (5.1/6.0)

#### 2011

5. MSE 2001: Principles and Applications of Engineering Materials  
The Georgia Institute of Technology (Co-Instructor)

4. MSE 2001: Principles and Applications of Engineering Materials  
The Georgia Institute of Technology (Co-Instructor)

2010

3. MSE 2001: Principles and Applications of Engineering  
The Georgia Institute of Technology – Instructor Rating (4.8/5.0)

2009

2. MSE 4777: Introduction to Polymers  
The Georgia Institute of Technology (Co-Instructor)

2006

1. Engineering Elective  
Denver School of Science and Technology (High School Instructor)

**Service**

University

2015 – 2016	CEAS Scholarship Committee, CU Denver
2015 – 2016	Mechanical Engineering Faculty Search Committee Chair, CU Denver
2015	Writing-Intensive Course Subcommittee, CU Denver
2014 – Present	Mechanical Engineering EAS-PhD Program Coordinator, CU Denver
2014	Guest Panelist for Bioengineering Retreat, CU Denver
2014	Presenter, CU Denver Mini-STEM Program
2014	Mechanical Engineering Faculty Evaluation Committee, CU Denver
2013 – 2014	Mechanical Engineering Undergraduate Review Committee, CU Denver
2012	Mechanical Engineering Qualifying Exam Committee, CU Denver
2012	Mechanical Engineering Faculty Search Committee, CU Denver
2005 – 2006	Faculty Search Committee Student Liaison, CU Boulder

Academia

2016	Reviewer, 1 manuscripts (various journals)
2015	Reviewer, 5 manuscripts (various journals)
2015	Grant Reviewer, 1 panel with National Science Foundation
2015	Grant Reviewer, 1 proposal for US Army
2014	Reviewer, 8 manuscripts (various journals)
2014	Grant Reviewer, 1 panel with National Science Foundation
2013	Reviewer, 11 manuscripts (various journals)
2013 – Present	Editor, ASME IMECE Technical Committee on Soft Materials
2012 – 2013	Secretary, ASME IMECE Technical Committee on Soft Materials
2012 – 2013	Guest Editor, Polymer Reviews (Coordinated Volume 52 Issue 1)



2012 Grant Reviewer, 3 panels with National Science Foundation

Industry Involvement

2017 – Present *Founder, CEO, CTO, President, Impressio, Inc.*  
2014 – 2018 *Technical Advisory Board Member, Lumed, Inc.*  
2005 *Co-Founder, MedShape, Inc.*

Primary Advisor      Graduated PhD Students Bolded

18. Ross Volpe – PhD Advisor (current) – CU Denver
17. Nicholas Traugutt – PhD Advisor (current) – CU Denver
16. Risheng Zhou – MS Advisor (current) – CU Denver
15. Brian Kaplun – PhD Co-Advisor (current) – CU Denver
14. Sabina Ula – PhD Advisor (current) – CU Denver
13. Sam Mills – PhD Co-Advisor (current) – CU Denver
12. Nicholas Traugutt – MS Advisor (2018) CU Denver
11. Michael Bollinger – MS Advisor (2018) – CU Denver
10. Rich Wojcik – MS Project Advisor (2018) – CU Denver
9. **Ravi Patel – PhD Co-Advisor (2018) – CU Denver**
8. Amir Torbati – Postdoc Advisor (2014-2017) – CU Denver
7. Ross Volpe – MS Advisor (2017) – CU Denver
6. **Mohand Saed – PhD Advisor (2017) – CU Denver**
5. Thomas Caranese – MS Advisor (2015) – CU Denver
4. Ryan Anderson – MS Co-Advisor (2015) – CU Denver
3. Daniel Lightbody – MS Project Advisor (2014) – CU Denver
2. Sam Weber – MS Project Advisor (2013) – CU Denver
1. Kathryn Smith – ASEE Postdoc Advisor (2010-2011) – MedShape, Inc.

Committee Member

12. Drew Hanzon – PhD Thesis (current) – CU Denver
11. Daniel Merkel – PhD Thesis (2018) – The University of Wyoming
10. Matthew McBride – PhD Thesis (2018) – CU Boulder
9. David Collins – MS Thesis (2015) – The University of Wyoming
8. Anthony Hoyt – MS Thesis (2015) – The University of Wyoming
7. Lillian Chatham – MS Thesis (2014) – CU Denver
6. Elmutaz Moftah – MS Project (2013) – CU Denver
5. Nishant Lakhera – PhD Thesis (2013) – The University of Wyoming

4. Amy DiRienzo – MS Thesis (2013) – The University of Wyoming
3. Alicia Martin – MS Thesis (2013) – The University of Wyoming
2. Lucas Newman – MS Project (2012) – CU Denver
1. Bradley Caravas – MS Project (2012) – CU Denver

Sponsored Undergraduate Students (Underlined denotes Financial Support)

Tolulope Odeyemi, Chelsea Starr, Julie Starr, Christina Gardner, Hannah Tift, Alba Avita, Ellana Taylor, Victoria Dorr, Arthur Boo, Michael Bollinger, Mona Haji, Wes Bower, Brandon Mang, Richard Wojcik, Eric Losty, Zaher Jabr, Beatriz Bermudaz, Kristen Bonifeld