
Taylor D. Sparks

Professor
Department of Materials Science & Engineering
122 Central Campus Drive
University of Utah, Salt Lake City, 84112

Office: CME room 314
Email: sparks@eng.utah.edu
Phone: (801) 581-8632
Website: www.eng.utah.edu/~sparks

❖ Education:

2009-2012 PhD, Harvard University, Cambridge, MA. Applied Physics Department. Faculty Advisor: David Clarke. Dissertation entitled "*Oxide Thermoelectrics: Role of Crystal Structure on Thermopower in Strongly Correlated Spinels*," May 2012.

2007-2009 M.S. in Materials, University of California, Santa Barbara, CA. Materials Department. Faculty Advisor: David Clarke. Thesis entitled "*Thermal Conductivity and Anisotropy of Layered Oxides*," September 2010.

2004-2007 B.S. (*honors*) in Materials Science & Engineering, University of Utah, Salt Lake City, UT. Materials Science & Engineering Department. Minor in Chemistry. Senior Thesis Adviser: Raymond Cutler. Thesis entitled "*Reaction-bonded CERCANAM® Material for High-Strength Low-Cost Refractories*," June 2007.

❖ Employment:

2024 – present Professor, Materials Science and Engineering, University of Utah, Salt Lake City, UT

2019 – 2024 Associate Professor, Materials Science and Engineering, University of Utah, Salt Lake City, UT

2022 – 2023 Royal Society Wolfson Visiting Fellow, University of Liverpool, UK

2019 – 2022 Associate Chair, Materials Science and Engineering, University of Utah, Salt Lake City, UT

2013 – 2019 Director of the Materials Characterization Laboratory, University of Utah, Salt Lake City, UT

2013 – 2019 Assistant Professor, Materials Science and Engineering, University of Utah, Salt Lake City, UT

2012 – 2013 Postdoctoral Fellow, UC Santa Barbara. Working with Ram Seshadri.

Fall 2011 International Center for Materials Research Fellow (ICMR). Institut Laue-Langevin, Grenoble, France and Technische Universität Darmstadt, Darmstadt, Germany.

Summer 2010 International Research and Education in Engineering (NSF-IREE) 2010 China Program awardee, Shanghai Institute of Ceramics Chinese Academy of Science (SICCAS), Shanghai, China.

Summer 2008 & 2009 International summer research, Tsinghua University, Beijing, China. Pan Wei lab.

2004-2007 Ceramatec Inc., Salt Lake City, UT. Research Intern.

❖ Publications: (As of March 2024, >110 journal articles, 12 conference proceedings, 6 patents, 82 podcast episodes, see full list [here](#))

❖ Federal Government Research Contracts:

1. "Transformers: a novel algorithm well-suited for the unique challenges of materials informatics" \$442,863 DOD ARO Materials Design, PI, (09/01/2023-08/31/2026)
2. "EAGER: SSMCDAT2023: Natural Language Processing and Large Language Models for Automated Extraction of Materials Chemistry Data from Scientific Literature" \$200,000 NSF EAGER, CMMT program, PI, (09/01/2023-08/31/2025)
3. "Designing Novel Multicomponent Niobium Alloys for High Temperature: Integrated Design, Rapid Processing & Validation Approach." \$800,000 DOE arpa-e, Phase I ULTIMATE program, Co-PI share \$133,000, (06/01/2021-12/31/2022)
4. "Quantum Computer Topological Insulator Single Crystal Material" \$16,819 KFAS, PI, (01/01/2021-12/31/2022).

5. "Research Experience in Utah for Sustainable Materials Engineering (ReUSE)" \$372,852 NSF DMR, Co-PI share \$186,462 (07/01/2020-06/30/2023).
6. "QII-TAQS: Quantum Devices with Majorana Fermions in High-Quality Three-Dimensional Topological Insulator Heterostructures" \$1,635,591 NSF MPS, Co-PI share \$277,169, (09/01/2019-08/30/2022).
7. "Collaborative Research: SSMCDAT2020: Solid-State and Materials Chemistry Data Science Hackathon" \$62,639 NSF DMR, PI, (07/01/2019-06/30/2020).
8. "Early Demonstration of Combinatorial Alloy Fabrication and FAST Irradiation Testing" \$400,000 INL Out-of-cycle LDRD, Co-PI share \$80,000 (04/03/2019-09/30/2019).
9. "Accelerated Nuclear Materials and Fuel Qualification by Adopting a First to Failure Approach", \$1,271,458 INL LDRD, Co-PI share \$279,720, (10/01/2018-09/30/2021).
10. "Fluorhydroxyapatite Coatings for Facilitating Epithelial Cells Adhesion to the Implant Surface for Preventing Infection in Percutaneous Implant Systems" \$749,864 DOD CDMRP PRORP (W81XWH-15-1-0682), Co-PI share \$74,360 (07/01/2014-06/30/2019).
11. "CAREER: SusChEM: Data Mining to Reduce the Risk in Discovering New Sustainable Thermoelectric Materials" \$580,000 NSF SSMC, PI, (07/01/2017 – 06/30/2022).
12. "Collaborative Research: Guided discovery of sustainable superhard materials via bond optimization" \$266,000 NSF CMMI MEP, PI, (06/01/2016-05/31/2019).
13. "Data-driven discovery of novel thermoelectric materials," \$3,600,000 DARPA SIMPLEX, Department of Defense, Defense Sciences Office, Co-PI share \$62,500, (04/01/2015-06/31/2018).
14. "Ceramic proppant design for in-situ microbially enhanced methane recovery," \$464,391 National Energy Technology Laboratory, Department of Energy, Office of Fossil Fuels, PI share \$232,195, (10/1/2014-9/30/2016).

❖ **Non-Federal Government Research Contracts:**

1. Research Gift, \$10,000 Jim Beaver, PI (03/015/2024-03/14/2025).
2. "Accelerated qualification of additive manufactured aerospace composites via materials informatics," \$286,563 ES3, PI (12/01/2023-11/30/2026).
3. "Pirta Paint testing and analysis", \$5,000 Pirta Ltd., PI (08/24/2023-08/23/2024).
4. "Accelerated discovery and qualification of dental materials using materials informatics phase III" \$78,717 Ultradent Products, Inc., PI, (08/16/2023-08/15/2024).
5. "Accelerated discovery and qualification of dental materials using materials informatics phase II" \$78,717 Ultradent Products, Inc., PI, (08/16/2022-08/15/2023).
6. "Characterization of ceramic electrosurgery tools." \$19,108 Excelsior Resources LLC, PI, (11/15/2021-03/31/2022).
7. "Metallization of Metamaterial Latticed Polymer Waveguide Structures – Phase II" \$49,996 L3Harris, PI, (09/15/2021-09/14/2022).
8. "Accelerated discovery and qualification of dental materials using materials informatics." \$78,717 Ultradent Products, Inc., PI, (08/16/2020-08/15/2021).
9. "Accelerated testing of fluoropolymer linings in acetic acid." \$10,000 Fisher Company, PI, (02/15/21-05/30/21).
10. "Literature review of superhard materials and testing for drilling applications." \$25,000 China National Petroleum Corporation, PI, (01/01/2021-06/01/2021).
11. "Metallization of Metamaterial Latticed Polymer Waveguide Structures." \$49,911 L3Harris, PI, (09/01/2020-08/31/2020).
12. "Biodegradable hot wax-sealable packaging materials" \$5,510 Procter & Gamble, PI, (01/01/2020-06/30/2020).
13. "An investigation of pathogens on rock climbing mat materials" \$15,000 IU4U, University of Utah, Co-PI share \$5,000 (02/01/2020-06/30/2021)
14. "Mechanical properties of fluoropolymer composites for chemical liners," Fisher Company, PI, (03/01/2015-05/31/2015) \$4,783.
15. "Flexible and laminable adjustable tint films" USTAR IPP, PI, (09/01/2016 – 08/30/2017).

16. "Mechanical properties of fluoropolymer composites for chemical liners," \$15,273 Fisher Company, PI, (03/01/2015-05/31/2015).
17. "Optimized power harvesting with tunable thermoelectric devices," \$125,000 Principle Energy Initiative Program, Utah Office of Energy Development, PI, (09/01/2015 – 08/31/2016).
18. "Scalable deposition method of electrochromic coatings for energy efficient windows" \$15,000 Governor's Energy Research Scholars Program, Utah Energy Research Triangle, State of Utah, PI, (07/01/2015-06/30/2016).
19. "Characterization of Inconel 718+ Alloy for Honeywell International," \$15,153 Honeywell International Inc., PI, (04/05/2016-09/15/2016).
20. "Characterization of SiC and Si₃N₄ for Honeywell International," \$30,354 Honeywell International Inc., PI, (07/01/2015-10/15/2016).
21. "Characterization and comparison of fluoropolymer composites for chemical liners," \$16,968 Fisher Company, PI, (03/01/2015-05/31/2015).
22. "Layered topological insulators in the 2D limit," \$35,000 MRSEC Seed Grant Award, Co-PI share \$17,500 (01/01/2015-12/31/2015).
23. "Characterization of steel blanks used for copper refining," \$14,480 Rio Tinto Group, Kennecott Copper LLC, PI, (01/15/2015-03/15/2015).
24. "Evaluation of cold temperature performance of PCM based thermal management systems in hybrid electric vehicles," \$33,000 University of Utah Seed Grant Award, PI, (07/01/2014-06/30/2015).
25. "High-performance Mg₂Si nanostructured thermoelectric materials," \$15,000 Governor's Energy Research Scholars Program, Utah Energy Research Triangle, State of Utah, PI, (07/01/2014-06/30/2015).
26. "Evaluation of cold temperature performance of PCM based TMS in hybrid electric vehicles," \$15,000 Governor's Energy Research Scholars Program, Utah Energy Research Triangle, State of Utah, PI, (07/01/2014-06/30/2015).

❖ Foreign Language:

Fluent in Spanish (lived in Argentina for two years for LDS mission), conversant and literate in German, intermediate Mandarin Chinese (lived in China for 7 months).

❖ Honors and Awards:

2023 Materials Science & Engineering Department Research Award
2023 Key expert resource in "Trew Marketing 2023 State of Marketing to Engineers Research Report"
2022 John G. Francis Prize for Undergraduate Student Mentoring
2022 Royal Society Wolfson Visiting Fellowship
2021 Outstanding Faculty Teaching Award for the College of Mines & Earth Science at the University of Utah
2021 Outstanding Reviewer Award of 2020, *Acta Materialia*
2019, 2021 TEDxSaltLakeCity invited speaker
2019 Journal of Materials Chemistry A "2019 Emerging Investigators"
2018 Turning Technologies Distinguished Educator
2018 Journal of Materials Research "2018 Early Career Scholars In Materials Science"
2016-2020 LDSSA and Salt Lake University Institute Excellence in Education Recognition Award
2016 NSF CAREER Award
2016 Runners up in Challenge.gov AFRL Materials Science and Engineering Data Challenge
2016 Career Services Faculty Recognition Award, University of Utah.
2012 Best Poster Award 2012 MRS Fall Meeting (coauthored poster).
2010 recipient of the 2010 Ron Jenkins Tuition Waiver award from the International Centre for Diffraction Data, Rietveld Refinement and Indexing Workshop.
2010 NSF-IREE (International Research and Education in Engineering) 2010 China Program award recipient
2009 First Place Poster, ICMR Spring School on Thermal Conductivity and Related Transport Properties of Oxides. Gainesville FL, May 17-23 2009
2007 Second Place Poster, University of Utah, Materials Department Senior Posters

2007 "Outstanding Graduating Senior for 2007" for the Department of Materials Science and Engineering, University of Utah

❖ **Volunteering and Service:**

2024-present Public & Governmental Affairs Committee Member, *TMS*

2024-present MARDA Governing Council Member

2023-present Content Development & Dissemination Committee Member, *TMS*

2023-present Organizing Committee for the 2nd World Congress on Artificial Intelligence in Materials and Manufacturing

2022-present Associate Editor, *Computational Materials Science*

2021-present Editorial Advisory Board for *Chemistry of Materials*, *Journal of Materials Informatics*, *APL Machine Learning*

2021-2022 Chair of TMS World Congress on Artificial Intelligence in Materials and Manufacturing 2022

2019-present Editorial Board Member for *Scientific Reports*

2019-present Section Editor over Materials Informatics for *Data in Brief*

2018 TMS Materials Data Task Force Member

2018 ACerS Meetings Committee Member

2017-present Scientific Advisory Board Member for Citrine Informatics

2017-present Editorial Board Member for *Integrating Materials and Manufacturing Innovation*

2015-2018 Scoutmaster for East Millcreek 7th Ward Troop, Boy Scouts of America

2012-present Reviewer for *Journal of Materials Chemistry A*, *Nature*, *Progress in Energy and Combustion Science*, *Chemistry of Materials*, *Acta Materialia*, *Journal of the American Chemical Society*, *Journal of the American Ceramic Society*, *Nano Energy*, *Journal of Materials Chemistry C*, *Journal of Applied Physics*, *Applied Physics Letters*, *ACS Applied Materials & Interfaces*, *Journal of Alloys and Compounds*, *Nanoscale*, *Physica Status Solidi (a)*, *APL Materials*, *Metallurgical and Materials Transactions A*, *Journal of Physics and Chemistry of Solids*, *Journal of Industrial and Engineering Chemistry*, *Journal of Electronic Materials*, *Renewable and Sustainable Energy Reviews*, and *Advanced Energy Materials*

2007-2009 Assistant Scoutmaster for Goleta Valley Troop, Boy Scouts of America

2002-2004 Served a two-year, full-time proselyting mission for the Church of Jesus Christ of Latter-Day Saints in Bahia Blanca, Argentina

❖ **Mentoring**

PhD Students: (starting year): Leila Ghadbeigi (2013), Alexander Szendrei (2014), Jake Graser (2014), Marcus Parry (2016), Ka'ai Kauwe (2017), Pooya Elahi (2017), Jason Hall (2018), Husain Alnaser (2019), Hasan Sayeed (2020), Sterling Baird (2020), Trupti Mohanty (2021), Zahra Gholami (2021), and Ramsey Issa (2021), Ethan Cutler (2023), Andrew Falkowski (2023), Kinston Ackolf (2024), Byron Millet (2024)

MS Students: (graduating year): Colton Fox (2018), Christian Robert (2018), Logan Kiefer (2019), Ashley Kennedy (2019), Dani Beatty (2020), Clarke Nielson (2020), Jason Nance (2020), Amber Barron (2020), Isaac Krieger (2022), Mark Halling (2023), Hayden Johnson (2023), Wade Smallwood (2023), Carter Salbego (2024), Elizabeth Winterholler (2024)

Postdoctoral Researchers: Jeff Bates (2013-2014), Wu Wenjuan (2016-2017, CSC recipient), Kyu Bum Han (2014-2017), Shadi Al Khateeb (2016-2018), Maged Bekheet (2018), Amit Vashist (2021), Victor Villapun (2024).

Undergraduate Student Researchers: 95 with 51% of publications include undergrad coauthors.