

Michael Miles

Brigham Young University
265 CTB
Provo, UT 84602
mmiles@byu.edu
801-422-1858

Experience

9/19 – Present	Brigham Young University - Provo, UT Professor, Manufacturing Engineering Department
9/13 – 8/19	Brigham Young University - Provo, UT Professor, Manufacturing Engineering Technology Program
9/09 – 12/16	Brigham Young University - Provo, UT Program Chair/Coordinator, Manufacturing Engineering Technology Program
9/07 – 8/13	Brigham Young University - Provo, UT Associate Professor, Manufacturing Engineering Technology Program
7/01 – 8/07	Brigham Young University - Provo, UT Assistant Professor, Manufacturing Engineering Technology Program
1/00 – 7/01	Assistant Plant Manager, Rexam, PLC - Whitehouse, OH
12/98 – 12/99	Engineering Manager, American National Can - Whitehouse, OH
5/98 – 12/98	Senior Project Engineer, American National Can – Elk Grove Village, IL
1/96 – 4/98	Tooling Engineer, American National Can – Elk Grove Village, IL
2/95 – 1/96	Project Engineer, Pechiney Research Center - Voreppe, France

Education

1995, Ph.D. Materials Science and Engineering, Ecole des Mines de Paris
1991, M.S. Metallurgical Engineering, Ohio State University
1989, B.S. Metallurgical Engineering (French minor), University of Idaho

Professional Activities and Awards

2022 - 2025	Melvin and Maxine Chabries Professorship, BYU Ira A. Fulton College of Engineering
2021	American Welding Society, Adams Memorial Membership Award
2018	Excellence in Scholarship Award, BYU Ira A. Fulton College of Engineering
2011-2013	Nominating committee, The Minerals, Metals, and Materials Society (TMS)
2010	Outstanding Faculty Award, BYU School of Technology
2007- 2010	Chair, The Minerals, Metals, and Materials Society (TMS) Shaping and Forming Committee
2009 – 2011	Faculty advisor, Society of Manufacturing Engineers (SME)
2006	First place award in Society of Manufacturing Engineers (SME) manufacturing challenge competition (faculty team advisor)
2004- 2014	Treasurer and Board Member, Society for the Advancement of Materials and Process Engineering (SAMPE) - Utah Chapter
2003-2007	Faculty advisor for BYU chapter of the Society for Advancement of Materials and Process Engineering (SAMPE)
2003	First place award in Society of Manufacturing Engineers (SME) manufacturing challenge competition (faculty team advisor)
1997	Young Leader Intern for The Minerals, Metals, and Materials Society (TMS)

1990-91	Forming Limit Diagram User's Group, North American Deep Drawing Research Group (NADDRG)
1989-91	Parson's Foundation Fellow, National Science Foundation (NSF) Engineering Research Center for Net Shape Manufacturing, Ohio State University
1988	Member of Tau Beta Pi

Program Director - Asia Manufacturing Engineering Study Abroad Program

Began mentored internship study abroad in 2006 with one company in Shanghai, China. By summer of 2019, approximately 100 students had participated in this program at 13 different companies and three countries (China, Taiwan, Vietnam). Manufacturing engineering technology students were the primary participants, but students from mechanical engineering, chemical engineering, construction management, and nursing were also involved in this 6 week program.

Patents

T. Turner, R. Forrest, M. Miles: End Closure with Improved Openability, 2/15/2000, number 6,024,239.

S. Packer, R. Steel, J. Babb, M. Miles, K. Kohkonen: Three-body joining using friction stir processing techniques, 12/7/2010, number 7,845,545.

M. Miles, R. Fleck, R. Steel: Friction bit joining using a friction rivet, 9/19/2017, number 9,764,375.

M.P. Miles and T.W. Nelson: Friction stir additive processing, BYU disclosure 2016-017, 3/28/2016.

Michael P Miles, Rodney Dale Fleck, Russell J Steel, Kevin Alexander Shirley and Shane Forrest Wood: Systems and methods for friction bit joining, 7/11/2023, number 11,697,173.

Expert Witness

Expert for Freshfields, Bruckhaus, Deringer in patent infringement lawsuit, London, England, September 2008 – January 2009.

Expert for Foley & Lardner LLP in patent infringement lawsuit, Washington, DC, July 2008 – October 2009.

Expert for Reed Smith LLP in personal injury lawsuit, Los Angeles, CA, January 2010 – March 2010.

Expert for Lewis and Rocca LLP in breach of contract lawsuit, Albuquerque, NM, January 2011 – July 2011.

Expert for Burr & Forman LLP, Inter Partes Review, March 2015 – May 2015.

Expert for Covington & Burling LLP in trade secret lawsuit, Washington, D.C., December 2016.

Expert for Morgan, Lewis & Bockius, Inter Partes Review, March 2019 – June 2020.

Expert for Dinsmore & Shohl, patent infringement lawsuit, April 2023 – August 2023.

External Funding

PI: "Development of a finite element model to predict bending limits of thick plate AA 2519", Rockwell Scientific (DARPA subcontract), February 2003 (\$15K).

PI: "Formability of Friction Stir Welded High Strength Steel Sheet", Society of Manufacturing Engineers Education Foundation, May 2005 (\$15K).

PI (with Co-PI Kent Kohkonen): "SGER: Friction Bit Joining - A New Solid State Spot Joining Process", National Science Foundation, July 2008 (\$99,435)

Co-PI (with PI David Fullwood and Co-PI Brent Adams): "GOALI: Defect Detection Microscopy: Microstructure Design for Formability of Wrought Magnesium Alloys", National Science Foundation, August 2009 (\$319,937)

PI: "Impact of PCBN tool design performance and tool life for DP 980 steel", DOE PNNL subcontract, March 2010 (\$36,864)

PI: "Tool life and joint performance for friction stir spot welding of ultra high strength steel using reduced vertical welding loads", DOE PNNL subcontract, July 2011 (\$37,616)

PI: "Solid state spot joining of cast iron and aluminum", RE-EV Program, subcontract through Ulsan University, South Korea, August 2011 (\$20K)

PI: "High speed friction stir spot welding: A new method for spot joining of ultra high strength steel", National Science Foundation, August 2011 (\$260,000)

PI (with Co-PI Paul Higgins): "Friction Bit Joining: A Novel Solution to Dissimilar Metals Joining", TCIP State of Utah, with Megastir Technologies, January 2012 (\$40,000)

Co-PI (with PI Zhili Feng): "Body-in-White Joining of Aluminum to Advanced High Strength Steel at Prototype Scale", DOE, with Oak Ridge National Lab and Honda, September 2013 (\$240,000)

PI (with Co-PI David Fullwood): "Microscopic Fracture Mechanisms Evaluation for Advanced High Strength Steel", Auto/Steel Partnership, October 2013 (\$35,000)

PI (with Co-PI Tracy Nelson): "GOALI: Crack Repair of Irradiated Stainless Steel by Friction Stir Processing", National Science Foundation, March 2014 (\$304,999)

Co-PI (with PI David Fullwood): "Microstructural Foundations of Magnesium Performance: A Data Mining Approach to High-Throughput HREBSD", National Science Foundation, September 2014 (\$346,362)

PI (with Co-PI David Fullwood): "Microscopic Fracture Mechanisms Evaluation for AHSS", Auto/Steel Partnership, October 2014 (\$30,000)

Co-PI (with PI David Fullwood and Co-PI Eric Homer): "GOALI: Deformation Microscopy of Retained Austenite Transformation in TRIP Steels", National Science Foundation, July 2015 (\$455,515)

PI (with Co-PIs Tracy Nelson and Carl Sorensen): "Development of a methodology for characterizing the tool/part interface in friction stir welding for improvement of predictive modeling in aluminum alloys" NASA, January 2019 (\$500,000)

PI: "Solid-State Body-in-White Spot Joining of Al to AHSS at Prototype Scale (Phase III)", Department of Energy, March 2019 (\$200,021)

PI (with Co-PI David Fullwood): “GOALI/Collaborative Research: Strain Gradient Plasticity Modeling to Link Microstructural Non-Local Effects of Dislocation/Interface Interactions with Ductility and Springback”, National Science Foundation, August 2019 (\$299,855)

Co-PI (with PI Troy Munro): “Improvement of Modeling Predictions in Friction Stir Welding by More Accurate Measurement of Heat Transfer Between Tooling and Workpiece”, National Science Foundation, December 2019 (\$348,402)

Co-PI (with PI Tracy Nelson and Co-PI Yuri Hovanski): “Investigation of friction stir additive repair techniques of AA 7050 for naval application”, Office of Naval Research, July 2020 (\$494,916)

Co-PI (with PI David Fullwood): “Collaborative Research: GOALI: Understanding multiscale mechanics of cyclic bending under tension to improve elongation-to-fracture of hexagonal metals”, National Science Foundation, September 2022 (\$314,745).

Co-PI (with PI Tracy Nelson): “A study on methods for obtaining materials flow data for the next generation inertia weld parameter optimization model”, General Electric Research Center, July 2023 (\$90,000).

Co-PI (with PI Tracy Nelson): “Morphogenic Interfaces”, DARPA/MINT, April 2023 (\$160,000).

PI: “Complex Internal Structures in Castings for Extreme Environmental Conditions”, Idaho National Laboratory, October 2023 (\$29,545)

Peer-reviewed journal papers (2014-2024): BYU student co-authors underlined

Sajjad Izadpanah Najmabad, David Fullwood, Tristan Russell, Marko Knezevic, Michael Miles (2024). Interpretation of the stress dip test as a means of characterizing backstress: Experiments and backstress-aided crystal plasticity modeling of polycrystalline tantalum, International Journal of Plasticity, Volume 181, pp. 104089.

Nathan Miller, Nicholas Pitkin, Talukder Musfika Tasnim Oishi, Desmond Mensah, Marko Knezevic, Michael Miles, David Fullwood (2024). Multiscale characterization of dislocation development during cyclic bending under tension in commercially pure titanium, Journal of Materials Research and Technology, Volume 32, pp. 2513-2527.

Talukder Musfika Tasnim Oishi, Nick Pitkin, Nathan Miller, Desmond Mensah, David T. Fullwood, Michael P. Miles, Brad L. Kinsey, Marko Knezevic (2024). Influence of specimen width on the elongation-to-fracture in cyclic-bending-under-tension of commercially pure titanium sheets. International Journal of Mechanical Sciences, Volume 278, pp.109447.

Matthew Goodson, Ryan Melander, Michael P. Miles, Troy Munro (2023). Effect of workpiece/tool heat transfer and friction coefficients on accuracy of simulated temperatures and torques in a friction stir welding plunge. Materials 2024, 17, pp. 198

Dane Sargeant, Md Zahidul Sarkar, Rishabh Sharma, Marko Knezevic, David T. Fullwood, Michael P. Miles (2023). Effect of pre-strain on springback behavior after bending in AA 6016-T4: Experiments and crystal plasticity modeling. International Journal of Solids and Structures, Volume 283, pp. 112485.

Derrik Adams, Marcus Behling, Michael P. Miles, Eric R. Homer, Anil K. Sachdev, Emily V. White, David T. Fullwood (2023). Characterization of the Factors Influencing Retained Austenite Stability in Q&P Steels via In Situ EBSD. Metall Mater Trans A 54, pp. 1355–1363.

Rishabh Sharma, Dane Sargeant, Sowmya Daroju, Marko Knezevic, Michael P. Miles, David T. Fullwood (2022). Multi-strain path deformation behavior of AA6016-T4: Experiments and crystal plasticity modeling, *International Journal of Solids and Structures*, Volumes 244–245, pp.111536.

Sowmya Daroju, Toshihiko Kuwabara, Rishabh Sharma, David T. Fullwood, Michael P. Miles, Marko Knezevic (2022). Experimental characterization and crystal plasticity modeling for predicting load reversals in AA6016-T4 and AA7021-T79, *International Journal of Plasticity*, Volume 153, pp.103292.

Evan Berger, Michael Miles, Andrew Curtis, Paul Blackhurst, and Yuri Hovanski (2022). 2D Axisymmetric Modeling of Refill Friction Stir Spot Welding and Experimental Validation, *Journal of Manufacturing and Materials Processing*, 6(4) pp. 89.

Jie Wu, Yuri Hovanski, and Michael Miles (2022). Digital Image Correlation Characterization and Formability Analysis of Aluminum Alloy TWB during Forming, *Materials* 15(15), pp. 5291.

David Prymak, Michael Miles, Tracy Nelson, Fredrick Michael (2021). A High-Pressure Shear Testing Approach to Measure Flow Stresses Near a Friction Stir Welding Tool, *Materials Performance and Characterization*, 10(1), pp. 727-738.

Jie Wu, Yuri Hovanski, Michael Miles (2021). Investigation of the Thickness Differential on the Formability of Aluminum Tailor Welded Blanks, *Metals*, 11(6), pp. 875.

Rishabh Sharma, Camille M Poulin, Marko Knezevic, Michael P Miles, David T Fullwood (2021). Micromechanical origins of remarkable elongation-to-fracture in AHSS TRIP steels via continuous bending under tension, *Materials Science and Engineering A*, 825, pp. 141876.

Derrik Adams, Michael P Miles, Eric R Homer, Tyson Brown, Raj K Mishra, David T Fullwood (2021). Phase determination in dual phase steels via HREBSD-based tetragonality mapping, *Journal of Microscopy*, 282(1), pp. 60-72.

Daniel Ellis, Matthew Goodson, Michael Miles, Troy Munro (2021). Optimized Design for a Device to Measure Thermal Contact Conductance During Friction Stir Welding, *International Journal of Thermophysics*, 42(1), pp. 1-24.

Jason Weaver, John Linn, Michael Miles (2021). Interface Joint Strength between SS316L Wrought Substrate and Powder Bed Fusion Built Parts, *Materials*, 14(11), p. 3041.

Stephen Cluff, Marko Knezevic, Michael P Miles, David T Fullwood, Raja K Mishra, Anil K Sachdev, Tyson Brown, Eric R Homer (2021). Coupling kinetic Monte Carlo and finite element methods to model the strain path sensitivity of the isothermal stress-assisted martensite nucleation in TRIP-assisted steels, *Mechanics of Materials*, 154, pp. 1-14.

Derrik Adams, Shamoon Irfan, Jeff Cramer, Michael P Miles, Eric R Homer, Tyson Brown, Raj K Mishra, David T Fullwood (2020). Digital Image Correlation of Forescatter Detector Images for Simultaneous Strain and Orientation Mapping, *Microscopy and Microanalysis*, 26(4), pp. 641-652.

Isaac Chelladurai, Devin Adams, David T Fullwood, Michael P Miles, Stephen Niezgoda, Irene J Beyerlein, Marko Knezevic (2019). Modeling of trans-grain twin transmission in AZ31 via a neighborhood-based viscoplastic self-consistent model, *International Journal of Plasticity*, 117, pp. 21-32.

Jason M Weaver, TJ Barton, John Linn, Derrik Jenkins, Michael P Miles, Robert Smith (2019). Quantifying accuracy of a concept laser metal additive machine through the NIST test artifact, *Rapid Prototyping Journal*, 25(2), pp. 221-231.

M.P. Miles, T.W. Nelson, C. Gunter, F.C. Liu, L. Fourment, T. Mathis (2019). Predicting recrystallized grain size in friction stir processed 304L stainless steel, *Journal of Materials Science & Technology*, 35(4), pp. 491-498.

T.M. Rampton, S.I. Wright, M.P. Miles, E.R. Homer, R.H. Wagoner, D.T. Fullwood (2018). Improved twin detection via tracking of individual Kikuchi band intensity of EBSD patterns, *Ultramicroscopy*, 185, 5-14.

J. Cramer, D. Adams, M.P. Miles, D.T. Fullwood, E.R. Homer, T. Brown, R.K. Mishra, A. Sachdev (2018). Effect of strain path on forming limits and retained austenite transformation in Q&P 1180 steel. *Materials Science and Engineering A*, 734, pp. 192-199.

A. Orme, D.T. Fullwood, M.P. Miles (2018). Evolution of Mg AZ31 twin activation with strain: a machine learning study. *Materials Discovery*, 12, 20-29.

R. Sharma, I. Chelladurai, A.D. Orme, M.P. Miles, C.G. Giraud-Carrier, D.T. Fullwood (2018). A Step Towards Intelligent EBSD Microscopy: Machine Learning Prediction of Twin Activity in MgAZ31. *Journal of Microscopy*, 272(1), 67-78.

C.Gunter, M.P. Miles, F.C.Liu, T.W. Nelson (2018). Solid state crack repair by friction stir processing in 304L stainless steel, *Journal of Materials Science & Technology*, 34(1) 140-147.

F.C.Liu, Y.Hovanski, M.P.Miles, C.D.Sorensen, T.W.Nelson (2018). A review of friction stir welding of steels: Tool, material flow, microstructure, and properties. *Journal of Materials Science & Technology*, 34(1), 39-57.

Eun-Yeong Ahn, Hrishikesh Das, Sung-Tae Hong, Kyung-Sik Han, Michael Miles, Kwang-Jin Lee, Ju-Won Park, Heung Nam Ha (2017). Process responses and resultant joint properties of friction stir welding of dissimilar 5083 and 6061 aluminum alloys, *Journal of Mechanical Science and Technology*, 31(8), 3955-3960.

I. Chelladuari, M.P. Miles, D.T. Fullwood, J.E. Carsley, R.K. Mishra, I.J. Beyerlein, and M. Knezevic (2017). Microstructure Correlation with Formability for Biaxial Stretching of Magnesium Alloy AZ31B at Mildly Elevated Temperatures. *JOM*, 69(5), 907-914.

J-R. Kim, E-Y. Ahn, H. Das, Y-H. Jeong, S-T. Hong, M.P. Miles, and K-J. Lee (2017). Effect of tool geometry and process parameters on mechanical properties of friction stir spot welded dissimilar aluminum alloys, *International Journal of Precision Engineering and Manufacturing* 18, 445-452.

Y. C. Lim, L. Squires, T.-Y. Pan, M. P. Miles, J. K. Keum, G.-L. Song, Y. Wang, Z. Feng (2017). Corrosion behaviour of friction-bit-joined and weld-bonded AA7075-T6/galvannealed DP980. *Science and Technology of Welding and Joining*, 22(6), 455-464.

A. D. Orme, I. Chelladurai, T. M. Rampton, D. T. Fullwood, A. Khosravani, M. P. Miles, R. K. Mishra (2016). Insights into twinning in Mg AZ31: A combined EBSD and machine learning study. *Computational Materials Science*, 124, 353-363.

T. Ruggles, S. Cluff, M.P. Miles, D.T. Fullwood, C. Daniels, A. Avila, M. Chen (2016). Ductility of Advanced High-Strength Steel in the Presence of a Sheared Edge. *JOM*, 68(7), 1839-1849.

L. Squires, Y.C. Lim, M.P. Miles, Z. Feng (2015). Mechanical properties of dissimilar metal joints composed of DP 980 steel and AA 7075-T6. *Science and Technology of Welding and Joining*, 20(3), pp. 242-248.

Y.C. Lim, L. Squires, T.-Y. Pan, M.P. Miles, G.-L. Song, Y. Wang, Z. Feng (2015). Study of mechanical joint strength of aluminum alloy 7075-T6 and dual phase steel 980 welded by friction bit joining and weld-bonding under corrosion medium. *Materials & Design*, 69(15), pp. 37-43.

T. Hartman, M.P. Miles, S.-T. Hong, R. Steel, S. Kelly (2015). Effect of PCBN tool grade on joint strength and tool life in friction stir spot welded DP 980 steel. *Wear*, 328-329, pp. 531-536.

D.T. Fullwood, A. Khosravani, J. Scott, M.P. Miles, R. Mishra (2015). Nucleation and propagation of twins in AZ31 magnesium alloy. *Acta Materialia*, 100, pp. 202-214.

M.P. Miles, U. Karki, and Y. Hovanski (2014). Temperature and Material Flow Prediction in Friction Stir Spot Welding of Advanced High Strength Steel. *JOM*, 66 (10), pp. 2130-2136.

N. Saunders, M. Miles, T. Hartman, Y. Hovanski, S.T. Hong, R. Steel (2014). Joint Strength in High Speed Friction Stir Spot Welded DP 980 Steel. *International Journal of Precision Engineering and Manufacturing*, 15(5), pp. 841-848.

Md. Abu Mowazzem Hossain, Md. Tariqul Hasan, Sung-Tae Hong, Michael Miles, Hoon-Hwe Cho, Heung Name Han (2014). Mechanical Behaviors of Friction Stir Spot Welded Joints of Dissimilar Ferrous Alloys under Opening-Dominant Combined Loads. *Advances in Materials Science and Engineering*, pp. 179-193.

Md. Abu Mowazzem Hossain, Md. Tariqul Hasan, Sung-Tae Hong, Michael Miles, Hoon-Hwe Cho, Heung Name Han (2014). Failure Behaviors of Friction Stir Spot Welded Joints of Dissimilar Ferrous Alloys under Quasi-Static Shear Loads. *International Journal of Materials and Product Technology*, 48 (1-4), pp. 179-193.

Book Chapters with Peer Review

M. Miles: Formability Testing of Sheet Metals, *ASM Handbook*, vol. 14B, pp. 673-696 (2006). (Chapter was revised and updated)