Oliver K. Johnson

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EDUCATION

Degree: PhD Materials Science & Engineering 2015
University: Massachusetts Institute of Technology

Degree: B.S. Mechanical Engineering 2010
University: Brigham Young University
Honors: Cum Laude

WORK EXPERIENCE

2015-Present — *Assistant Professor*
Department of Mechanical Engineering
Brigham Young University (Provo, UT)

2011-2015 — *Research Assistant*
Christopher A. Schuh Research Group
Massachusetts Institute of Technology (Cambridge, MA)

2014, 2015 — *Teaching Assistant, Kinetic Processes in Materials*
Massachusetts Institute of Technology (Cambridge, MA)

2013 — *Consultant*
Materials Engineering Group, Eagar LLC (Cambridge, MA)

2012 — *Student Intern (CCMS Summer Institute)*
Lawrence Livermore National Laboratory (Livermore, CA)

2008-2010 — *Research Assistant*
Brent L. Adams Research Group
Brigham Young University (Provo, UT)

2009-2010 — *Research Intern*
Los Alamos National Laboratory (Los Alamos, NM)

TEACHING/MENTORING

Courses Taught
ME EN 250: Science of Engineering Materials
ME EN 382: Manufacturing Processes
ME EN 554: Kinetics of Materials

Graduate Students Advised
2018-Present Sterling Baird (MS)
2018-Present José David Niño Sáenz (PhD)
2017-Present Christopher Adair (PhD)
2016-2018 Christian Kurniawan (MS)
2016-2018 Dallin Frandsen (MS)
2016-2018 Derek Lontine (MS)

Undergraduate Mentoring

2020-Present	Nathan Miller (BYU)
2020-Present	Jeremy Green (BYU
2019-2020	Alexia Bigelow (BYU)
2019	Eric Green (BYU)
2018	Brieanna Alexander (BYU)
2018	Daniel Richards (BYU)
2018	Joseph Crapo (BYU)
2017-2020	Brandon Snow (BYU)
2017-2018	John Hunt (BYU)
2017-2018	Madeline Foote (BYU)
2017	Kierenne Maughan (BYU)
2017-2019	Thomas Naylor (BYU)
2016-2017	Prabhakar Ramaraj (BYU)
2016-2017	Chris Bailey (BYU)
2016-2019	Dustin Doty (BYU)
2015-2019	Tyler Critchfield (BYU)
2015-2017	Jarrod Lund (BYU)
2015-2016	Dallin Frandsen (BYU)
2014	Isabel Crystal (MIT)

FELLOWSHIPS/SCHOLARSHIPS

2011-2014	National Defense Science and Engineering Graduate Fellowship (NDSEG)

AWARDS & HONORS

2019	TMS Young Leaders Professional Development Award
2017	National Science Foundation (NSF) CAREER Award
2016	Invited Feature Paper, Journal of Materials Research (JMR)
2015	Robert W. Cahn Best Paper Prize Finalist, Journal of Materials Science (JMS)
2014	Graduate Student Teaching Award, Dept. Materials Science & Engineering (MIT)
2010	3rd Place Outstanding Paper - SAMPE 2010 Fall Technical Conference
2009	2nd Place Engineering Division U.S. Department of Energy, Science & Energy Research Challenge (SERCh), $1500 Scholarship Award (Oak Ridge National Laboratory)

PUBLICATIONS

Journal Publications

1. Critchfield, T.R., **Johnson, O.K.** "Representative and Statistical Volume Elements for Grain Boundary Networks: A Stereological Approach," *Acta Materialia*, vol. 188, pp. 166-180 (2020). doi: 10.1016/j.actamat.2019.12.029

2. Kurniawan, C., Baird, S., Fullwood, D.T., Homer, E.R., **Johnson, O.K.** "Grain boundary structure–property model inference using polycrystals: the overdetermined case," *Journal of Materials Science*, 55(4), pp. 1562–1576 (2020). doi: 10.1007/s10853-019-04125-z

3. Snow, B.D., Doty, D.D., **Johnson, O.K.**, "A Simple Approach to Atomic Structure Characterization for Machine Learning of Grain Boundary Structure-Property Models," *Frontiers in Materials*, vol. 6, May, pp. 120 (2019). doi: 10.3389/fmats.2019.00120 (Invited)

4. Priedeman, J.L., Rosenbrock, C.W., **Johnson, O.K.**, Homer, E.R., "Quantifying and connecting atomic and crystallographic grain boundary structure using local environment representation and dimensionality reduction techniques," *Acta Materialia*, vol. 161, December, pp. 431-443 (2018). doi: 10.1016/j.actamat.2018.09.011

5. **Johnson, O.K.**, Kurniawan, C., "An Efficient Algorithm for Generating Diverse Microstructure Sets and Delineating Properties Closures," *Acta Materialia.* vol. 147, April, pp. 313-321 (2018). doi: 10.1016/j.actamat.2018.01.004

6. **Johnson, O.K.**, Lund, J.M., Critchfield, T.R., "Spectral Graph Theory for Characterization and Homogenization of Grain Boundary Networks," *Acta Materialia.* vol. 146, March, pp. 42-54 (2018). doi:10.1016/j.actamat.2017.11.054

7. **Johnson, O.K.**, Schuh, C.A., "Texture Mediated Grain Boundary Network Design in Three Dimensions," *Mechanics of Materials.* vol. 118, March, pp. 94-105 (2018). doi:10.1016/j.mechmat.2017.12.001

8. **Johnson, O.K.**, Schuh, C.A., "Texture Mediated Grain Boundary Network Design in Two Dimensions," *Journal of Materials Research.* vol. 31, no. 9, pp. 1171-1184 (2016). doi:10.1557/jmr.2016.138 (Invited Feature Paper)

9. **Johnson, O.K.**, Li, L., Demkowicz, M., Schuh, C.A., "Inferring Grain Boundary Structure-Property Relations from Effective Property Measurements," *Journal of Materials Science.* vol. 50, no. 21, pp. 6907-6919 (2015). doi:10.1007/s10853-015-9241-4

10. **Johnson, O.K.**, Schuh, C.A., "The Triple Junction Hull: Tools for Grain Boundary Network Design," *Journal of the Mechanics and Physics of Solids*, vol. 69, no. 1, pp. 2-13 (2014). doi:10.1016/j.jmps.2014.04.005

11. Mason, J.K., **Johnson, O.K.**, "Convergence of the hyperspherical harmonic expansion for crystallographic texture," *Journal of Applied Crystallography*, vol. 46, no. 6, pp. 1–7, (2013). doi:10.1107/S0021889813022814

12. Mason, J.K., **Johnson, O.K.**, Reed, B.W., Li, S.F., Stolken, J.S., and Kumar, M., "Statistics of twin-related domains and the grain boundary network," *Acta Materialia*, vol. 61, no. 17, pp. 6524–6532, (2013). doi:10.1016/j.actamat.2013.07.031

13. **Johnson, O.K.**, Schuh, C.A., "The uncorrelated triple junction distribution function: Towards grain boundary network design," *Acta Materialia*, vol. 61, no. 8, pp. 2863–2873, (2013). doi:10.1016/j.actamat.2013.01.025

14. **Johnson, O.K.**, Gardner, C.J., Seegmiller, D.B., Mara, N.A., Dattelbaum, A.M., Rae, P.J., Kaschner, G.C., Mason, T.A., Fullwood, D.T., Hansen, G., "Multiscale Model for the Extreme Piezoresistivity in Silicone/Nickel Nanostrand Nanocomposites." *Metallurgical and Materials Transactions A,* Vol. 42, No. 13, pp. 3898-3906 (2011). doi:10.1007/s11661-011-0814-9

15. **Johnson, O.K.**, Kaschner, G.C., Mason, T.A., Fullwood, D.T., Hansen, G., "Optimization of Nickel Nanocomposite for Large Strain Sensing Applications." *Sensors and Actuators A,* Vol. 166, No. 1, pp. 40-47 (2011). doi:10.1016/j.sna.2010.12.022

16. **Johnson, O.K.**, Gardner, C.J., Fullwood, D.T., Adams, B.L., Hansen, N., Hansen, G., "The Colossal

Piezoresistive Effect in Nickel Nanostrand Polymer Composites and a Quantum Tunneling Model." *Computers, Materials, & Continua*. Vol. 15, No. 2, pp. 87-112 (2010). doi:10.3970/cmc.2010.015.087

Technical Conference Papers

1. Ottosson, H.J., Naylor, T.A., **Johnson, O.K.**, Mattson, C.A., "Establishing Baseline Performance for Off-The-Shelf Nitrile Seals for the India Mark II Hand Pump System." *Proceedings of the ASME 2019 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2019)*, Anaheim, CA, August 18-21, 2019.

2. Hyatt, T.B., Fullwood, D.T., Bradshaw, R.J., Bowden, A.E., **Johnson, O.K.,** "Nano-composite sensors for wide range measurement of ligament strain." *Experimental and Applied Mechanics*, vol. 6 (2011). doi: 10.1007/978-1-4419-9792-0_59

3. **Johnson, O.K.**, Seegmiller, D., Fullwood, D.T., Dattelbaum, A., Mara, N.A., Kaschner, G., Mason, T., Yeager, J.D., "Characterization of electrical properties of polymers for conductive nano-composites." *Proceedings of the 43rd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Long Beach, CA, May 23-26, 2011.

4. **Johnson, O.K.**, Seegmiller, D., Fullwood, D.T., Dattelbaum, A., Mara, N.A., Kaschner, G., Mason, T., "A new technique to measure tunneling barrier height in solid media." *Proceedings of the 43rd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Long Beach, CA, May 23-26, 2011.

5. Converse, M.I., Fullwood, D.T., Farrer, J., Hansen, N., **Johnson, O.K.**, "Toward nano-scale morphological characterizations with Electron Backscatter Diffraction patterns on Nickel nanostrands." *Proceedings of the 43rd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Long Beach, CA, May 23-26, 2011.

6. **Johnson, O.K.**, Fullwood, D.T., "A Percolation/Quantum Tunneling Model for the Unique Behavior of Multifunctional Silicone/Nickel Nanostrand Nanocomposites." *Proceedings of the 42nd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Salt Lake City, UT, October 11-14, 2010.

7. Converse, M.I., **Johnson, O.K.**, Fullwood, D.T., "Quantification of Nickel Nanostrand Distributions within a Silicone Matrix using a FIB/SEM System." *Proceedings of the 42nd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Salt Lake City, UT, October 11-14, 2010.

8. Calkins, T.B., Fullwood, D.T., Ghosh, S., Hyatt, T.B., **Johnson, O.K.**, Hansen, N., Hansen, G., "Applications for a Nano-Composite High Displacement Strain Gauge." *Proceedings of the 42nd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Salt Lake City, UT, October 11-14, 2010.

9. Hyatt, T.B., Fullwood, D.T., Bowden, A.E., Bradshaw, R.J., **Johnson, O.K.,** "Nano-composite sensors for wide range measurement of strain." *Proceedings of the SAMPE 2010 Exhibition & Symposium*. Society for the Advancement of Material and Process Engineering (SAMPE), Seattle, WA, May 17-20, 2010.

10. **Johnson, O.K.**, Kaschner, G.C., Mason, T.A., Fullwood, D.T., Adams, B.L., Hansen, G., "Multi-scale

Model for the Extreme Piezoresistivity in Silicone/Nickel Nanostrand/Nickel Coated Carbon Fiber Nanocomposites." *Collected Proceedings: Modeling, Simulation, and Theory of Nanomechanical Materials Behavior.* TMS 2010: 139th Annual Meeting & Exhibition, The Minerals, Metals & Materials Society (TMS), Seattle, WA, February 16, 2010.

11. **Johnson, O.K.**, Kaschner, G.C., Mason, T.A., Fullwood, D.T., Hyatt, T.B., Adams, B.L., Cole, K., Hansen, G., "Extreme Piezoresistivity of Silicone/Nickel Nanocomposites for High Resolution Large Strain Measurement." *Collected Proceedings: Advances in Composite, Cellular, and Natural Materials.* TMS 2010: 139th Annual Meeting & Exhibition, The Minerals, Metals & Materials Society (TMS), Seattle, WA, February 17, 2010.

12. **Johnson, O.K.**, Gardner, C.J., Fullwood, D.T., Adams, B.L., Hansen, G., "Deciphering the Structure of Nano-Nickel Composites." *Proceedings of the SAMPE 2009 Technical Conference.* Society for the Advancement of Material and Process Engineering (SAMPE), Baltimore, MD, May 18, 2009.

*Technical Conference Presentations (*Speaker)*

1. ***Johnson, O.K.**, Snow, B.D., Baird, S.G., Kurniawan, C., Fullwood, D.T., Homer, E.R., "GB Property Localization: Inference and Uncertainty Quantification of Grain Boundary Structure-Property Models," *TMS 2020: 149th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society (TMS), San Diego, CA, February 23-27, 2020.

2. *Adair, C.W., **Johnson, O.K.**, "Higher Order Spectral Terms in Grain Boundary Networks," *TMS 2020: 149th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society (TMS), San Diego, CA, February 23-27, 2020.

3. *Adair, C., Adair, S.R., Holladay, S., Hansen, D., **Johnson, O.K.**, "Human-in-the-loop Strategies for Dimensionality Reduction and Optimization in Materials Design," *Materials Science & Technology 2019 (MS&T'19).* The Minerals, Metals & Materials Society (TMS), Portland, OR, September 29-October 3, 2019.

4. *Baird, S., Kurniawan, C., Critchfield, T., Fullwood, D.T., Homer, E.R., **Johnson, O.K.**, "Backtracking 5DOF Grain Boundary Hydrogen Diffusivities in High-Purity Nickel: Experimentation, Localization Techniques, and Inverse Problem Theory," *Materials Science & Technology 2019 (MS&T'19).* The Minerals, Metals & Materials Society (TMS), Portland, OR, September 29-October 3, 2019.

5. *Ottosson, H.J., Naylor, T.A., **Johnson, O.K.**, Mattson, C.A., "Establishing Baseline Performance for Off-The-Shelf Nitrile Seals for the India Mark II Hand Pump System." *ASME 2019 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2019)*, Anaheim, CA, August 18-21, 2019.

6. *Niño, J.D., **Johnson, O.K.**, "Influence of Grain Boundary Energy Anisotropy on the Evolution of Grain Boundary Network Structure during Anisotropic Grain Growth," Seventh Conference on Recrystallization and Grain Growth (ReX&GG). Ghent (Belgium), August 4-9, 2019.

7. *Homer, E.R., Priedeman, J., Rosenbrock, C., **Johnson, O.K.**, Hart, G.L., Patala, S., "Connecting Atomic and Crystallographic Structure-Property Relationships of Grain Boundaries," MRS 2019: Spring Meeting & Exhibit. Materials Research Society (MRS), Pheonix, AZ, April 22-26, 2019.

8. Doty, D., *Snow, B., **Johnson, O.K.**, "Algorithms and Metrics for Characterization of Arbitrary Atomic Structures," *TMS 2019: 148th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society

(TMS), San Antonio, TX, March 10-14, 2019.

9. Kurniawan, C., Fullwood, D.T., Homer, E.R., ***Johnson, O.K.**, "GB Property Localization: Inference and Uncertainty Quantification of GB Structure-Property Models from Indirect Polycrystal Measurements," *TMS 2019: 148th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society (TMS), San Antonio, TX, March 10-14, 2019.

10. *Adair, C., **Johnson, O.K.**, "New Spectral Graph Theoretic Metrics for Grain Boundary Network Design," *TMS 2019: 148th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society (TMS), San Antonio, TX, March 10-14, 2019.

11. Lontine, D., ***Johnson, O.K.**, "Stress Modulated Grain Boundary Mobility," *TMS 2019: 148th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society (TMS), San Antonio, TX, March 10-14, 2019.

12. *Adair, C., Bradford, A., McCullough, M., Lion, J., Holladay, S., Hansen, D., **Johnson, O.K.**, "Video Games & Crowd Sourcing: Algorithm Development for Materials Design," *TMS 2019: 148th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society (TMS), San Antonio, TX, March 10-14, 2019.

13. *Page, D., Homer, E.R., Varela, K., **Johnson, O.K.**, Fullwood, D.T., "Simulated hydrogen diffusion in nickel grain boundaries," *TMS 2019: 148th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society (TMS), San Antonio, TX, March 10-14, 2019.

14. Priedeman, J., Rosenbrock, C., **Johnson, O.K.**, *Homer, E.R., "Connecting atomic and crystallographic structure-property relationships of grain boundaries," *TMS 2019: 148th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society (TMS), San Antonio, TX, March 10-14, 2019.

15. *Priedeman, J., Rosenbrock, C., **Johnson, O.K.**, Homer, E.R., "Grain Boundary Structure Characterization with the Smooth Overlap of Atomic Positions Descriptor," *Materials Science & Technology 2018 (MS&T'18)*. The Minerals, Metals & Materials Society (TMS), Columbus, OH, October 14-18, 2018.

16. *Frandsen, D.J., **Johnson, O.K.**, "Fabricating Optimized Crystallographic Textures through Heterogeneous Templated Grain Growth," *TMS 2018: 147th Annual Meeting & Exhibition*. The Minerals, Metals & Materials Society (TMS), Pheonix, AZ, March 11-15, 2018.

17. ***Johnson, O.K.**, Kurniawan, C., Schuh, C.A., "Hierarchical Simplex Sampling: An Efficient Algorithm for Construction of Diverse Microstructural Sets and Delineation of Properties Closures," *TMS 2018: 147th Annual Meeting & Exhibition*. The Minerals, Metals & Materials Society (TMS), Pheonix, AZ, March 11-15, 2018.

18. *Kurniawan, C., **Johnson, O.K.**, "Property Localization: Quantifying the Uncertainty of Inferred Constitutive Models for Grain Boundaries," *TMS 2018: 147th Annual Meeting & Exhibition*. The Minerals, Metals & Materials Society (TMS), Pheonix, AZ, March 11-15, 2018.

19. ***Johnson, O.K.**, Lund, J.M., Critchfield, T.R., "Grain Boundary Network Structural Metrics and Phase Transitions," *TMS 2018: 147th Annual Meeting & Exhibition*. The Minerals, Metals & Materials Society (TMS), Pheonix, AZ, March 11-15, 2018.

20. *Priedeman, J., Rosenbrock, C., **Johnson, O.K.**, Hart, G., Homer, E.R., "Grain Boundary Structure Characterization with the Smooth Overlap of Atomic Positions Descriptor," *TMS 2018: 147th Annual Meeting & Exhibition*. The Minerals, Metals & Materials Society (TMS), Pheonix, AZ, March 11-15, 2018.

21. *Frandsen, D.J., **Johnson, O.K.**, "Fabricating Designed Crystallographic Textures through Heterogeneous Templated Grain Growth," *18th International Conference on Textures of Materials (ICOTOM)*, St. George, UT, November 5-10, 2017.

22. *Kurniawan, C., **Johnson, O.K.**, "Inferring Grain Boundary Structure-Property Models from the Effective Properties of Polycrystals via Inverse Problem Theory," *18th International Conference on Textures of Materials (ICOTOM)*, St. George, UT, November 5-10, 2017.

23. *Critchfield, T.R., **Johnson, O.K.**, "Comparison of Representative Volume Elements for Grain Boundary Networks and Textures," *18th International Conference on Textures of Materials (ICOTOM)*, St. George, UT, November 5-10, 2017.

24. *Lontine, D.M., **Johnson, O.K.**, "Trends in Grain Boundary Mobility with Varied Stress State," *Materials Science & Technology 2017 (MS&T'17)*. The Minerals, Metals & Materials Society (TMS), Pittsburgh, PA, October 8-12, 2017.

25. ***Johnson, O.K.**, Lund, J., Critchfield, T., "Graph Spectra and Grain Boundary Network Design," *TMS 2017: 146th Annual Meeting & Exhibition*. The Minerals, Metals & Materials Society (TMS), San Diego, CA, March 1, 2017.

26. ***Johnson, O.K.**, "Spectral Graph Theory for Grain Boundary Network Design," *2016 MRS Fall Meeting & Exhibit*, Materials Research Society (MRS), Boston, MA, November 30, 2016.

27. *Doty, D., **Johnson, O.K.**, Homer, E., "Faceting Model for Σ3 Grain Boundaries: Testing the Hypothesis," *Materials Science & Technology 2016 (MS&T'16)*. The Minerals, Metals & Materials Society (TMS), Salt Lake City, UT, October 26, 2016.

28. *Critchfield, T., **Johnson, O.K.**, "Determining Appropriate Representative Volume Element Sizes for Grain Boundary Networks," *Materials Science & Technology 2016 (MS&T'16)*. The Minerals, Metals & Materials Society (TMS), Salt Lake City, UT, October 25, 2016.

29. *Lund, J., **Johnson, O.K.**, "The Influence of Crystallographic Constraints on Percolation," *Materials Science & Technology 2016 (MS&T'16)*. The Minerals, Metals & Materials Society (TMS), Salt Lake City, UT, October 25, 2016.

30. ***Johnson, O.K.**, "Eigendecomposition and the Network Structure of Grain Boundaries in Polycrystals," *Materials Science & Technology 2016 (MS&T'16)*. The Minerals, Metals & Materials Society (TMS), Salt Lake City, UT, October 24, 2016.

31. ***Johnson, O.K.**, Li, L., Demkowicz, M.J., Schuh, C.A., "Inferring Structure-Property Models for Grain Boundaries via Localization," *2015 MRS Fall Meeting & Exhibit*, Materials Research Society (MRS), Boston, MA, November 29-December 4, 2015.

32. ***Johnson, O.K.**, Li, L., Demkowicz, M.J., Schuh, C.A., "Inferring Grain Boundary Properties from Measurements Made on Polycrystals," *Materials Science & Technology 2015 (MS&T'15)*. The Minerals, Metals & Materials Society (TMS), Columbus, OH, October 4-8, 2015.

33. ***Johnson, O.K.**, Schuh, C.A., "Grain Boundary Network Design," *TMS 2015: 144th Annual Meeting & Exhibition,* The Minerals, Metals and Materials Society (TMS), Orlando, FL, March 15-19, 2015.

34. **Johnson, O.K.**, *Schuh, C.A., "Design of Interfacial Networks in Polycrystalline Materials," *TMS 2015: 144th Annual Meeting & Exhibition,* The Minerals, Metals and Materials Society (TMS), Orlando, FL, March 15-19, 2015.

35. ***Johnson, O.K.**, Schuh, C.A., "Spectral Methods for Grain Boundary Network Design: Tools for Materials Discovery," *2014 MRS Fall Meeting & Exhibit*, Materials Research Society (MRS), Boston, MA, November 30, 2014.

36. ***Johnson, O.K.**, Schuh, C.A., "The Structure of Grain Boundary Networks and Effective Properties: Towards Grain Boundary Network Design," *Materials Science & Technology 2014 (MS&T'14)*, Pittsburgh, PA, October 12-16, 2014.

37. ***Johnson, O.K.**, Schuh, C.A., "Texture Mediated Grain Boundary Network Design," *17th International Conference on Textures of Materials (ICOTOM)*, Dresden, Germany, August 24-29, 2014.

38. ***Johnson, O.K.**, Schuh, C.A., "Designer Grain Boundary Networks for Energy Applications," *Forum on Materials for Sustainable energy*, Cambridge, MA, March 4-5, 2013.

39. ***Johnson, O.K.**, Schuh, C.A., "The Triple Junction Distribution Function for Arbitrary Textures: Tools for 3rd Order Microstructure Design," *Materials Science & Technology 2012 (MS&T'12)*, Pittsburgh, PA, October 7-11, 2012.

40. **Johnson, O.K.**, Seegmiller, D., *Fullwood, D.T., Dattelbaum, A., Mara, N.A., Kaschner, G., Mason, T., Yeager, J.D., "Characterization of electrical properties of polymers for conductive nano-composites." *43rd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Long Beach, CA, May 23-26, 2011.

41. **Johnson, O.K.**, Seegmiller, D., *Fullwood, D.T., Dattelbaum, A., Mara, N.A., Kaschner, G., Mason, T., "A new technique to measure tunneling barrier height in solid media." *43rd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Long Beach, CA, May 23-26, 2011.

42. *Converse, M.I., Fullwood, D.T., Farrer, J., Hansen, N., **Johnson, O.K.**, "Toward nano-scale morphological characterizations with Electron Backscatter Diffraction patterns on Nickel nanostrands." *43rd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Long Beach, CA, May 23-26, 2011.

43. **Johnson, O.K.**, *Fullwood, D.T., "A Percolation/Quantum Tunneling Model for the Unique Behavior of Multifunctional Silicone/Nickel Nanostrand Nanocomposites." *42nd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Salt Lake City, UT, October 11-14, 2010.

44. *Converse, M.I., **Johnson, O.K.**, Fullwood, D.T., "Quantification of Nickel Nanostrand Distributions within a Silicone Matrix using a FIB/SEM System." *42nd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Salt Lake City, UT, October 11-14, 2010.

45. *Calkins, T.B., Fullwood, D.T., Ghosh, S., Hyatt, T.B., **Johnson, O.K.**, Hansen, N., Hansen, G., "Applications for a Nano-Composite High Displacement Strain Gauge." *42nd International SAMPE Technical Conference*. Society for the Advancement of Material and Process Engineering (SAMPE), Salt Lake City, UT, October 11-14, 2010.

46. *Hyatt, T.B., Fullwood, D.T., Bradshaw, R.J., Bowden, A.E., **Johnson, O.K.,** "Nano-composite sensors for wide range measurement of ligament strain." *SEM Annual Conference & Exposition on Experimental and Applied Mechanics*. Society for Experimental Mechanics, Indianapolis, IN, June 7-10, 2010.

47. *Hyatt, T.B., Fullwood, D.T., Bowden, A.E., Bradshaw, R.J., **Johnson, O.K.,** "Nano-composite sensors for wide range measurement of strain." *SAMPE 2010 Exhibition & Symposium*. Society for the Advancement of Material and Process Engineering (SAMPE), Seattle, WA, May 17-20, 2010.

48. **Johnson, O.K.**, *Kaschner, G.C., Mason, T.A., Fullwood, D.T., Adams, B.L., Hansen, G., "Multi-scale Model for the Extreme Piezoresistivity in Silicone/Nickel Nanostrand/Nickel Coated Carbon Fiber Nanocomposites." *TMS 2010: 139th Annual Meeting & Exhibition*, The Minerals, Metals & Materials Society (TMS), Seattle, WA, February 16, 2010.

49. **Johnson, O.K.**, *Kaschner, G.C., Mason, T.A., Fullwood, D.T., Hyatt, T.B., Adams, B.L., Cole, K., Hansen, G., "Extreme Piezoresistivity of Silicone/Nickel Nanocomposites for High Resolution Large Strain Measurement." *TMS 2010: 139th Annual Meeting & Exhibition*, The Minerals, Metals & Materials Society (TMS), Seattle, WA, February 17, 2010.

50. *Fullwood, D.T., **Johnson, O.K.**, Hansen, G., "Structure Metrics and Their Evolution in Piezo-resistive Nano-Composites", International Conference on Computational & Experimental Engineering and Sciences (ICCES) 2010, Las Vegas, NV, March 28, 2010 (Keynote).

51. ***Johnson, O.K.**, Mara, N.A., Gardner, C.J., Fullwood, D.T., Adams, B.L., Hansen, G., "Textures of Dispersion of Nickel Nanostrand Composites, and Modeling of Piezoresistive Behavior." *Materials Science & Technology 2009 (MS&T'09)*. The Minerals, Metals & Materials Society (TMS), Pittsburgh, PA, October 25, 2009.

52. ***Johnson, O.K.**, Gardner, C.J., Fullwood, D.T., Adams, B.L., Hansen, G., "Deciphering the Structure of Nano-Nickel Composites." *SAMPE 2009 Technical Conference.* Society for the Advancement of Material and Process Engineering (SAMPE), Baltimore, MD, May 18, 2009.

53. *Gardner, C.J., **Johnson, O.K.**, Hansen, G., Adams, B.L., Fullwood, D.T., "The Colossal Piezoresistive Effect in Nickel Nanostrand Polymer Composites and a Preliminary Quantum Tunneling Model." *TMS 2009: 138th Annual Meeting & Exhibition,* The Minerals, Metals and Materials Society (TMS), San Francisco, CA, February 15, 2009.

Poster Presentations (*Speaker)

1. *Page, D.E., Varela, K.F., **Johnson, O.K.**, Fullwood, D.T., Homer, E.R., "Methods to Simulate Grain Boundary Diffusion in Bicrystals and Polycrystals," *TMS 2020: 149th Annual Meeting & Exhibition.* The Minerals, Metals & Materials Society (TMS), San Diego, CA, February 23-27, 2020.

2. *Foote, M.J., Amalaraj, A., Fullwood, D.T., **Johnson, O.K.**, "Digital Representations of Microstructure," *2018 Utah Conference on Undergraduate Research (UCUR)*. Cedar City, UT, February 9, 2018.

3. *Kurniawan, C., **Johnson, O.K.**, "Inferring Mesoscale Grain Boundary Structure-Property Models from the Macroscopic Properties of Polycrystals via Inverse Problem Theory," *Materials Science & Technology 2017 (MS&T'17)*. The Minerals, Metals & Materials Society (TMS), Pittsburgh, PA, October 8-12, 2017.

4. ***Johnson, O.K.**, Reed, B.W., Mason, J.K., Stolken, J.S., Kumar, M., "Fractality of Correlated Microstructures." *LLNL Annual Student Poster Symposium*, Lawrence Livermore National Laboratory (LLNL), Livermore, CA, August 9, 2012.

5. ***Johnson, O.K.**, Kaschner, G.C., Rae, P.J., Cady, C.M., Mason, T.A., Fullwood, D.T., Hansen, G., "Nanocomposite Large-Strain Sensor Optimization." *U.S. Department of Energy 2009 Science & Energy Research Challenge (SERCh)*, U.S. Department of Energy, Oak Ridge, TN, November 8, 2009.

GRANTS

1. **Johnson, O.K. (PI)**, Homer, E.R., Fullwood, D.T., "REU: Using the Effective Diffusivity of Polycrystals to Infer a Complete 5D Structure-Property Model for Hydrogen Diffusivity in Iron Grain Boundaries." National Science Foundation (NSF), DMR (Shiflet, Gary): No. 1835408, $16,000 (9/2018 – 8/2020).

2. **Johnson, O.K. (PI)**, "Mentored Experiential Learning Opportunity for Undergraduates: Electrochemical Measurement of Diffusion in Grain Boundaries." Brigham Young University, Department of Mechanical Engineering, Experiential Learning Grant, $4,000 (4/2018 – 12/2018).

3. **Johnson, O.K. (PI)**, "Realizing the Promise of Microstructure Design: Synthesis of Arbitrary Crystallographic Textures." Ira. A. Fulton College of Engineering and Technology, Brigham Young University, Seed Funding Grant, $12,500 (11/2017 – 11/2019).

4. Mattson, C., **Johnson, O.K. (Co-PI)**, "Village Pump." Ford Motor Company, Ford College Community Challenge, $25,000 (6/2017).

5. Mattson, C., **Johnson, O.K. (Co-PI)**, "Village Pump." Cisco Systems, Inc., Cisco Global Problem Solver Challenge, $10,000 (6/2017).

6. **Johnson, O.K. (PI)**, "CAREER: CDS&E: Quantifying & Designing Grain Boundary Network Structure via Spectral Graph Theory." National Science Foundation (NSF), DMR (Hess, Daryl): No. 1654700, $490,977 (6/2017 – 5/2022).

7. **Johnson, O.K. (PI)**, "Mentored Experiential Learning Opportunity for Undergraduates: Using Polycrystal Hydrogen Permeation Measurements to Infer Grain Boundary Properties." Brigham Young University, Department of Mechanical Engineering, Experiential Learning Grant, $4,000 (6/2017 – 12/2017).

8. Mattson, C., **Johnson, O.K. (Co-PI)**, "Clean Water Pumps and Seals." Ira A. Fulton College of Engineering & Technology, Brigham Young University, Weidman Global Leadership Grant, $15,000 (3/2017).

9. **Johnson, O.K. (PI)**, "Realizing the Promise of Microstructure Design: Synthesis of Arbitrary Crystallographic Textures." Brigham Young University, BYU Office of Research & Creative Activities (ORCA), Mentoring Environment Grant (MEG), $20,000 (12/2016 – 12/2018).

10. **Johnson, O.K. (PI)**, "Evolution of Microstructural Topology." US Synthetic (USS), $46,792 (9/2016 –

8/2018).

11. **Johnson, O.K. (PI)**, "Developing Process Capability for Innovation in SOFC Electrolytes." Brigham Young University, Department of Mechanical Engineering, Undergraduate Mentoring Grant, $4,000 (2/2016 – 12/2016).

12. **Johnson, O.K. (PI)**, Homer, E.R., Fullwood, D.T., "Using the Effective Diffusivity of Polycrystals to Infer a Complete 5D Structure-Property Model for Hydrogen Diffusivity in Iron Grain Boundaries." National Science Foundation (NSF), DMR (Farkas, Diana): No. 1610077, $409,434 (9/2016 – 8/2019).

13. **Johnson, O.K. (PI)**, "Piezoresistivity in Nickel Nanostrand Composite Materials as Studied by Three-Dimensional Reconstruction of Focused Ion Beam Serial-Sections." Brigham Young University, BYU Office of Research & Creative Activities (ORCA), $1,500 (1/2010 – 12/2010).

PATENTS

1. **Johnson, O.K.**, Frandsen, D., "Heterogeneous Templated Grain Growth and a System for its Practice." Pending U.S. Non-Provisional Patent Application No. PCT/US2017/050643, (9/8/2017).

PROFESSIONAL SERVICE

Reviewer:

- Acta Materialia
- Scripta Materialia
- Scientific Reports (Nature Publishing Group)
- Journal of Applied Crystallography
- Metallurgical and Materials Transactions A
- Materials Characterization
- Journal of Materials Research
- IOP Science
- Materials
- Physical Review Materials

SOFTWARE CONTRIBUTIONS

2015-2016 *Electron Diffraction Optical Reflectance (EDOR) Software*
Wrote many of the auxiliary and enabling functions. See
http://www.nature.com/articles/npjcompumats201616#supplementary-information

2013-2014 *MTEX Quantitative Texture Analysis Software*
Added functionality for coloring grain boundaries according to full misorientation information (axis and angle), and generating corresponding color legends for interpretation. See http://mtex-toolbox.github.io

LANGUAGES

English (1st Language), Spanish (Fluent)