

Education and Scientific Experience

08/2019-current	Norwegian University of Science and Technology Feodor Lynen-Research Fellowship of the Alexander von Humboldt Foundation, "Nanoengineering of Ferroelectric Domain Walls" (Prof. D. Meier)	Trondheim, Norway
08/2018 – 07/2019	TU Darmstadt Post-doctoral researcher, Career bridging grant	Darmstadt, Germany
02/2015 – 08/2018	TU Darmstadt PhD, topic: "Polarization reversal dynamics in polycrystalline ferroelectric/ferroelastic ceramic materials" (Prof. Rödel, Dr. Koruza), Grade: magna cum laude	Darmstadt, Germany Yekaterinburg, Russia Grenoble, France Lausanne, Switzerland Tallahassee, FL, USA Erlangen, Germany
10/2011 – 10/2014	Friedrich Alexander University of Erlangen-Nuremberg Master of Science in Materials Science and Engineering; Specialization on Glass and Ceramics – Grade A+; Master-Thesis topic: "Processing and characterization of paper-derived MAX-phases" (Prof. Greil, Prof. Travitzky) – Grade A+;	Erlangen, Germany
08/2014 – 10/2014	National Cheng Kung University DAAD-MOST Taiwan Summer Institute Programme (Prof. K. Fung), topic: "Multi-Layer Solid Oxide Fuel Cells by Tape Casting"	Tainan, Taiwan
01/2013 – 08/2013	The Pennsylvania State University Research scholar (Prof. G. Messing), topic: "Roll Processing of Ceramic Green Tapes"	State College, PA, USA
10/2008 – 10-2011	Friedrich Alexander University of Erlangen-Nuremberg Bachelor of Science in Materials Science and Engineering; Graduation in 2011 – Grade B+;	Erlangen, Germany
02/2011 – 07/2011	ETH Zurich Erasmus Exchange Semester; Bachelor thesis topic: „Porous-dense alumina composites for high temperature thermal insulation“ (deCavisAG, Dr. Gonzenbach, Prof. Gauckler) – Grade A+	Zurich, Switzerland
09/2000 – 04/2008	Gymnasium Ernestinum Coburg Abitur (High School Diploma); Specialization on mathematics and chemistry – Grade B+; 6 month duration term paper in chemistry: "Glue" – Grade A	Coburg, Germany

Prizes and awards

08/2020	JECS Trust Poster Award, Electroceramics XVII	GatherTown, virtual
02/2020	Acta Student Award from Acta Materialia	San Diego, CA, USA
11/2019	Young Talent Award from the German Society for Materials Science (DGM)	Berlin, Germany
10/2019	Global Distinguished Doctoral Dissertation Award from the American Ceramic Society	Portland, OG, USA
10/2018	Edward C. Henry Best Paper Award from the Journal of the American Ceramic Society	Columbus, OH, USA
05/2017	Student Poster Competition Gold Award, ISAF 2017	Atlanta, GA, USA
08/2016	Best Poster Award, ISAF 2016	Darmstadt, Germany
03/2015	3 rd Price of Hans-Walter-Hennicke Competition of the German Ceramic Society	Bayreuth, Germany
07/2010	Semikron Prize for Outstanding Results during the first Semesters of Studies	Erlangen, Germany

Membership of scientific societies

Institute of Electrical and Electronics Engineers (IEEE)
German Ceramic Society (DKG)
German Society for Materials Science (DGM)
German Physical Society (DPG)
American Ceramic Society (ACerS)

Teaching and Education Experience

02/2015 – 08/2019	DGHD accredited certificate for university didactics	Darmstadt, Germany
02/2015 – 08/2019	Supervision of 4 bachelor and master students and 1 PhD student	Darmstadt, Germany
02/2015 – 08/2017	Teaching Assistant in materials science Giving a weekly exercise for students in materials science in mechanical properties of materials; Stand-in lectures in mechanical properties of materials; Designing and correcting examinations.	Darmstadt, Germany
10/2009 – 10/2014	Teaching Assistant in mathematics Giving a weekly exercise for engineering students	Erlangen, Germany
10/2008 – 10/2013	Teaching Assistant in a mathematics refresher course Tutor in a group of 20-25 people (2 weeks annually)	Erlangen, Germany
10/2011 – 10/2012	International Buddy Program	Erlangen, Germany

Conference Contributions (invited talks are highlighted)

2021 08/2020	J. Schultheiß , European Materials Research Society; invited J. Schultheiß , E. Lysne, J. Schaab, E. Bourret, Z. Yan, L. Puntigam, S. Krohns, D.M. Evans, D. Meier, "Conductivity mapping at charged domain walls in ErMnO ₃ under alternating voltages", Electroceramics XVII, poster J. Schultheiß , L. Porz, L. K. Venkataraman, M. Höfling, P. Cook, C. Detlefs, S. Gorfman, J. Rödel, H. Simons, "Mapping Elastic Stresses and Domains in the Bulk of Ferroelectric/Ferroelastic Polycrystalline Ceramics by Dark-field X-Ray Microscopy", Electroceramics XVII; oral presentation Y. Genenko, R. Khachatryan, I. Vorotiahin, J. Schultheiß , J. Daniels, A. Grünebohm, J. Koruza, „Stochastic models of sequential and parallel switching processes in tetragonal and rhombohedral ferroelectrics“, Electroceramics XVII, oral presentation; invited	Warsaw, Poland GatherTown, virtual
07/2020	Y.A. Genenko, I. S. Vorotiahin, R. Khachatryan, A. Grünebohm, J. Schultheiß , J.E. Daniels, J. Koruza, „Multi-step stochastic mechanism model of field-driven polarization reversal in rhombohedral ferroelectrics/ferroelastics; 29 th ISAF IEEE International Symposium on the Application of Ferroelectrics; oral presentation	Keystone, CO, USA
10/2019	J. Schultheiß , J. Koruza, "Impact of structure on Polarization Reversal in Polycrystalline Ferroelectric/Ferroelastic Ceramics", Materials Science & Technology MS&T 2019; oral presentation	Portland, OG, USA
07/2019	J. Schultheiß , J. Koruza, "Interplay between Intrinsic/extrinsic Structural Parameters and Polarization Reversal in Polycrystalline Multiaxial Ferroelectrics", 28 th ISAF IEEE International Symposium on the Application of Ferroelectrics; oral presentation Y. Genenko, R. Khachatryan, J. Schultheiß , J. Koruza, "Do the 180° Switching Processes Contribute to the Polarization Response in PZT?", 28 th ISAF IEEE International Symposium on the Application of Ferroelectrics; oral presentation J. Roscow, J. Schultheiß , J. Koruza, C. Bowen, "Investigating the Effect of Anisometric Pore Orientation on the Switching Behavior, Sensing and Energy Harvesting Properties of Lead Zirconate Titanate (l)", 28 th ISAF IEEE International Symposium on the Application of Ferroelectrics; oral presentation; invited	Lausanne, Switzerland
05/2019	J. Schultheiß , J.I. Roscow, C.R. Bowen, J. Koruza, "Porous piezoceramics with anisometric oriented pores for energy and transducer applications", International Conference on High-Performance Ceramics, oral presentation	Kunming, China
07/2018	J. Schultheiß , L. Liu, J.E. Daniels, D. Damjanovic, J. Koruza „The polarization switching mechanism in polycrystalline ferroelectric/ferroelastic materials“, Electroceramics XVI, poster	Hasselt, Belgium
05/2018	J. Schultheiß , H. Uršič, B. Malič, J. Koruza, „Broad Switching Behavior in Polycrystalline Ferroelectric/Ferroelastic Ceramic Materials“, 27 th ISAF IEEE International Symposium on the Application of Ferroelectrics; oral presentation Y.A. Genenko, R. Khachatryan, J. Schultheiß , A. Ossipov, J.E. Daniels, J. Koruza „Sequential Polarization Switching in Ferroelectrics: Statistical Description of Experiment“, 27 th International Symposium on the Application of Ferroelectrics; oral presentation	Hiroshima, Japan
08/2017	J. Schultheiß , M. Weber, L. Liu, J.E. Daniels, J. Koruza, „Switching mechanisms in Polycrystalline Ferroelectric Materials“, 27 th International Symposium on the Application of Ferroelectrics; oral presentation; invited J. Schultheiß , S. Zhukov, R. Khachatryan, Y.A. Genenko, J. Koruza "Experimental approach for investigating polarization and strain switching dynamics in ferroelectric/ferroelastic materials"; International conference scanning probe microscopy; oral presentation	Yekaterinburg, Russia
05/2017	J. Schultheiß , Y.A. Genenko, S. Zhukov, R. Khachatryan, L. Liu, J.E. Daniels, J. Koruza "Simultaneous Time-Resolved Measurements of Polarization and Strain Dynamics to Explore Switching in Ferroelectric/Ferroelastic Materials, 26 th IEEE International Symposium on the Application of Ferroelectrics; oral presentation; J. Schultheiß , Y.A. Genenko, S. Zhukov, R. Khachatryan, L. Liu, J.E. Daniels, J. Koruza "Simultaneous Time-Resolved Measurements of Polarization and Strain Dynamics to Explore Switching in Ferroelectric/Ferroelastic Materials, 26 th IEEE International Symposium on the Application of Ferroelectrics; poster;	Atlanta, GA, USA
08/2016	J. Schultheiß , S. Zhukov, H. von Seggern, W. Sakamoto, Y. Genenko, J. Koruza, „Effect of texturing on the polarization switching dynamics in ferroelectric ceramics“, 25 th IEEE International Symposium on the Application of Ferroelectrics; oral presentation; J. Schultheiß , S. Zhukov, H. von Seggern, W. Sakamoto, Y. Genenko, J. Koruza, „Effect of texturing on the polarization switching dynamics in ferroelectric ceramics“, 25 th IEEE International Symposium on the Application of Ferroelectrics; poster;	Darmstadt, Germany

Publication List (awarded publications are highlighted)

- [18] L. Puntigam, **J. Schultheiß**, A. Strinic, Z. Yan, E. Bourret, M. Althaler, I. Kezsmarki, D.M. Evans, D. Meier, S. Krohns, "Insulating improper ferroelectric domain walls as robust barrier layer capacitors", submitted to *J. Appl. Phys.* (2020)
- [17] **J. Schultheiß**, L. Porz, L.K. Venkataraman, H. Höfling, C. Yildirim, P. Cook, C. Detlefs, S. Gorfman, J. Rödel, H. Simons, "Quantitative imaging of embedded nanotwin structures", submitted to *Nano Lett.* (2020)
- [16] Y.A. Genenko, R. Khachatryan, **J. Schultheiß**, J.E. Daniels, A. Grünebohm, J. Koruza, "Multi-step stochastic mechanism of polarization reversal in rhombohedral ferroelectrics", *Phys. Rev. B* 102, 064107 (2020)
- [15] E. Khomyakova, S. Wenner, K. Bakken, **J. Schultheiß**, T. Grande, J. Glaum, M.-A. Einarsrud, "On the formation mechanism of Ba_{0.85}Ca_{0.15}Zr_{0.1}Ti_{0.9}O₃ thin films by aqueous chemical solution deposition", *J. Eur. Ceram. Soc.* 40, 5376 (2020)
- [14] **J. Schultheiß**, J. Schaab, D. R. Småbråten, S. H. Skjærvø, E. Bourret, Z. Yan, S. M. Selbach, D. Meier, "Intrinsic and extrinsic conduction contributions at nominally neutral domain walls in hexagonal manganites", *Appl. Phys. Lett.* 116, 262903 (2020); **Editors Pick**
- [13] M.H. Zhang, Y.X. Liu, K. Wang, J. Koruza, **J. Schultheiß**, "Origin of High Electromechanical Properties in KNN-Based Lead-Free Piezoelectrics Modified with BaZrO₃", *Phys. Rev. Mater.* 4, 064407 (2020)
- [12] **J. Schultheiß**, S. Checchia, H. Uršič, T. Frömling, J.E. Daniels, B. Malič, T. Rojac, J. Koruza, "Domain wall-grain boundary interactions in polycrystalline Pb(Zr_{0.7}Ti_{0.3})O₃ piezoceramics", *J. Eur. Ceram. Soc.* 40(12), 3965 (2020)
- [10] R. Khachatryan, **J. Schultheiß**, J. Koruza, Y.A. Genenko, "Stochastic model of dispersive multi-step polarization switching in ferroelectrics due to spatial electric field distribution", *Appl. Phys. Lett.* 114, 222902 (2019); **Editors Pick**
- [9] **J. Schultheiß**, H. Kungl, J. Koruza, "Influence of crystallographic structure on polarization reversal in polycrystalline multiaxial ferroelectric materials", *J. Appl. Phys.* 125, 174101 (2019)
- [8] **J. Schultheiß**, L. Liu, H. Kungl, M. Weber, K.V. Lalitha, S. Checchia, D. Damjanovic, J. E. Daniels, J. Koruza, "Revealing the switching mechanisms in polycrystalline ferroelectric/ferroelastic materials", *Acta Mater.* 157, 355 (2018); **Acta Materialia Student Award**
- [7] Y.A. Genenko, R. Khachatryan, **J. Schultheiß**, A. Ossipov, J.E. Daniels, J. Koruza, "Stochastic multi-step polarization switching in ferroelectrics", *Phys. Rev. B*, 97, 144101 (2018)
- [6] M. Acosta, R. Detsch, A. Grünwald, V. Rojas, **J. Schultheiß**, W. Aleksandra, R. Stark, N. Suman, S. Maciej, J. Koruza, A. Boccaccini, "Cytotoxicity, chemical stability, and surface properties of ferroelectric ceramics for biomaterials", *J. Am. Ceram. Soc.*, 101[1], 440-449 (2018)
- [5] **J. Schultheiß**, O. Clemens, S. Zhukov, H. von Seggern, W. Sakamoto, J. Koruza, "Effect of degree of crystallographic texture on dielectric, ferroelectric, and piezoelectric properties of Ba_{0.85}Ca_{0.15}TiO₃ piezoceramics", *J. Am. Ceram. Soc.*, 100[5], 2098-2107 (2017); **Edward C. Henry Award**
- [4] H. Han, J. Koruza, E. A. Patterson, **J. Schultheiß**, E. Erdem, W. Jo, J. Lee, J. Rödel, "Hardening behavior and highly enhanced mechanical quality factor in (K_{0.5}Na_{0.5})NbO₃-based ceramics", *J. Eur. Ceram. Soc.*, 37[5], 2083-89 (2017)
- [3] R. Khachatryan, S. Zhukov, **J. Schultheiß**, C. Galassi, C. Reimuth, J. Koruza, H. von Seggern and Y. A. Genenko, "Polarization-switching dynamics in bulk ferroelectric with isometric and oriented anisometric pores", *J. Phys. D: Appl. Phys.*, 50 045303 (2017)
- [2] S. Zhukov, Y. A. Genenko, J. Koruza, **J. Schultheiß**, H. von Seggern, W. Sakamoto, H. Ichikawa, T. Murata, K. Hayashi, and T. Yogo, "Effect of texturing on polarization switching dynamics in ferroelectric ceramics," *Appl. Phys. Lett.*, 108[1] 012907 (2016)
- [1] **J. Schultheiß**, B. Dermeik, I. Filbert-Demut, N. Hock, X. Yin, P. Greil, N. Travitzky, "Processing and Characterization of paper-derived Ti₃SiC₂ based ceramic," *Ceram. Int.*, 41[10A] 12595-03 (2015)
- Currently under preparation:
- [19] **J. Schultheiß**, E. Lysne, L. Puntigam, E. Bourret, Z. Yan, D.M. Evans, S. Krohns, and D. Meier, "Electronically switchable signal diode/transmitting wire based on ferroelectric domain walls", *Nat. Electron.*
- [20] **J. Schultheiß**, D. Meier, "Frequency-dependence of electronic properties of ferroelectric domain walls", *J. Phys. Condens. Matter*
- [21] **J. Schultheiß**, Y. Li, G. Picht, J. Wang, Y. Genenko, L.Q. Chen, J.E. Daniels, J. Koruza, "Polycrystallinity: A rich toolbox for tuning electromechanical properties of ferroelectrics by manipulating domain walls dynamics", *Prog. Mater. Sci.*