Preliminary Technical Program

2017 Joint IEEE International Symposium on the Applications of Ferroelectrics
International Workshop on Acoustic Transduction Materials and Devices
Workshop on Piezoresponse Force Microscopy
IEEE ISAF - IWATMD - PFM
Atlanta, Ga, U.S.A.
May 7-11, 2017
## SESSIONS

All Technical Sessions are Held in the **Klaus Building**. All Plenary Talks are Held in the **Student Center Ballroom**

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<td>8:30 AM - 10:00 AM</td>
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<td>Challenging in Processing of Bulk and Thin Film Ferroelectric Oxides</td>
<td>Alp Sêhîltioglu and Brady Gibbons</td>
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<td>Electro-mechanical Surface Properties by Force Microscopy</td>
<td>Neus Domingo</td>
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<td>10:00 AM - 10:30 AM</td>
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<td>10:30 AM - 12:00 PM</td>
<td><strong>Mechanical Properties, Reliability and Failure in Ferroelectric Materials</strong></td>
<td>Chris Lynch</td>
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<td>PFM - Can one Escape from the Artifacts all Around this Technique?</td>
<td>Elisabeth Soergel</td>
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<td>12:00 PM - 1:00 PM</td>
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<td>1:00 PM - 2:30 PM</td>
<td><strong>Piezoelectric Sensors, Actuators and Transducers: Design, Fabrication, Characterization and Applications</strong></td>
<td>Xiaoning Jiang</td>
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<td>Morphotropic Phase Boundary and Defects and Domain Walls</td>
<td>Dragan Damjanovic</td>
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<td>PFM Hands-on Workshop Session I</td>
<td>Rama Vasudevan, Nina Balke, and Stephen Jesse</td>
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<td>3:00 PM - 4:30 PM</td>
<td><strong>Piezoelectric Films in FBARs and Other Devices</strong></td>
<td>Sandy Cochran</td>
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<td>Insights to Ferroelectric Perovskites by Diffuse Scattering Techniques</td>
<td>Jiri Hlinka</td>
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<td>PFM Hands-on Workshop Session II</td>
<td>Rama Vasudevan, Nina Balke, and Stephen Jesse</td>
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<td>6:00 PM - 8:00 PM</td>
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| 8:00 AM - 8:30 AM | Welcome and Introductory Remarks  
Student Center Ballroom |
| 8:30 AM - 9:30 AM | Plenary Session I  
Student Center Ballroom  
Session Chair: Prof. Clive Randall  
Title of Abstract: Cold Sintering - Rethinking What We Thought We Knew in Electroceramics |
| 9:30 AM - 10:00 AM | Refreshment Break |
| 10:00 AM - 12:00 PM | SESSION I  
| **PNR and Domains** | **Synthesis-property Relationship in Thin Films** | **Strain via Elastic and Piezoelectric Measurement** | **Array-based Devices and MEMS** |
| 10:00 AM | INVITED - (10:00AM - 10:30AM)  
Why Nanopolar Regions Matter in Tunable Dielectrics, Flexoelectrics, and Photovoltaics  
Lauren M. Garten, David Moore, Shyam Dwarknauth, Sanjini Nanayakkara, Matthew Burch, Arnab Sen Gupta, Ryan Haislmaier, Venkataraman Gopalan, Elizabeth Dickey, Kristin Persson, David Ginley, and Susan Troller-McKinstry |
| 10:15 AM - 10:30 AM | INVITED - (10:00AM - 10:30AM)  
Piezoelectric Properties of BiFeO$_3$-BaTiO$_3$ Ceramics and Thin Films  
Tae Kwon Song, J.S. Kim, D.J. Kim, M.H. Lee, M.H. Kim, and W.J. Kim |
| 10:00 AM - 10:15 AM | INVITED - (10:00AM - 10:15AM)  
What Is Needed for the PiezoMEMS Applications of the Future?  
R.Q. Rudy and R.G. Polcawich |
| 10:30 AM - 10:45 AM | Evaluation on Operation of a Lead-Zirconium-Titanate (PZT) Actuator Array for Highly Integrated Biochip Application  
Tue Trong Phan, R. Shimura, T. Shimoda, and Y. Takamura |
| 10:30 AM - 10:45 AM | Manipulation of Domain Structure in [100] Tetragonal Pb(Zr, Ti)O$_3$ Nanorods by Charge Screening  
| 10:30 AM - 10:45 AM | PIEZOELECTRICS: Putting the “Squeeze” on New Materials  
Michelle Dolgos |
| 10:30 AM - 10:45 AM | In-situ X-ray Investigation of Pb(Mg$_{1/3}$Nb$_{2/3}$)O$_3$-PbTiO$_3$ Polycrystalline Ceramics in an External Electric Field  
Dong Hou, Ted Marie Usher, Marko Vrabel, Lovro Bulanovic, Hana Ursic, Barbara Malic, Igor Levin, and Jacob L. Jones |
| 10:30 AM - 10:45 AM | Simultaneous Mechanical Displacement and Ferroelectric Pulse Switching Measurements of Piezoelectric MEMS Devices  
Glen R. Fox, R.Q. Rudy, K. Grove, M. Rivas, and R.G. Polcawich |
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<td>Pavel Mokry</td>
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<td>Enhanced Dielectric and Piezoelectric Properties of the BiFeO$_3$-PbTiO$_3$-BaZrO$_3$ Ternary High Curie Temperature Ceramics</td>
<td>Jie Jian, Jianguo Chen, and Jinrong Cheng</td>
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<td>Simultaneous Time-Resolved Measurements of Polarization and Strain Dynamics to Explore Switching in Ferroelectric/ Ferroelastic Materials</td>
<td>Jan Schulteiss, Y.A. Genenko, S. Zhukov, R. Khachatryan, L. Liu, J.E. Daniels, and J. Koruza</td>
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<td>11:00AM - 11:15AM</td>
<td>Interactions Between Point Defects and Ferroelectric Domain Walls</td>
<td>D.R. Småbråten, L. Xia, S.H. Skjærvø, T. Tybell, and Sverre Magnus Selbach</td>
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<td>In situ Poling and the Strong Post-poling Relaxation of non-180° Domain Texture in Bismuth Ferrite Ceramics</td>
<td>Lisha Liu and John E. Daniels</td>
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<td>Finite Element Simulation of Switchable and Tunable Resonators</td>
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<td>Rare-Earth Modified Bismuth Ferrite Ceramics: Composition, Structure and Properties from Local to Macroscopic Scales</td>
<td>Julian Walker, D. Alkin, S. Troller-McKinstery, and T. Rojac</td>
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<td>Sukriti Mantri, Jette Oddershede, Dragan Damjanovic, and John E. Daniels</td>
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<td>Dielectric, Electrical Conduction, Piezoelectric and Impedance Analysis of Bi$_3$TiNbO$_6$ Piezoceramics with Ce-Modifications</td>
<td>Jing Yuan, Rui Nie, and Jianguo Zhu</td>
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<td>INVITED (11:30AM - 12:00PM) Lattice Strain and Domain Contributions in Piezoelectric PZT</td>
<td>Nan Zhang, Semën Gorfman, Hiroko Yokota, A.M. Glazer, Wei Ren, and Z.-G. Ye</td>
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<td>Design of “Hard” BiScO$_3$-PbTiO$_3$ Ceramics for Shear-Bending Mode Actuator Using at High Temperature</td>
<td>Julian Walker, Jianxin Wei, and Jinrong Cheng</td>
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<td>Domain Configuration in (1-x)Pb(Mg$<em>{1/3}$Nb$</em>{2/3}$)$_2$O$_3$-xPbTiO$_3$ Ceramics Analyzed by Transmission Electron Microscopy</td>
<td>Majca Otonicar, H. Ursic, D. Alkin, M. Vrabek, A. Bencan, B. Malic and T. Rojac</td>
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<td>Exploring Next Generation High Temperature Ferroelectrics: 35Bi$<em>3$(Mg$</em>{1/2}$Ti$_{1/2}$)$_2$O$_3$-65PbTiO$_3$ Thin Films</td>
<td>Carl S. Morandi, S. Troller-McKinstery, K.R. Udayakumar, S. Bhaskar, and J. Rodriguez</td>
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<td>Atomistic Modeling of Ageing in Ferroelectrics</td>
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<td>Ferroelectric Domain Continuity over Grain Boundaries</td>
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<td>Point Defects in (001)-strained BiFeO3</td>
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<td>Highly (100)-Oriented Metallic LaNiO3 Grown by RF Magnetron Sputtering</td>
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<td>Lisha Liu and John E Daniels</td>
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<td>Improving Reliability in Piezoelectric Films</td>
<td>Betul Akkopru-Akgun, M.T. Lanagan, and S. Trolier-Mckinstry</td>
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<td>Mechanical Reliability of Piezoelectric Microelectromechanical Systems Pb[(Zr0.52Ti0.48)0.98Nb0.02]O3 Films</td>
<td>Kathleen Coleman, J. Walker, H.G. Yeo, and S. Trolier-Mckinstry</td>
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<td>Probing the Role of Surface Water in Ferroelectric Domain Charge Dynamics</td>
<td>Iaroslav Gaponenko, N. Domingo, N. Stucki, A. Verdaguer, and P. Paruch</td>
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<td>Tuning Light-induced Polarization Screening of Ferroelectric Materials by Water</td>
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<td>Local Writing and Characterization of Individual Charged Conducting Domain Walls in y-cut LiNbO3 (MgO 5% mol) Single Crystals</td>
<td>James P.V. McConville, M.P. Campbell, A. Kumar, and J.M. Gregg</td>
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<td>Simultaneous Time-Resolved Measurements of Polarization and Strain Dynamics to Explore Switching in Ferroelectric/Ferroelastic Materials</td>
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<td>Electric-field-induced Polarization Rotation in PbZb0.9Ti0.1O3 Revealed by in-situ Pair Distribution Function Study</td>
<td>Changhao Zhao, Dong Hou, Ching-Chang Chung, Jacob L. Jones</td>
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<td>Periodic Nano-domain Patterns in Relaxor Single Crystals</td>
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<td>Losses and Heat Generation of Piezoelectric Ceramics by Polarization Orientation</td>
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<td>EMAT Phased Array Probe for Detecting Surface Cracks</td>
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<td>Current Construction Advancements of an Ultrasonic Phased Array Transducer for Future Deployment Within an Advanced Test Reactor Loop for in-use Monitoring</td>
<td>Galestan Mackertich Sengerdy, and B.R. Tittmann</td>
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<td>Strongly [001] Oriented Bimorph Thick PZT Films Grown by High Temperature rf- Magnetron Sputtering for a Non-resonant Piezoelectric Energy Harvester</td>
<td>Hong Goo Yeo, Tiancheng Xu, Shad Roundy, and Susan Trollier-Mckinstry</td>
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<td>Anomalous Enhancement in Photocatalytic Rate by Stabilizing a Metastable Phase in a BiFeO₃-Based Photocatalyst</td>
<td>Bastola Narayan, Sangeeta Adhikari, Giridhar Madras, and Rajeev Ranjan</td>
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<td>How does Cyclic Electrical Loading Influence the Electrocaloric Effect in PMN-xPT?</td>
<td>Andraz Bradeško, M. Vrbelj, L. Fulanović, M. Otonićar, Z. Kutnjak, B. Malić, and T. Rojac</td>
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<td>Controlled Functionalization of Poly(4-methyl-1-pentene) Films for High Energy Storage</td>
<td>Guan Wang, M. Zhang, Z. Xu, and L. Zhang</td>
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<td>Solid state Cooling Device Based on Electrocaloric Ceramic Multilayers</td>
<td>Tian Zhang, Xiaoshi Qian, Haiming Gu, and Q. M. Zhang</td>
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**Contributed Posters**

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<td>Effects of Sintering Temperature on Structure, Ferroelectric and Piezoelectric Properties of 0.71BF-0.29BT Ceramic</td>
<td>Jian-Xin Wei, Jin-Rong Cheng, and Jian-Guo Chen</td>
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<td>Synthesis and Characterization of Intergrowth Bismuth Layer Structured Bi₅Ti₃O₁₂-CaBi₅Ti₃O₁₅ Ceramics</td>
<td>Sam Yeon Cho, G. P. Choi, and S.D. Bu</td>
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<td>Lead-free KN-NBZ Piezoelectric Ceramics</td>
<td>Stephan Collins and A.J. Bell</td>
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<td>Hard-Piezoelectric Ceramics for Low Temperature Co-Fired Multilayer Piezoelectric Transformers</td>
<td>Sinan Dursun, A.E. Gurdal, S. Tuncdemir, D. Fridkin, and C.A. Randall</td>
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<td>Stabilizing High Energy Piezoelectric Polymorphs</td>
<td>Lauren M. Garten, Riley Whitehead, John Magnum, Shyam Dwaraknath, Laura Schelhas, Michael F. Toney, Julian Walker, Brian Gorman, Paul Ndione,</td>
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Textured Lead-free Piezoelectrics for High-Frequency Ultrasound Imaging
Astri Bjørnetun Haugen, Erling Ringgaard, and Franck Levassort

Mechanical Strength and Material Property Evaluation of Textured PMN-PZT Polycrystalline Ceramic
Richard Pérez-Moyet, D.P. Sherman, A.A. Heitmann, and J.B. Blottman

Observation of Room Temperature Ferroelectricity in LiNbO$_3$, KNbO$_3$, and Na$_{0.8}$Li$_{0.2}$NbO$_3$ Ceramics Synthesized by Conventional Solid State Reaction
Viancy Isaza-Zapata, C. Maya, A. Gómez, V.H. Zapata, O. Morán, and J.L. Izquierdo

Synthesis of Single-Crystalline Lithium Tantalate Nanorods - Piezoelectric and Non-Linear Optic Properties
Prem Jaschin and K.B.R. Varma

Synthesis, Dielectric and Ferroelectric Behaviour of Lead-free KBT-BT Ceramics
Karuppanan Aravind and P. Ramasamy

High Performance PZT Chemical Coating Solution and Films for Piezoelectric MEMS Devices
Masami Kawahara, S.S. Won, M. Hochido A.I. Kingon, and Seung-Hyun Kim

Investigation of Electrical Properties in a New Lead-free (100-x)(Li$_{0.12}$Na$_{0.88}$)NbO$_3$-xBaTiO$_3$ (0 ≤ x ≤ 40) Piezoelectric System
Ajit Kulkarni and Supratim Mitra

Effects of SiO$_2$ Coating on the Dielectric and Ferroelectric Properties of BaTiO$_3$-SiO$_2$ Composites
Xu Lu, Yang Tong, Hossein Talebinezhad, Jiachen Liu, Yancen Cai and Z.-Y Cheng

Structure, Ferroelectric and Mechanical Performance of Polycrystalline Gadolinium Doped Lead Lanthanum Zirconate Titanate Ceramics
S.F. Mansour, L. Abd El-Latif, A.M. Eid, M.M. Rashad, S. Ducharme, Mohamed Affifi, and J.A. Turner

Bi(Mg$_{2/3}$Nb$_{1/3}$)O$_3$-BaTiO$_3$-BiFeO$_3$ PbO-free Piezoelectric Ceramics
Shunsuke Murakami, Dawei Wang, Amir Khesro, Antonio Feteira, Derek C. Sinclair, and Ian M. Reaney

Structure-Processing Relations in PbZr,Ti$_x$O$_3$ Films Processed Far From Equilibrium on Glass and Polymer Substrates
Aaron B. Naden, C. Deng, Y. Yulian, S. Neumayer, B. Rodriguez, N. Bassiri-Gharb, and A. Kumar

Room Temperature Crystallographic Phase analysis of (1-x) KNbO$_3$-xCaZrO$_3$ lead-free piezoelectric materials.
Samuel J. Parry and A.J. Bell

Silicon Doping of Barium Strontium Titanates
D.L. Tjhe, A.V. Berenov, R. Bower, and Peter K. Petrov

Targets Modification During NBT Thin Film Deposition
Sergey A. Popov, T.V. Kruzina, Yu.N. Potapovich, M.P. Trubitsyn, and O.S. Rutskyi

Multifunctional Molecular Ferroelectric Thin Films
Zhaojue Zhang, Peng-Fei Li, Yuanjuan Tang, Andrew J Wilson, Katherine Willets, Manfred Wuttig, Ren-Gen Xiong, and Shengqiang Ren

Fabrication and Characterization of La, Ga Co-modified BiFeO$_3$-PbTiO$_3$ Multiferroic Ceramics with High Magnetic Field Assisted Sintering
Shujin Shen, Jianguo Chen, and Jinrong Cheng

Remarkably Enhanced Photocatalytic Activity in Bi$_{1-x}$Ba$_x$FeO$_3$ Prepared by Sol-Gel Method
Chenlan Zhang, Tong Tong, Jianguo Chen, Dengren Jin, and Jinrong Cheng

Crystalline Phase and Electrical Properties of Lead-Free Piezoelectric KNN-based films with Different Orientations
W. Chen, L.Y. Wang, W. Ren, G. Niu, J.Y. Zhao, N. Zhang, M. Liu, Y. Tian, and M. Dong

Ceramic/Polymer Microwave Composites via the Cold Sintering Process
Dawei Wang, D. Zhou, and I.M. Reaney
Textured Ternary Ceramics with Enhanced Piezoelectric Properties by Templated Grain Growth
Beecher Watson, Yunfei Chang, Libby Kupp, Jie Wu, Mark A. Fanton, Richard J. Meyer Jr., and Gary L. Messing

Far-From-Equilibrium Processing of PbZr,Ti,_,O Thin Films on Glass and Polymeric Substrates
Yulian Yao, C. Deng, A.B. Naden, S. Neumayer, A. Kumar, P.C. Joshi, B. Rodriguez, and N. Bassiri-Gharb

Properties and Structures of Nonstoichiometric (K,Na)NbO,-based Lead-free Ceramics
Jie Xing, Zhi Tan, Lixu Xie, Jiagang Wu, Dingquan Xiao, and Jianguo Zhu

Investigation of Noise Characteristics of Phosphorous Chalcogenide Crystal in the Vicinity of Phase Transition
Ilona Zamaraitė, Jonas Matukas, Sandra Pralgiauskaite, Andrius Džiaugys, Yulian Vysochanskii, and Juraj Banys

Dynamic Observation of Nanoscale Domain Switching Behaviors in Ferroelectric HfO films Using Scanning Nonlinear Dielectric Microscopy

Dielectric Relaxation in Ca,Nb,Ti, Ceramic
Chunchun Li, Xiaoyong Wei, Haixue Yan, and Michael J. Reece

Vibrational Signatures of Ti and Fe Doped Lithium Niobate
Peter Mackwitz, M. Rüsing, G. Berth, and A. Zrenner

Stability of Ferroelectric Phase I in Epitaxial HfO,-based Films
Takanori Mimura, Kiriha Katayama, Takao Shimizu, Takanori Kiguchi, Akihiro Akama, Toyohiko J. Konno, Osami Sakata, and Hiroshi Funakubo

Complex Impedance Spectra of Amorphous And Glass-ceramic Li,GeO Compounds
Oleksii O. Nesterov, M.P. Trubitsyn, S.N. Plyaka, and M.D. Volnyanskii

Direct Evidence of Spin Cylcoid in Strained Nanoscale Bismuth Ferrite Thin Film

PRAP Version 3.1
Ron Tasker

Reliability in Patterned PZT Films for MEMS Applications
Jung In Yang, S.Y. Lee, S.W. Ko, and S. Trollier-McKinstry

Probing Cracks Induced by Inhomogeneous Stresses in MLCAs
Jianwei Zhao, Caleb Mooney, Antje Kynast, Michael Toepfer, Eberhard Hennig, Elizabeth C. Dickey, and Jacob L. Jones

Smart Correction of SPM Time Series: Can Data Analytics Help us Extract Correlations?
Iaroslav Gaponenko, P. Tückmantel, B. Ziegler, G. Rapin, M. Chhikara, and P. Paruch
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<tr>
<td>2:00 PM</td>
<td>INVITED - (2:00PM - 2:30PM)</td>
<td>Lead-free Piezoelectric (Na,Bi)TiO&lt;sub&gt;3&lt;/sub&gt;-BaTiO&lt;sub&gt;3&lt;/sub&gt; Thin Films and Their Application</td>
<td>Invited - (2:00PM - 2:30PM)</td>
<td>Piezoelectric Enhancement of Bismuth-based Piezoelectric Materials with Pseudo-cubic Symmetry Based on Nano/Macro Complex Domain Configurations</td>
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<td>Eiji Fujii, Y. Tanaka, T. Harigai, and H. Adachi</td>
<td>Eiji Fujii, Y. Tanaka, T. Harigai, and H. Adachi</td>
<td>Invited - (2:00PM - 2:30PM)</td>
<td>A Novel Compact Tunable Dual-Band Bandstop Filter (DBBSF) with Spurline and Stepped-Impedance Resonator Loaded with BST Capacitors</td>
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<td>Deposit of Epitaxial PMN-PT on Silicon Wafers For Piezoelectronic Transduction Memory Devices</td>
<td>Wei-Ting Chen, Ahmet Erkan Gurdal, Safakcan Tuncdemir, Jing Guo, Hanzheng Guo, and Clive. A. Randall</td>
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<td>Ignotas Grybas, A. Bubulis, V. Jurenas, V. Bakanauskas, and J. Janutenaitė</td>
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<td>2:30 PM - 2:45 PM</td>
<td></td>
<td>Implications of Ferroelectricity During the Growth of Ferroelectric Superlattices</td>
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<td>Rui Liu, Alec Sun, Benjamin Bein, Hsiang-Chun Hsing, Anna Gura, Giulia Bertino, Jin-Wen Lai, and Matthew Dawber</td>
<td>Implications of Ferroelectricity During the Growth of Ferroelectric Superlattices</td>
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<tr>
<td>2:45 PM - 3:00 PM</td>
<td></td>
<td>Hydrothermal Assisted Cold Sintering of Lead Zirconate Titanate (PZT-5A) Powder</td>
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<td>Biocompatible Lithium Niobate for Sensing and Microfluidics</td>
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<td></td>
<td>Dixiong Wang, C.S. Morandi, and S. Troller-McKinstry</td>
<td>Hydrothermal Assisted Cold Sintering of Lead Zirconate Titanate (PZT-5A) Powder</td>
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<td>Applications</td>
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**SESSION II**
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<th>Time</th>
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<tr>
<td>3:00PM - 3:15PM</td>
<td>RF Reactive Sputtering AlN Thin Film at Room Temperature for CMOS-compatible MEMS Application</td>
<td>Enhanced Piezoelectric Properties in [001], Textured PIN-PMN-PT Termen Ceramics</td>
<td>Wenjuan Liu, W. J. Xu, W.Z. Wang, L.M. He, J. Zhou, K. Radhakrishnan, H. Yu, and J.Y. Ren</td>
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<tr>
<td>3:00PM - 3:15PM</td>
<td>Phase Formation, Crystal Growth, Crystal Structure and Piezoelectric Properties of Ca₃Ta₅Al₃Si₂O₁₄ Single Crystal</td>
<td>Fabrication and Testing of Electromechanical Actuation Devices based on Gd-doped Ceria Thin Films</td>
<td>Yuui Yokota, Y. Ohashi, A. Yamaji, S. Kurosawa, K. Kamada, and A. Yoshikawa</td>
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<td>3:00PM - 3:15PM</td>
<td>Topological Structures in Ferroic Materials as Nanoscale Functional Elements</td>
<td>Local Probe Studies of Switching and Current Dynamics in Pb(Zr₀.₂Ti₀.₈)O₃ Thin Films</td>
<td>Jan Seidel</td>
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<td>3:00PM - 3:30PM</td>
<td>Self-limiting Growth of Barium Titanate via Molecular Beam Epitaxy</td>
<td>Manufacturing Grain Textured Piezoelectric Ceramic Transducer Components</td>
<td>Timothy A. Morgan, M. Zamani-Alavijeh, G. Story, W. Schroeder, A.V. Kuchuk, M. Benamara and G.J. Salamo</td>
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<tr>
<td>3:45PM - 4:00PM</td>
<td>Phase Formation, Crystal Growth, Crystal Structure and Piezoelectric Properties of Ca₃Ta₅Al₃Si₂O₁₄ Single Crystal</td>
<td>Fabrication and Testing of Electromechanical Actuation Devices based on Gd-doped Ceria Thin Films</td>
<td>Yuui Yokota, Y. Ohashi, A. Yamaji, S. Kurosawa, K. Kamada, and A. Yoshikawa</td>
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<td>5:30 PM - 7:30 PM</td>
<td>Craft Beer Tasting, Student Social</td>
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<td>Monday Night Brewery</td>
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<tr>
<td>Time</td>
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| 8:30 AM - 9:30 AM | **Plenary Session II**  
Student Center Ballroom  
**Session Chair:**  
Prof. Elizabeth Dickey  
**Title of Abstract:** *Lattice Defects in Ferroelectric Oxides and Their Interactions with Electric Fields*
| 9:30 AM - 10:00 AM | **Refreshment Break**  
**SESSION III**  
**Polar Interactions and Metastabilities**  
**Session Chair:**  
**Ferroelectric-based Memories and Transistors**  
**Session Chair:**  
**Transducer Materials**  
**Session Chair:**  
**PFM: Signal Contribution**  
**Session Chair:** |
| 10:00 AM  | [Polar Interactions and Metastabilities](#)  
**Session Chair:**  
**Ferroelectric-based Memories and Transistors**  
**Session Chair:**  
**Transducer Materials**  
**Session Chair:**  
**PFM: Signal Contribution**  
**Session Chair:** |
| 10:15 AM - 10:30 AM |  
**INVITED - (10:00AM - 10:30AM)**  
**Polar Metastable States in Antiferroelectrics**  
Elena Buixaderas  
**Graphene Ferroelectric Field-Effect Transistors: Up-Scaling and Practicality**  
J. Heidler and Kamal Asadi  
**Ferroelectric Properties of an Innovative FeFET with 3.3V Writing, 10^7 Endurance, and Long Retention**  
Mitsue Takahashi, W. Zhang, and S. Sakai  
**Modeling Losses of a Piezoelectric Resonator: Analytical vs. Finite Elements Analysis**  
Thibaut Meurisse and D. Damjanovic  
**INVITED - (10:00AM - 10:30AM)**  
“Strange Ferroelectrics”: Why So Many Materials Appear to Show Piezo/Ferroelectric Behaviors During Nanoscale Measurements  
Rama K. Vasudev, N. Balke, A. Ievlev, O. Ovchinnikova, P. Maksymovych, S. Jesse and S.V. Kalinin |
| 10:30 AM  |  
**INVITED - (10:00AM - 10:30AM)**  
**Susceptible Ferroelectric/ Antiferroelectric Phase Transition Near the Surface of Typical Antiferroelectric Materials**  
Yun Liu  
**Tunable, Multi-State Switching in Ferroelectric Thin Films**  
Ruijuan Xu, S. Liu, S. Saremi, H. Lu, S. Pandya, R. Gao, E. Bonturim, A.M. Rappe, and L.W. Martin  
**Advanced Mechanical Characterization for Piezoelectric Automotive Sensor Applications**  
Gunnar Picht and S. Frank  
**INVITED - (10:30AM - 11:00AM)**  
Mechanical Reading of Ferroelectric Polarization  
Kumara Cordero-Edwards, A. Abdollahi, J. Sort, N. Domingo, and G. Catalán |
| 10:45 AM - 11:00 AM |  
**Non-Classical Electrostriction in Fluorites and Perovskites: Current Understanding and Future Prospects**  
Nimrod Yavo, Ori Yeheskel, Ellen Wachtel, Anatoly Frenkel, and Igor Lubomirsky  
**The Piezoelectronic Family of Devices, from RF Switches to Fast Low Power Transistors**  
Glenn J. Martyna  
**Functional Material Properties of Oxide Thin Films Probed by Atomic Force Microscopy on the Nanoscale**  
Nina Balke and Alexander Tselev |
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<td>11:00 AM</td>
<td>Defect Dipole Enhanced Electromechanical Coupling</td>
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<td>Ronald E. Cohen, Shi Liu, and Muhtar Ahart</td>
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<td>Anti-Ferroelectric HfO₂ or ZrO₂: a Key Material for Novel Anti-</td>
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<td>Ferroelectric Non-volatile Memories</td>
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<td>M. Pešić, M. Hoffmann, C. Richter, S. Slesazeck, T. Mikolajick, and</td>
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<td>Uwe Schroeder</td>
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<td>INVITED - Phenomenology of Transducer Materials</td>
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<td>George A. Rossetti, Jr.</td>
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<td>INVITED - Converse Flexoelectric Effects in PFM</td>
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<td>Neus Domingo, A. Abdollahi and G. Catalán</td>
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<td>11:15 AM</td>
<td>Stress-Dependent Bulk Photovoltaic Effect in Donor-Doped LiNbO₃:</td>
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<td>Relation Between Defect Structure, Band Structure and Dielectric</td>
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<td>S. Nadupalli and Torsten Granzow</td>
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<td>Ferroelectric Probe Data Storage Using HfO₂-Based Thin-Film Recording</td>
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<td>INVITED - Probing Genuine Piezoresponse in Piezoresponse Force</td>
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<td>Microscopy Yuseok Kim</td>
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<td>11:30 AM - 12:00 PM</td>
<td>Dielectric Properties of Lithium Niobate From mHz to Optical</td>
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<td>Charlotte Cochard, T. Spielmann, N. Balhawane, A. Halpin, and T.</td>
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<td>Granzow</td>
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<td>Controlling Magnetization using Patterned Electrodes on a Piezoelectric</td>
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<td>Chris S. Lynch and J. Cui</td>
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<td>Modeling the Effect of Porous Structure on Poling Behavior of Ferroelectric Ceramics</td>
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<td>James L. Roscow, Y. Zhang, R.W.C Lewis, J. Taylor, and C.R. Bowen</td>
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<td>Manufacturing Technologies for Ultrasonic Transducers in a Broad</td>
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<td>Frequency Range</td>
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<td>S. Gebhardt, P. Günther, K. Hohlfeld, and Holger Neubert</td>
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<td>12:00 PM - 2:00 PM</td>
<td>Lunch Break</td>
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POSTER SESSION II
Klaus Building Atrium - 12:00 pm - 2:00 PM
Session Chair:

Dielectric Properties of Multiferroic Ceramics of the Bi$_{1-x}$La$_x$Fe$_{0.50}$Sc$_{0.50}$O$_3$ Metastable Solid Solutions System

Gamma-ray Irradiation Effects on Electrical Properties of Ferroelectric ABO$_3$ Perovskite Structure Materials
Sam Yeon Cho, E.Y. Kim, G.J. Lee, M. K. Lee, and S.D. Bu

Effects of the Interface Strain on the Magnetic Transition Temperature of Hexagonal YMnO$_3$ Films: A First-Principles Study
Dong Chen, Y.L. Zhu, and X.L. Ma

A Phenomenological Micromechanical Constitutive Model for General Ferroelectric Materials: 95/5 PZT
Wen D. Dong and J. Robbins

Nd doped (K$_{0.44}$Na$_{0.52}$Li$_{0.04}$)(Nb$_{0.86}$Ta$_{0.1}$Sb$_{0.04}$)O$_3$ Multifunctional Ceramics
Juan Du

NaNbO$_3$ Based Lead-free Antiferroelectric Ceramics
Lisheng Gao, Hanzheng Guo, Shujun Zhang, and Clive A. Randall

Pressure-Induced Phase Transitions of Perovskite Ferroelectric Crystals: Comparison of Hydrostatic and One-Dimensional Compression Pressure
Junjie Gao, Long Xie, Hao Zhang, Jidong Yu, Ganghua Wang, Gaomin Liu, Yanqin Gu, Hongliang He, and Jingsong Bai

Room Temperature Ferroelectricity and Magnetoelectric Coupling in Sr$_3$Co$_2$Fe$_{24}$O$_{41}$ Hexaferrite
Anurag Gaur and Pawan Kumar

Flexoelectric Impact on Spontaneous Formation and Properties of Domain Structures in Thin Ferroelectric Films
Ivan S. Vorotiahin, Eugene A. Eliseev, Li Qian, Sergei V. Kalinin, Anna N. Morozovska, and Yuri A. Genenko

Distribution of Local Structures in Lead-Free Relaxor Ferroelectrics: (Bi$_{1/2}$Na$_{1/2}$)TiO$_3$-BaTiO$_3$ Investigated with Na NMR

Magnetodielectric Properties of CuO and MnO$_2$ Modified BiFeO$_3$-BaTiO$_3$ Solid Solution
Amit Kumar, Narayan Bastola, and Rajeev Ranjan

Tunable Elastic Metamaterial Based on Piezoelectric Transducer
Pavel Marton, J. Nečásek, J. Václavík, and P. Mokrý

Relation of the Structure and Magnetic and Dielectric Properties of the Core/Shell Composite Co$_{1-x}$Ni$_x$Fe$_2$O$_4$
Ulisis Salazar-Kuri, J.O. Estevez, N. R. Silva, and M.E. Mendoza

Strain and Magnetic Field Induced Spin-Structure Transitions in Multiferroic BiFeO$_3$

Domain Wall Orientation and Domain Shape in KTiOPO$_4$ Crystals
Forward Domain Growth in Uniaxial Ferroelectrics
Vladimir Shur, D.O. Alikin, A.P. Turygin, A.V. levlev, and S.V. Kalinin

Periodic Domain Patterning by Electron Beam in Lithium Niobate Single Crystals Modified by Proton Exchange

Characterization of Photoferroelectric BaTiO$_3$-based Solid Solutions
Halyna Volkova, P. Gemeiner, P. Nukala, F. Karolak, C. Bogicevic, B. Dkhil, and I.C. Infante

Pressure Dependence of the Soft Mode Close to the Ferroelectric-Paraelectric Transition in PbTiO$_3$
Hamit Yurtseven and A. Kiraci

In-situ X-ray Diffraction Study of Gamma Irradiation Effects on Ferroelectric Thin Films

Observation of Positive and Negative Magnetodielectric Effects in Relaxor PbCo$_{1/3}$Nb$_{2/3}$O$_3$ Ceramic
Adityanarayan H. Pandey, Anand M. Awasthi, and Surya M. Gupta

Ferroelectric Film Dynamics Simulated by a Second-order Time-dependent Landau Model
Michael S. Richman, Paul Rulis, and Anthony N. Caruso

Structural and Dielectric Properties in Nd$^{3+}$ Doped Bi-Cobaltite Nanoparticles
Muhammad Anis-ur-Rehman, F. Ahmed, and A. Munir

Effect of Parameter Variation in UTBB FDSOI-NCFET
Bhaskar Awadhiya and P.N. Kondekar

Dielectric Properties of BaTiO$_3$-KNbO$_3$ Composites
Sergejus Bačiūnas, Maksim Ivanov, Jūras Banys, and Satoshi Wada

Bismuth Nickel Niobate with Small Negative Temperature Coefficients of Dielectric Constant
Xiukai Cai, Xiaoobo Sun, and Lufeng Pang

Interface Diffusion of Silver Electrode into Bismuth-based Ceramics and its Effects on the Dielectric Properties
Xiukai Cai, Xiaoobo Sun, and Lufeng Pang

The Structure and Dielectric Properties of Bismuth-Nickel-Niobium Oxide Based Ceramics
Xiukai Cai, Xiaoobo Sun, and Lufeng Pang

Lead Zirconate Titanate Thin Films for a 2D Ultrasound Array
Christopher Y. Cheng, Y. Qiu, S. Cochran, and S. Trolier-McKinstry

Preparation and Characterization of Ferroelectric Polymer Nanocomposites
Hongfang Li, Hanting Dong, Susu Wang, Jianguo Chen, and Jinrong Cheng

Electrocaloric Effect in BNKT-based and PbZrO$_3$-based Ceramics
Zhongming Fan, Zunping Xu, Xiaoming Liu, and Xiaoli Tan
Role of Buffer Layer in PZT Film-Based Transparent Stack Deposited on Glass
D. Sette, Sebastjan Glinsek, N. Godard, S. Girod, N. Adjeroud, R. Leturcq, and E. Defay

Fabrication and Characterization of Perovskite Oxynitride Dielectrics
Takuya Hoshina, A. Sahashi, K. Kanehara, H. Takeda, and T. Tsurumi

Chemical Solution Deposition of Piezo Films for Prototype Microelectromechanical Systems (MEMS)
Beth Jones and S. Trolier-McKinstry

Electrocaloric Effects and Temperature Distribution Analysis of BaTiO₃-based Ceramics and Multi-layer Capacitor
Hiroshi Maiwa

Reduced Hysteresis Model and Temperature Dependency of Multilayer Piezo Actuators
Charles Mangeot

HfO₂/HfOₓ Bilayer Structures for Multilevel Resistive Switching and Visualization of Oxygen Deficiencies by Electron Holography

Paper Transistors with Organic Ferroelectric P(VDF-TrFE) Films
Min Gee Kim and Byung Eun Park

Characterization of PiezoMEMS PbZr₀.₅₂Ti₀.₄₈O₃ with IrO₂/Pt, IrO₂, and Pt Bottom Electrodes
Daniel M. Potrepka, H. Yu, M. Aindow, M. Rivas, G.R. Fox, and R.G. Polcawich

Determination of Elastic Modulus of IrO₂ Thin Films for PiezoMEMS Applications
Manuel Rivas, G. Song, R.Q. Rudy, B. Hanrahan, S.W. Lee, B. Huey, and R.G. Polcawich

Dielectric Behavior and Non-ohmic Behavior of CCTO/SiO₂ Composites
Hossein Talebinezhad, Y. Tong, X. Lu, and Z.Y. Cheng

Process and Microstructure to Achieve High Dielectric Constant in Ceramic-Glass Composites for Energy Storage Applications
Yang Tong, H. Talebinezhad, X. Lu, and Z.Y. Cheng

Electrocaloric Effect in Ferroelectric Thin Film
Jinbin Wang and B. Li

Significantly Enhanced Electric Polarization and Energy Density of All Polymer based Sandwich Structured Composites for Energy Storage Applications
Jie Chen and Hong Wang

Embedded Nanotransducer for Ultrahigh-frequency SAW Utilizing AlN/Diamond Layered Structure
Lei Wang, S.M. Chen, J.Y. Zhang, X. Ning, Z. Chen, and J.T. Liu

Improved Tunability of (Ba,Sr)TiO₂-Ba₄Ti₁₃O₃₀ Composite Ceramics by Infiltrate BaTiO₃
Rui Zheng, Dengren Jin, Kai Xu, Hanting Dong, Jinrong Cheng, and Jianguo Chen

Efficient Power Generation via Controlled Porosity in Ferroelectric Polymers
Mohammad Mahdi Abolhasan, M. Naebe, K. Shirvanimoghadam, and K. Asadi

Performance Comparison of Piezoceramic and Piezocrystal for Low-frequency Power Ultrasonics Application in Surgical Needles
Tingyi Jiang, Zhihong Huang, and Sandy Cochran

New Methodology to Determine the Dielectric Constant and Loss at the Resonance/Antiresonance Frequency Range
Hossein Daneshpajooh, K. Uchino, and M. Choi

Influence of the Measurement System on the Nondestructive Pyroelectric Evaluation of Embedded Piezoelectric Transducers
Piezoelectrets: Novel Transducer Materials for Mechanic and Acoustic Applications
Biao Zhu, Xiaoqing Zhang, Peng Fang, Jie Zheng, Tao Liu, Zeyang Xia, and Guanglin Li

Non-resonant Magnetoelectric Energy Harvester
Peter Finkel and M. Staruch

On the Optimal Electric Load for Ultrasound Energy Receivers
Mikel Gorostiaga, M. C. Wapler, and U. Waltzabe

Design, Simulation and Experimental Evaluation of Tri-Phase Piezoelectric Composite Transducers
Amar Bhalla, Juan P. Tamez, and Ruyan Guo

Piezoelectric Composite Modules for Sensing and Energy Conversion from Road
Ruyan Guo, Bryan Gamboa, Dipon Wasim, George Nall, Juan Tamez, Kalyan Chakravarthy, Mayur Pole, Pratheek Gopalakrishnan, Shuza Binzaid, and Amar Bhalla

Pyroelectric Energy Conversion Cycles Tailored for Antiferroelectrics
Brendan M. Hanrahan, Y. Espinal, C.J. Neville, and A.N. Smith

High Temperature Poling and Aging Behavior in PIN-PMN-PT Single Crystals
Adam A. Heitmann, D.P. Sherman, and R. Pérez-Moyet

Characterization of Lead Titanate Single Crystals Grown by Self-Flux Technique
Thomas E. Hooper, A.J. Bell

Investigation of Morphotropic Phase Boundaries in the PIN-PSN-PT Ferroelectric Systems with High T_r and T_c Phase Transition Temperatures
Dabin Lin, Fei Li, Shujun Zhang, Edward Gorzkowski, and Thomas R. Shrout

Comprehensive Analysis for Calculating Extensive Elastic Compliance and Mechanical Loss from a Non-Electrode Sample
Maryam Majzoubi, Minkyu Choi, Timo Scholehwar, Eberhard Hennig, and Kenji Uchino

Finite Element Modeling of Transducers using the ATILA++ Code
Pascal Mosbah, R.J. Meyer, D.C. Markley, and J. Roland

Dielectric and Piezoelectric Properties of PNN-PWM-PZT-x BCW Ceramics Sintered at Low Temperature
Rui Nie, Hong Liu, and Jianguo Zhu

Stress and Electric-Field Driven Structural Transformation in (1-x)Bi(M_{1/2}M_{1/2})O_3-xPbTiO_3 Piezoceramics
Rishikesh Pandey and Rajeev Ranjan

ONR's Research Program on Acoustic Transduction Materials and Devices
Harold Robinson, W.A. Smith, C. Wu

A Hybrid Boundary Element Method for the Simulation of Acoustic Cross-talk in Large Piezoelectric Micromachined Ultrasonic Transducer Arrays in Immersion
Bernard Shieh, K.G. Sabra, and F.L. Degertekin

Effect of Heat Treatment on Impedance Spectra of Na_{0.5}Bi_{0.5}TiO_3 Single Crystal

Relaxor to Ferroelectric Phase Transition in 0.83PbMg_{1/3}Nb_{2/3}O_3-0.17PbTiO_3 Single Crystal
Šarunas Svirskas, J. Banys and S. Kojima

Piezo1D 1.0
Ron Tasker

A New Interface Technique for Vibration-based Energy Harvesting using Synchronous Switch and Intermediate Capacitor
Hongtao Wang and Baoqiang Zhang
### SESSION IV

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<thead>
<tr>
<th>2:00 PM - 3:30 PM</th>
<th>Organic Piezoelectrics, Composites</th>
<th>Light-interaction</th>
<th>L. Eric Cross Memorial</th>
<th>PFM: Role of Interface</th>
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<td><strong>2:00PM</strong></td>
<td><strong>INVITED - (2:00PM - 2:30PM)</strong></td>
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<td><strong>INVITED - (2:00PM - 2:15PM)</strong></td>
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<td>Tuning of The Depolarization Field, Built-In Voltage and Nanodomain Structure in Ferroelectric Thin Films and Superlattices</td>
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<td><strong>INVITED - (2:00PM - 2:30PM)</strong></td>
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<td></td>
<td>Celine Lichtensteiger, S. Fernandez-Pena, C. Weymann, P. Zubko, P. Paruch, and J.-M. Triscone</td>
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</tbody>
</table>
| 2:30PM – 2:45PM | Flexible Lead Free Piezoelectric Composites for Energy Harvesting Applications  
  *Pim Groen*  
  (2:45PM - 3:00PM) Microstructural Tuning of Piezoelectric Particulate-Polymer-Foam Composites  
  *Hamedeh Khanbareh, K. de Boom, S. van der Zwaag and W.A. Groen*  
  (2:45PM - 3:00PM) A Multiferroic on the Brink: Modulation of Ferroelectric, Magnetic, and Optical Response using Strain-induced Transitions in BiFeO₃ films  
  *Daniel Sando, T. Young, Y. Zhou, C. Carrétéro, V. Garcia, S. Fusil, A. Barthélémy, M. Blibis, P. Munroe, and V. Nagarajan*  
  (3:00PM – 3:15PM) PVDF-Ppy Nanofibril Membranes For Peripheral Nerve Lesion Treatments  
  *Liangxi Li and Zhongyang Cheng*  
  (3:00PM – 3:15PM) Self-Assembled Diphenylalanine Microtubes: Emerging Properties And Applications  
  *F. Salehli, S. Kopyl, P. Zelenovskiy, A. Nuraeva, S. Vasilev, A. Esin, V. Shur and Andrei L. Kholkin*  
  (3:00PM – 3:30PM) Effect of Temperature, Humidity and Thickness on Tip Induced Polarization Switching of Single Phase Multiferroic Thin Films  
  *Dhiren K. Pradhan, Rama K. Vasudevan, Evgheni Strelcov, Shalini Kumari, Sergei V. Kalinin, A.K. Pradhan, and Ram S. Katiyar*  
  (3:00PM – 3:30PM) Interface Dependent Domain Growth and Charge Transport Control in Lithium Niobate  
  *Sabine M. Neumayer*  
  (3:00PM – 3:30PM) Ultrafast Switching in Avalanche-driven Ferroelectrics by Supersonic Kink Movements  
  *Ekhard K.H. Salje, X. Wang, X. Ding, and J.F. Scott*  
  (3:00PM – 3:15PM) Cross-Fertilization: Electrostriction, Devonshire and High Temperature Transducers  
  *Andrew J. Bell*  
  (3:30 PM - 4:00 PM) Refreshment Break |
<table>
<thead>
<tr>
<th>Time</th>
<th>Processing Optimization</th>
<th>Local Order and Defects in Lead-free</th>
<th>L. Eric Cross Memorial</th>
<th>PFM: Switching Dynamics</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:00 PM</td>
<td>(4:00PM – 4:15PM) Control of PbO Loss during Sintering of PZT: Laboratory vs Industry</td>
<td>Compositional Dependence of Disorder in Na$<em>{0.5}$Bi$</em>{0.5}$TiO$_3$-x%BaTiO$_3$</td>
<td>INVITED - (4:00PM – 4:30PM) What is so Interesting about Antiferroelectrics: A Walk In Lesser-Known Footsteps of Prof. Eric Cross</td>
<td>INVITED - (4:00PM – 4:30PM) Controlling Emergent Structures and Properties in Epitaxial Ferroelectric Films</td>
</tr>
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<td>4:15 PM</td>
<td>elease and Transfer of Thin-Film Pb(Zr$<em>{0.52}$Ti$</em>{0.48}$)O$_3$ onto Thin Polyimide Substrate</td>
<td>Structural Disorder of Bi$<em>{0.3}$K$</em>{0.7}$TiO$_3$ Studied By Total Scattering and DFT</td>
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<td>Mesoscale Correlative Electro-Chemo-Mechanical Response in Ferroelectric Solid Solutions</td>
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<tr>
<td>4:30 PM - 4:45 PM</td>
<td>Inkjet Printing of LaNiO$_3$ Electrodes for Ferroelectric Applications</td>
<td>Local Structure of (1-x)Na$<em>{0.5}$Bi$</em>{0.5}$TiO$_3$ - xBaTiO$_3$, Relaxor Ferroelectrics as Function of Temperature</td>
<td>Recent Advances in Materials for Piezoelectric Transducers</td>
<td>Nanoscale Piezoelectric Response and Domain Relaxation of (K,Na)NbO$_3$-Based Lead-Free Perovskite with Abnormal Grain Growth</td>
</tr>
<tr>
<td>4:45 PM</td>
<td>Optimizing Lead Content in a Low Temperature Solution Processed PZT Film</td>
<td>Use of Bayesian Inference in Characterization of Ceramic Materials: An Introduction and Applications in Ferroelectrics</td>
<td>INVITED - (4:45PM – 5:15PM) Journey of a Life-time Down Ferroelectrics-Road with Professor Cross</td>
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<td>Time</td>
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<td>5:00PM - 5:15PM</td>
<td>A Proposal of New Buffer Layer for Depositing (110)-oriented Perovskite Thin Films on (111)Pt/SiO₂/Si Substrates</td>
<td>Kiyoshi Uchiyama, T. Sato, A. Akama, T. Kiguchi, T. J. Konno, N. Oshima, D. Ichinose, and H. Funakubo</td>
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<td>5:15PM - 5:30PM</td>
<td>Electrical Fatigue Behavior of Li,Sb and Ta doped KNN Ceramics</td>
<td>Orapim Namsar, Chunmanus Uthaisar, and Soodkhet Pojprapai</td>
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<td>Elution of Lead from PZT to Acid Rain</td>
<td>Takaaki Tsurumi, B.S. Takezawa, T. Hoshina, and H. Takeda</td>
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<td>Size-effects in layered ferrielectric CuInP₂S₆</td>
<td>Petro Maksymovych, Marius Chyasnavichyus, Michael A. Susner, and Michael A. McGuire</td>
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**Wednesday, May 10, 2017**

<table>
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<tr>
<th>Time</th>
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| 8:00 AM - 9:00 AM | **Plenary Session III**  
Student Center Ballroom  
Session Chair: Prof. Marty Gregg  
Title of Abstract: *Seeking Simple Truth in Complex Materials: Wrestling with Ferroelectrics* |
| 9:00 AM - 10:00 AM | **Plenary Session IV**  
Student Center Ballroom  
Session Chair: Dr. Scott Smith  
Title of Abstract: *Medical Ultrasound Transducers: Piezoelectrics at Work* |
| 10:00 AM - 10:30 AM | Refreshment Break                                                               |
| 10:30 AM - 12:00 PM | **SESSION VI**  
| **Lead-Free Piezoelectrics** | **Domains and Domain Walls** | **Thermal and Dynamic Behaviors of PZT** | **Energy Harvesting** |
| **Session Chair:** | **Session Chair:** | **Session Chair:** | **Session Chair:** |
| 10:30AM       | INVITED - (10:30AM - 10:45AM)  
Processing of Lead-free Piezoelectrics  
Mari-Ann Einarsrud | (10:30AM - 10:45AM)  
Domain And Domain Wall Imaging With Low Energy Electrons  
Temperature Dependence of Field-responsive Mechanisms in Lead Zirconate Titanate Investigated Using Laboratory X-ray Diffraction  
| 10:45AM - 11:00AM | (10:30AM - 11:15AM)  
A New Technique Based on Current Measurement For Nanoscale Ferroelectricity Assessment: Nano-positive Up Negative Down  
S. Martin, D. Albertini, N. Baboux, and Brice Gautier | Domain Reorientation and Extrinsic Scaling Effects in Polycrystalline, {001} Textured PbZr0.3Ti0.7O3 Thin Films  
| 11:00AM - 11:15AM | Dielectric Properties for Ba(Zr0.2Ti0.8)O3-(Ba0.7Ca0.3)TiO3 Ceramics  
Jon F. Ihlefeld, Joseph R. Michael, Bonnie B. McKenzie, David A. Scrymgeour, Jon-Paul Maria, Andrew Kitahara, and Elizabeth A. Paisley | Thermal Conductivity of Lead Zirconate Titanate across the Phase Diagram  
Brian M. Foley, E.A. Paisley, J.F. Ihlefeld and P.E. Hopkins |
|                |                                                                 | Optimization of a Novel Transducer Design for a Pavement Embedded Energy Harvesting Application  
Gregory Yesner, A. Jasim, H. Wang, B. Basily, A. Maher, and A. Safari |
<table>
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<tr>
<th>Time</th>
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</table>
| 11:15AM - 11:30AM  | Dielectric and Piezoelectric Properties of Ba\(_{1-x}\)Ca\(_x\)Ti\(_1-y\)Zr\(_y\)O\(_3\) Thin Films  
C.J.M. Daumont, Q. Simon, S. Payan, P. Gardes, P. Poveda, B. Negulescu, M. Maglione, and Jerome Wolfman |
| 11:30AM             | Observation, Injection and Controlled Motion of Conducting Domain Walls in Improper Ferroelectric Cu-Cl Boracite  
Raymond G. P. McQuaid, Michael P. Campbell, Roger W. Whatmore, J. Marty Gregg, and Amit Kumar |
| 11:45AM - 12:00PM   | Characterization of Domain wall Dynamics in PbZr\(_{1-x}\)Ti\(_x\)O\(_3\) Using X-Ray Photon Correlation Spectroscopy  
Samir Gorfman, A. Bokov, M. Reiser, N. Zhang, Z.-G. Ye, A. Zozulya, and C. Gutt |
| 12:00 PM - 2:00 PM  | Linking Pyroelectric Energy Conversion Theory to Practice  
Brian Hanrahan, Y. Espinal, A. Smith, H. Khassaf, R. Polcawich, and S. Pamir Alpay |
| 11:30AM - 11:45AM   | Cu Co-fired (Na, K)NbO\(_3\) Multilayer Structure toward Piezoelectric Applications  
Lisheng Gao, Hanzheng Guo, Eberhard Hennig, Shujun Zhang, and Clive A. Randall |
| 11:45AM - 12:00PM   | Local Writing and Characterization of Individual Charged Conducting Domain Walls in y-cut LiNbO\(_3\) (MgO 5% mol) Single Crystals  
James McConville, M.P. Campbell, A. Kumar, and J.M. Gregg |
| 12:00 PM - 2:00 PM  | Large-scale and Flexible Energy Harvester Based on ZnO Conical Nanostructures by Nano-Imprint Lithography and Atomic Layer Deposition  
D. Spirito, E. Defay, K. Menguelti, J. Kreisel, and D. Lenoble |
|                     | Direct Writing of BaTiO\(_3\) Nanocomposites with Tailored Microstructure for Energy Harvesting  
M.H. Malakooti, A. Nafari, F. Jule, and Henry A. Sodano |
|                     | Manipulating the DWC in Bulk LiNbO\(_3\)  
C. Razzaghi, M. Becker, and Elisabeth Soergel |
|                     | Bio-compatible Lead-free Piezoelectric Thin Films for Small-scale Flexible Energy Harvesting and Storage Devices  
Seung-Hyun Kim, M. Kawahara, S.S. Won, T. Shibayama, M. Hochido, I.W. Kim, and A.I. Kingon |

**Lunch Break**

12:00 PM - 2:00 PM

**Women in Engineering**  
Location TBD
<table>
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<tr>
<th>Time</th>
<th>Session Chair</th>
<th>Session VII</th>
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| 2:00 PM  | INVITED - (2:00PM - 2:30PM) | **Multiferroics, BFO Part I**  
   Ferroelectric and Ferromagnetic MPBs of Modified BiFeO$_3$-PbTiO$_3$ Solid Solutions  
   Jinrong Cheng, Jianguo Chen, and Dengren Jin  

| 2:30 PM  | (2:30PM - 2:45PM) | **Ferroelectrics, Reliability**  
   Functional Response of Monolithic and Hetero-Layered Ferroelectric Thin Films  
   Evelyn S. Chin and N. Bassiri-Gharb  

| 2:00PM   | INVITED - (2:00PM - 2:15PM) | **Jan Fousek Memorial**  
   Improving Reliability in Piezoelectric Films  
   Betul Akkopru-Akgun, M.T. Lanagan, and S. Trolier-McKinstry  

| 3:00PM   | INVITED - (3:00PM - 3:15PM) | **Transducers I**  
   EMAT Phased Array Probe for Detecting Surface Cracks  
   Julio Isla and Frederic Cegla  

| 2:30PM   | INVITED - (2:30PM - 3:00PM) | **Domain Wall Mobility in Ferroelectric Films**  
   Tuning Domain Wall Thickness in Non-magnetic Ferroics  
   Alexander K. Tagantsev  

| 2:45PM   | INVITED - (2:30PM - 3:00PM) | **Piezoelectric Sensors and Transducers for Advancing Structural Health Monitoring Technologies**  
   Kui Yao, Shuting Chen, Szu Cheng Lai, Lei Zhang, Chin Yaw Tan, and Yifan Chen  

| 3:00PM   | INVITED - (3:00PM - 3:15PM) | **Dielectric Failure in Nb-doped [001] Textured Lead Zirconate Titanate Films**  
   Wanlin Zhu, T. Borman, K. DeCesaris, S.W. Ko, P. Mardilovich, and S. Trolier-McKinstry  

| 2:00PM   | (2:00PM - 2:15PM) | **Partial Discharge Characteristics of Ferroelectric Ceramics**  
   T. Hang, Julia Glaum, Yuri Genenko, T. Phung, and M. Hoffman  

| 3:00PM   | (3:00PM - 3:15PM) | **Role of Domain Patterns in Ferroelectrics: From Basic Ideas to Phase-Field Simulations**  
   Pavel Mokry  

| 2:15PM   | (2:30PM - 2:45PM) | **Principle and Performance of a Novel Soft Material Loudspeaker**  
   Kun Jia, Kai Wang, and Yicheng Zhang  

| 3:00PM   | (3:00PM - 3:15PM) | **A Performance Study of Various Piezoelectric Crystals Based Through Wall Data Communication Systems at Elevated Temperature**  
   Suresh Kaluvan and Haifeng Zhang  

| 2:15PM   | INVITED - (2:30PM - 3:00PM) | **New Route to Design Vertically Aligned Multiferroic Nanocomposites**  
   Sergey Basov, C. Elissalde, and L. Piraux  

| 3:00PM   | INVITED - (2:00PM - 2:30PM) | **Magnetic Ion Partitioning in Multiferroic Aurivillius Bismuth Iron Manganese Titanate**  
   L. Keeney, A. Faraz, M. Schmidt, C. Downing, V. Nicolisi, M.E. Pemble, and Roger W. Whatmore  

| 2:45PM   | INVITED - (2:30PM - 3:00PM) | **Fabrication and Characterization of Nanoimprinted Organic-Inorganic Multiferroic Nanocomposites**  
   Pedro Sa, Bernard Nysten, Luc Piraux, and Alain M. Jonas  

| 3:00PM   | INVITED - (3:00PM - 3:15PM) | **Improving Reliability in Piezoelectric Films**  
   Betul Akkopru-Akgun, M.T. Lanagan, and S. Trolier-McKinstry  

| 2:00PM   | (2:00PM - 2:15PM) | **Domain Wall Mobility in Ferroelectric Films**  
   Susan Trolier-McKinstry  

| 3:00PM   | (3:00PM - 3:15PM) | **Role of Domain Patterns in Ferroelectrics: From Basic Ideas to Phase-Field Simulations**  
   Pavel Mokry  

| 2:00PM   | (2:00PM - 2:15PM) | **EMAT Phased Array Probe for Detecting Surface Cracks**  
   Julio Isla and Frederic Cegla  

| 3:00PM   | (3:00PM - 3:15PM) | **A Performance Study of Various Piezoelectric Crystals Based Through Wall Data Communication Systems at Elevated Temperature**  
   Suresh Kaluvan and Haifeng Zhang  

| 2:45PM   | INVITED - (2:30PM - 3:00PM) | **Investigation of (non) polar Crystallographic Structures of (un) doped HfO$_2$: Bulk Ceramics and Nanoparticles**  

| 3:00PM   | INVITED - (3:00PM - 3:15PM) | **Piezoelectric Sensors and Transducers for Advancing Structural Health Monitoring Technologies**  
   Kui Yao, Shuting Chen, Szu Cheng Lai, Lei Zhang, Chin Yaw Tan, and Yifan Chen  

| 2:15PM   | INVITED - (2:30PM - 3:00PM) | **Principle and Performance of a Novel Soft Material Loudspeaker**  
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| 3:00PM   | INVITED - (3:00PM - 3:15PM) | **A Performance Study of Various Piezoelectric Crystals Based Through Wall Data Communication Systems at Elevated Temperature**  
   Suresh Kaluvan and Haifeng Zhang
### Photovoltaic Enhancement Accompanied by Polar-instability: BiFeO$_3$ vs MAPbI$_3$

Junling Wang and Andrew M. Rappe

### Advances in Piezoelectric Thin Film Characterization and Reliability Testing

Thorsten Schmitz-Kempen,
S. Tiedke, R. Kessels, P. Mardilovich, T. Ebefors, and S. Troller-McKinstry

### Fabrication and Acoustic Characterization of BNT-Based Ultrasonic Therapeutic Transducer

Elaheh Taghaddos, T. Ma, Q. Zhou, H. Zhang, M. X. Wan, and A. Safari

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### Refreshment Break

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### SESSION VIII

<table>
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<tr>
<td>Multiferroics, BFO Part II</td>
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<td><strong>Session Chair:</strong></td>
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</table>
| 4:00 PM | (4:00PM - 4:15PM) Deterministic Control over Symmetry States in Mixed Phase BiFeO$_3$
Clive Randall | (4:00PM - 4:15PM) End-Fire Ring Driven Flextensional Transducer
Alex L. Butler and John L. Butler |
| 4:15 PM - 4:30 PM | Point Defects in (001)-strained BiFeO$_3$
Lu Xia and Sverre M. Selbach | Ferroionic States: Coupling Between Surface Electrochemical and Bulk Ferroelectric Functionalities on the Nanoscale
Sergei V. Kalinin, Ye Cao, Evgenii Eliseev, and Anna N. Morozovska | Mechanical Pre-Stressing a Transducer through a Negative DC Bias Field
Stephen C. Butler |
| 4:30 PM | (4:30PM - 4:45PM) Ferromagnetism in BiFe$_{x}$CoO$_{3}$ Thin Films and the Correlation Between Ferroelectric and Ferromagnetic Domains
Hajime Hojo, R. Kawabe, K. Shimizu, H. Yamamoto, K. Mibu, and M. Azuma | (4:30PM - 4:45PM) Probing the Role of Surface Water in Ferroelectric Domain Charge Dynamics
Pavel Marton, P. Ondrejovic, V. Stepkova, A. Klič, I. Rychetský, and J. Hlinka |
| | | | (4:30PM - 4:45PM) Temperature and Stress-dependent Single Crystal Properties for High Power SONAR Applications
Raphaël Lardat, Thomas Leissing, and Thomas Pasteuraud |
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| 4:45PM - 5:00PM | Magnetoelectric Heterostructures With Vinylidene Fluoride Oligomers  
Shireen Adenwalla, K. Foreman,  
E. Echeverria, M. A. Koten,  
R. M. Lindsay, N. Hong, J. Shields,  
S. Poddar, A. Workman, S. Callori, and Stephen Ducharme |
| 4:45PM - 5:00PM | In Situ TEM Study of Charge Compensation in Ferroelectric Thin Films  
Myung-Geun Han, Joseph Garlow,  
Matthew S. J. Marshall,  
Frederick J. Walker, Charles H. Ahn, and Yimei Zhu |
| 4:45PM - 5:15PM | Tuning Light-induced Polarization Screening of Ferroelectric Materials by Water  
Fanmao Liu, I. Fina, F. Sánchez, and J. Fontcuberta |
| 4:45PM - 5:15PM | Band Structure Tuning Through Combinatorial Interface  
Chemical Modulation  
Antoine Ruyter, J. Wolfman,  
B. Negulescu, P. Andreazza,  
C. Autret, and J. Sakai |
| 5:00PM - 5:15PM | Tuning Light-induced Polarization Screening of Ferroelectric Materials by Water  
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Fanmao Liu, I. Fina, F. Sánchez, and J. Fontcuberta |
| 5:00PM - 5:30PM | Tuning Light-induced Polarization Screening of Ferroelectric Materials by Water  
Fanmao Liu, I. Fina, F. Sánchez, and J. Fontcuberta |
| 6:00 PM - 10:00 PM | Banquet Dinner  
Student Center Ballroom |
Thursday, May 11, 2017

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<tr>
<th>Time</th>
<th>Session</th>
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| 8:30 AM - 9:30 AM | Plenary Session V  
Student Center Ballroom  
Session Chair: Prof. Haosu Luo  
Title of Abstract: *Investigation of Relaxor-PT Single Crystals for Device Applications* |
| 9:30 AM - 10:00 AM | Refreshment Break |
| 10:00 AM - 12:00 PM | SESSION XI  
**Superlattices, Films**  
Session Chair:  
*INVITED* - (10:00AM - 10:30AM) Domain Engineering in Ferroelectric Tricolor Superlattices Probed by X-ray diffraction  
Nathalie Lemée, A. Boulle, I. C. Infante, C. Hubault, N. Blanc, N. Boudet, V. Demange, and M. G. Karkut  
*INVITED* - (10:00AM - 10:30AM) Understanding Polarization Asymmetry and Precise Tuning of the Built-In bias in PbTiO₃ Based Superlattice Thin Films  
Hsiang C. Hsing, Simon Divilov, Joe Garlow, Mohammed H. Yusuf, John Bonini, Joe Bennett, Yimen Zhu, Premala Chandra, Karin M. Rabe, Xu Du, Maria V. Fernandez Serra, and Matthew Dawber |
| 10:15 AM - 10:30 AM |  
*INVITED* - (10:00AM - 10:30AM) Atomic-Scale Structural and Chemical Analysis of Domain Walls in Bismuth Ferrite  
*INVITED* - (10:00AM - 10:30AM) The Moiré Effect in the Scanning Transmission Electron Microscope: High Precision Structural Analysis Over Large Fields of View  
Aaron B. Naden, K.J. O’Shea, T. Vrejoiu, A. Herpers, R. Dittmann, and D.A. MacLaren |
| 10:30 AM - 11:00 AM |  
*INVITED* - (10:30AM - 11:00AM) Self-Assembled Monolayer-Assisted Inkjet Printing of PZT Films on Platinized Silicon  
Nicolas Godard, D. Sette, S. Glinsek, and E. Defay  
*INVITED* - (10:30AM - 11:00AM) Analyzing Pressure Dependence of a Low-Temperature Solution-Processed PZT Actuator  
Reijiro Shimura, P. T. Tue, T. Shimoda, and Y. Takamura |

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**BFO: Structure and Properties**  
Session Chair:  
(10:00AM - 10:15AM) Self-Assembled Monolayer-Assisted Inkjet Printing of PZT Films on Platinized Silicon  
Nicolas Godard, D. Sette, S. Glinsek, and E. Defay  
(10:00AM - 10:15AM) Piezoelectric Single Crystal Standard  
Lynn M. Ewart and Zuo-Guang Ye

**Processing and Characterization**  
Session Chair:  
(10:00AM - 10:15AM) Self-Assembled Monolayer-Assisted Inkjet Printing of PZT Films on Platinized Silicon  
Nicolas Godard, D. Sette, S. Glinsek, and E. Defay  
(10:30AM - 10:45AM) Analyzing Pressure Dependence of a Low-Temperature Solution-Processed PZT Actuator  
Reijiro Shimura, P. T. Tue, T. Shimoda, and Y. Takamura

**Single Crystals I**  
Session Chair:  
(10:00AM - 10:15AM) Self-Assembled Monolayer-Assisted Inkjet Printing of PZT Films on Platinized Silicon  
Nicolas Godard, D. Sette, S. Glinsek, and E. Defay  
(10:00AM - 10:15AM) Piezoelectric Single Crystal Standard  
Lynn M. Ewart and Zuo-Guang Ye  
(10:30AM - 10:45AM) Analyzing Pressure Dependence of a Low-Temperature Solution-Processed PZT Actuator  
Reijiro Shimura, P. T. Tue, T. Shimoda, and Y. Takamura

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**SESSION XI**
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<td>10:45AM - 11:00AM</td>
<td>Nanoscale Bubble Domains in Ultrathin Ferroelectric Films</td>
<td>Qi Zhang, Lin Xie, Guangqiang Liu, Sergei Prokhorenko, Yousra Nahas, Xiaojing Pan, Laurent Bellaiche, Alexei Gruverman, and Nagarajan Valanoor</td>
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<td>11:00AM - 11:15AM</td>
<td>Nanoscale Origins of Ferroelastic Domain Wall Mobility in Ferroelectric Multilayers</td>
<td>Nagarajan Valanoor, Hsin-Hui Huang, Zhijian Hong, Hualin L. Lin, Dong Su, Long-Qing Chen, Guanzhong Huang, and Paul R. Munroe</td>
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<td>Controlled Functionalization of Poly(4-methyl-1-pentene) Films for High Energy Storage</td>
<td>Guan Wang, M. Zhang, Z Xu, and L. Zhang</td>
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<td>The Impact of Local Structure on Macroscopic Properties of ABO$_3$ Perovskite Relaxor</td>
<td>Shujun Zhang, Fei Li, Long-Qing Chen, and Thomas R. Shrout</td>
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<td>Probing the Switching Behaviour of PMN-PT Below Room Temperature</td>
<td>Philippa M. Shepley, L.A. Stoica, and A.J. Bell</td>
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<td>1:30 PM</td>
<td>INVITED (1:30PM - 2:00PM) Nanoscale Polarization in Molecular Ferroelectrics</td>
<td>INVITED (1:30PM - 2:00PM) Influence of Compressive Stress on the Piezoelectric and Dielectric Behavior of Lead-Free Ferroelectrics: Shifting Phase Boundaries</td>
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<td>1:30 - 1:45PM</td>
<td>Mechanisms of Thermal Depolarization in Lead-Free Relaxor/Semiconductor Composites Lallitha, P. Groszewicz, and J. Koruza</td>
<td>The MPB of BNT-xBT from the Titanium NMR Point of View</td>
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<td>1:45 - 2:00PM</td>
<td>Lallitha, P. Groszewicz, and J. Koruza</td>
<td>W. Jo, Jürgen Rödel, and Gerd Bunktowski</td>
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<td>2:00 - 2:15PM</td>
<td>R. Khachataryan, J. Wehner, and Yuri A. Genenka</td>
<td>Electromechanical Hardening In Lead-Free Relaxor Composites</td>
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<td>2:30 - 2:45PM</td>
<td>Zuo-Guang Ye, Zenghui Liu, Alisa Paterson, Hua Wu, and Wei Ren</td>
<td>Quenching Effects for Electrical Properties on Lead-free (Bi\textsubscript{12}Na\textsubscript{3}O\textsubscript{7})\textsubscript{2}TiO\textsubscript{3} and Related Solid Solution Ceramics</td>
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| 2:45PM - 3:00PM | Quantitative Modeling of High-Response Piezoelectricity Near a Phase Boundary  
Dennis M. Newns, M. Kuroda, F. Cipcigan, J. Crane, and G.J. Martyna |
| 3:00PM - 3:15PM | Influence of Additives on Ferroelectric Properties Of NBT-Based Ceramics  
| 3:15PM - 3:30PM | Solid State Cooling Device Based on Electrocaloric Ceramic Multilayers  
Tian Zhang, Xiaoshi Qian, Haoming Gu, and Q. M. Zhang |
| 3:30PM - 3:45PM | In-situ Exploration of the Correlation Between Domain Evolution and First-order Phase Transition in (K, Na)NbO$_3$ Based Single Crystal  
Anyang Cui, Guisheng Xu, Zhigao Hu, and Junhao Chu |
| 3:45PM - 4:00PM | In-situ Exploration of the Correlation Between Domain Evolution and First-order Phase Transition in (K, Na)NbO$_3$ Based Single Crystal  
Anyang Cui, Guisheng Xu, Zhigao Hu, and Junhao Chu |

**Refreshment Break**

| 4:00PM - 4:30 PM | **Quantitative Modeling of High-Response Piezoelectricity Near a Phase Boundary**  
Dennis M. Newns, M. Kuroda, F. Cipcigan, J. Crane, and G.J. Martyna |
| 3:00PM - 3:15PM | **Influence of Additives on Ferroelectric Properties Of NBT-Based Ceramics**  
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Anyang Cui, Guisheng Xu, Zhigao Hu, and Junhao Chu |
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| 4:30 PM - 5:30 PM | **Plenary Session VI**  
Student Center Ballroom  
**Session Chair:** Prof. Paul Mura  
**Title of Abstract:** Pushing the Performance of Electro-mechanical Thin Films |
| 5:30 PM - 6:00 PM | **Conference Closing**                                                          |