2017 Joint IEEE ISAF - IWATMD - PFM

26th International Symposium on Applications of Ferroelectrics (ISAF)
International Workshop on Acoustic Transduction Materials and Devices (IWATMD)
Piezoresponse Force Microscopy and Polar Phenomena at the Nanoscale Workshop (PFM)

May 7 – 11, 2017

Georgia Institute of Technology
Atlanta, Georgia 30332 USA

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Dear friends and colleagues,

Welcome to the 2017 Joint IEEE International Symposium on Applications of Ferroelectrics, International Workshop on Acoustic Transduction Materials and Devices, and the Piezoresponse Force Microscopy and Polar Phenomena at the Nanoscale Workshop.

The technical content of the conference is densely packed with over three hundred submissions to be presented over the four-day long program, and the Technical Program Chairs and committees have done an outstanding job of pulling together a wide range of representatives of academic institutions, national laboratories and industrial research to highlight some of the most interesting advances in the field of ferroelectrics, multiferroics, piezoelectric and dielectric materials – from fundamental science, to processing, characterization and applications. We have sessions highlighting specialty approaches by piezoresponse force microscopy in characterization of the materials at the nanoscale, as well as single crystals for use in acoustic transducer materials. I would also like to draw your attention to the memorial sessions to honor the contributions and lives of two great scientists, Profs. L.E. Cross and Jan Fousek, which will span over the Tuesday and Wednesday afternoons.

In general, we have seen a very large student component (~25% of the participants), and representation from well over 100 different institutions, indicating a healthy and growing field. Thus, as part of the ongoing effort to prepare the future through student involvement, we are holding the traditional student poster competition – this year with ~30 posters of excellent technical content selected as finalists to be presented at the Poster Session on Monday, as well as at select technical oral sessions.

However, our community has felt strongly the challenges caused by the U.S.A.'s political climate and especially the two Executive Orders on immigration and travel bans, issued at the beginning of the year. A number of the registered presenters have been affected by the Travel Bans, even if both Executive Orders have been suspended by State and Federal Courts. At the time of the writing of this letter, it is still unclear how many of them will ultimately be prevented from attending the Conference in person. Therefore, I want to personally thank each and all of you that did decide to participate and not divide the community on a political basis. I deeply believe that we are stronger together, not divided. As many of you are aware, I am Iranian, English and American. I consider myself also, at least in part, Italian and French by acquisition. I do not believe that science or life should be limited by barriers and country lines. I believe in thriving by collaborating, by extending a hand and working together. I hope that you will take the opportunity at this Conference to discuss not only science and technology with people that you already know, but also meet new colleagues, start new collaborations and help bring our community closer together. The Monday Night Brewing Student Social on Monday, the WIE luncheon on Wednesday, Welcome Reception on Sunday evening and the Wednesday night's reception and Banquet should all offer many chances to accomplish that.

Lastly, I would like to take the opportunity to thank a few people for their special contributions, in particular the Technical Program Chairs, Prof. Susan Trolier-McKinstry, Prof. Barbara Malic, Prof. Brahim Dkhil, Dr. Nina Balke and Prof. Patrycja Paruch, representing IWATMD, ISAF and PFM, respectively, to whom goes the merit for the great technical content. I would also like to acknowledge the help of the organizing committee – both local and international, as without them the organization of this conference would not have been possible.

Wishing all of us a very fruitful meeting,
Nazanin Bassiri-Gharb, General Chair

Plenary Speakers

Monday, May 8, 8h30	–	Prof. Clive A. Randall
Tuesday, May 9, 8h30	–	Prof. Elizabeth C. Dickey
Wednesday, May 10, 8h00	–	Prof. Marty Gregg
Wednesday, May 10, 9h00	–	Dr. Scott Smith
Thursday, May 11, 8h30	–	Prof. Haosu Luo
Thursday, May 11, 16h30	–	Prof. Paul Muralt

Prof. Clive A Randall, The Pennsylvania State University, USA
Cold Sintering--Rethinking What We Thought We Knew in Electroceramics

For over 30,000 years, the general practice of sintering ceramics has involved a high temperature thermal treatment to drive the transport processes to densify the particles and minimize the surface energy of the material. Typical sintering temperatures consider 0.6 to 0.8 of the melting temperature (T_m) for many oxides; this means we sinter around 800 ^oC to 1200 ^oC for 2 to 10 hours. Here we introduce a broad body of systems that utilize a transient aqueous based liquid phase (1 to 10 wt%) that sinters under a uniaxial pressure, while being heated from room temperature to 250 ^OC, over a time period of 10 to 60 minutes.

Given the massive drop in sintering temperature of the ceramic, this offers many new opportunities in material design, especially in composites. We will show three different types of polymer ceramic composites with high percentages of ceramic, 100% to 60%, with the thermoplastic polymers for dielectric applications, ionic electrolytes, and semiconducting composites. We will give insights into the mechanisms that control the Cold Sintering process. It will be shown that multilayer structures and printable electronics are all possible with this technique. We will consider the impact in the ferroelectrics and transducer fields. Furthermore, these manufacturing approaches and routes will be discussed.

Prof. Elizabeth C. Dickey, North Carolina State University, USA
Lattice Defects in Ferroelectric Oxides and Their Interactions with Electric Fields

Lattice point defects in electroceramics dominate the overall electrical properties of the material, and thus great effort is expended on controlling the point defect equilibria via oxygen activity control during processing and/or doping. In device applications, because the lattice defects are typically charged, the applied electric field provides a strong driving force for defect migration. When the electrodes are impermeable to mass transport, the spatio-temporal redistribution of defects can cause time-dependent increases in the leakage current in many electroceramic devices. While this leakage current enhancement is detrimental in devices such as capacitors, the phenomenon of lattice defect migration can be utilized to form novel functional behaviors such as resistive switching in metal-oxides.

Our research into this phenomenon combines electrical transport measurements with electron microscopy analyses to understand the mesoscopic redistribution of point defects as a function of temperature, electric field and time. In systems for which electronic transport is limited by injection at the electrode, we find that the accumulation of the charged defects can modulate the Schottky barrier at the electrodes. At high electrical potentials, the non-stoichiometry in the near-electrode regions can become very large, inducing defect clustering and ordering. The implications of this defect redistribution process and its reversibility are discussed within the context the overall electrical transport characteristics.

Prof. Marty Gregg, Queen's University Belfast, Ireland
Seeking Simple Truth in Complex Materials: Wrestling with Ferroelectrics

It is not trivial to perform experiments which reveal fundamental aspects of materials' behavior. This is particularly true in nanoscale ferroelectrics, as defect and strain free samples, of quality comparable to those used for semiconductor research for example, are not readily available; yet, the measured properties and behavior of ferroelectrics are often dramatically altered by the presence of defect states. The inevitable result is that physics, due predominantly to defect behavior, can easily be misinterpreted as fundamental to the ferroelectric itself (nicely illustrated in JF Scott's now infamous "Banana" paper.

This talk will attempt to give an overview of two decades of research, performed mostly by the Queen's University Belfast ferroelectrics research team and its collaborators, in which initial frustrations with sample quality drove an alternative fabrication approach, where thin films and nanostructures were made by Focused Ion Beam (FIB) patterning of high purity single crystal bulk material. Studying these new kinds of samples has allowed a number of relatively clean insights into nanoscale ferroelectric properties: statements on the existence and nature of dielectric "dead-layers" in ferroelectric thin film capacitor structures have been possible; flux-closure domains have been observed in simple and complex arrangements which preempted the discovery of genuine dipole vortices; room-temperature magnetoelectric multiferroic effects in single phase-single crystal nanosheets have been seen, as have intriguing properties of "superdomains". Novel methods to control switching and domain wall motion have also been developed in these FIB-machined samples.

Having spent so much effort to remove the influence of defects by examining only nanoscale high purity single crystals, it is somewhat ironic that the most recent research performed in Belfast concerns conducting domain walls in bulk ferroelectrics, where the existence of defects is extremely important for both maximizing wall conductivity and allowing the creation of domain wall electronic devices. Poetic justice will hence ensure that future research will involve the controlled introduction, rather than attempted removal, of defect states.

Dr. Scott Smith, GE Global Research, USA
Medical Ultrasound Transducers: Piezoelectrics at Work

Ultrasound is the most widely used medical imaging modality worldwide because it is safe, fast, portable, and inexpensive. The global market is currently over $5 billion annually and continues to grow faster than GDP. Imagers can be divided into three main parts, the transducer probe, an electronic processing unit, and the display. Piezoelectrics are the key component of the probe where they generate and detect ultrasonic waves. The rest of the imager is electronics controlled by software. With the dramatic miniaturization of electronics over the last half century the rest of the imager has become largely a computer and software. Hence, advances in piezoelectric materials and designs that fully exploit piezo- electric properties have been, and in the future are expected to be, essential for progress.

This overview presentation will describe the main requirements for various medical diagnoses: penetration, resolution, contrast, frame rate, and field of view, and will show how these change for different medical exams. For example, transducers for a cardiac stress test, a 2nd trimester fetal exam, and a peripheral vascular exam will all have different shapes and sizes. An exploration of the physics behind these requirements will enable a better understanding of the various structures. Transducer design tools, materials, and fabrication will be briefly described. Throughout the focus will be on the role of piezoelectric properties and how they impact clinical practice. After approximately half a century of dominance by PZT piezoceramic materials, single crystal materials, both the binaries and ternaries, are starting to find their way into medical products. are beginning to show membrane based transducers operating either piezoelectrically or electrostatically. A wide range of ultrasound images and videos will illustrate the rich variety of the technology, some extensions to non-imaging applications like drug delivery and therapy, and suggest some of the opportunities for further progress.

Prof. Haosu Luo, Chinese Academy of Sciences, China
Investigation of Relaxor-PT Single Crystals for Device Applications

Several large size and high quality of relaxor-PT single crystals (PMN-PT, PIN-PMN-PT etc.) have been successfully grown by the Bridgman techniques in SICCAS since 1997. These relaxor-PT single crystals exhibit not only extra high piezoelectric performances, but also excellent opto-electric and pyroelectric performances. From our experiences on various device applications, these relaxor-PT single crystals still need to improve some their performances to meet the requirements in different device applications.
For an example, PMN-PT crystals are now commercially utilized in medical ultrasonic transducers in many companies. However, they still need to increase Curie temperature to enhance applied electric field and temperature stability for the transducer applications, to exceed convectional PZT transducers not only in bandwidth and sensitivity but also stability in working duration. PIN-PMN-PT crystals are new good candidates for the next generation of ultrasonic transducer applications.
For sensor applications, Mn-doped relaxor-PT crystals have been improved to reduce noise and increase signal-to-noise ratio for their low dielectric loss. Dipole defect $(Mn_{Ti}^{2+})'' - V_o^{\bullet\bullet}$ were found in in Mn-doped PMN-PT and PIMN-PMN-PT single crystals, where Mn^{2+} is in the B-site of perovskite ABO_3. The dipole defects pin the domain movements and reduce DC conductivity, resulted to lower dielectric loss and higher coercive field Ec.
By using our relaxor-PT crystals, several high performances of devices have been fabricated. The medical transducer shows 96% bandwidth at the insertion loss of 6dB, and loop sensitivity -70.39dB in 2.7MHz single crystal phase array transducer, higher than 78% bandwidth and -71.16dB loop sensitivity in PZT transducer. The special detectivity reaches at 3.01×10^9 cmHz$^{1/2}$/W@4Hz and 2.21×109 cmHz$^{1/2}$/W@10 Hz in the charge mode of single element of Mn: PMN-PT infrared detector, 4-6 times higher than conventional LiTaO3 infrared detectors. The magnetic anomaly sensors were fabricated by ME laminated composites, and the detectivity reaches at 5pT/Hz$^{1/2}$@1Hz, 1pT/Hz$^{1/2}$@10Hz, 0.1pT/Hz$^{1/2}$@1kHz and 10 fT/Hz$^{1/2}$@EMR.

Prof. Paul Muralt, Ecole Polytechnique Fédérale de Lausanne, Switzerland
Pushing the Performance of Electro-mechanical Thin Films

Today we are witnessing the advent of the 4th industrial revolution, and are heading towards a largely robotized world. Digital electronics is clearly the enabling technology for establishing the required intelligent machines, however, a lot of analogue electro-mechanical devices are required to add abilities for sensing, actuation, communication, fabrication, and man-machine and environment-machine interfaces. Piezoelectricity plays an important role in any electro-mechanical conversion and is used today in about 100 applications, including for instance ultrasonic imaging and mobile phone communication. The increasing importance of miniaturized devices results in a demand for piezoelectric thin films, which serve as integrated materials in micro and nano devices.
This talk will first introduce the phenomena of piezoelectricity and electrostriction in crystalline matter, and shortly mention their MEMS applications. Whereas the strongest piezoelectric effects are realized in ferroelectric phases of perovskite oxides such as $Pb(Zr,Ti)O_3$ (PZT), wurtzite thin films like aluminum nitride (AlN) are superior at GHz frequency applications because of their higher mechanical quality factors, and their extremely well reproducible and stable properties. AlN is the most preferred thin film material today to realize RF filters for mobile telecommunication working at 2 GHz and above. The most recent innovation in this thin film material is a solid solution with scandium nitride to obtain much larger piezoelectric coefficients. In this case, increasing efforts are made to find out about maximal achievable piezoelectric coefficients, quality factors, and process reproducibility. An interesting competition for property determination is observed between density functional theory and experiment. AlScN will fill a gap between AlN and PZT, and looks interesting for energy harvesting. For actuators, however, PZT or related materials in thin films form will remain the champions in force per voltage figures. An astonishingly high piezoelectric stress of 600 MPa can be produced in PZT thin films with only 30V/μm electric field. At least for thicker films, this limit was found to be governed by the mechanical resistance of PZT. Properties of ferroelectric thin films depend in a complex manner from film texture, grain structure, domain configuration and defects. As illustration, the imprinting of PZT thin films with interdigitated electrodes is discussed, and the question is raised, how we could profit from all our knowledge in ferroelectric domains as acquired by theoretical works and nanoprobe techniques to make domain wall contributions large and controllable above the micron scale in the domain of MEMS devices. A completely different phenomenon than the previously mentioned ones occurs in $(Ce,Gd)O_{2-x}$ thin films, hitherto known as oxygen ion conductor. Particularly prepared films of this material show a giant electrostrictive effect. In contrast to inorganic piezoelectric materials, the transverse effect shows a compressive stress. The effect is rather slow and not yet understood.

Invited Speakers

Shireen **Adenwalla**, ……University of Nebraska, U.S.A.
Andreja **Bencan**, …… Jozef Stefan Institute, Slovenia
Elena **Buixaderas**, …… Institute of Physics, Czech Republic
Wenwu **Cao**, …… The Pennsylvania State University, U.S.A.
Patrycja **Paruch**,…… DQMP, University of Geneva, Switzerland
Salia **Cherifi-Hertel,** …… Université de Strasbourg, CNRS, France
Francesco **Cordero**, ……CNR-ISC, Italy
John **Daniels**, …… University of New South Wales, Australia
Stephen **Ducharme**, ……. University of Nebraska, U.S.A.
Mari-Ann **Einarsrud**, …… NTNU, Norway
Eiji **Fujii**, ……Panasonic, Japan
Lauren **Garten**, ……National Renewable Energy Laboratory, U.S.A.
Anne-Christine **Hladky**, …… IEMN, France
Yunseok **Kim**, …… Sungkyunkwan University, South Korea
Nathalie **Lemee**, ……Université de Picardie Jules Verne, France
Fei **Li**, ……The Pennsylvania State University, U.S.A.
Lane **Martin**, ……University of California, Berkeley, U.S.A.
Pavel **Marton**, …… Institute of Physics, Czech Academy of Sciences, Czech Republic
Pavel **Mokry**, …… Institute of Plasma Physics, Czech Republic
Sabine **Neumayer**, …… University College Dublin, Ireland
Gunnar **Picht**, …… Robert Bosch GmbH, Germany
Inna **Ponomareva**, ……University of South Florida, U.S.A.
Clive **Randall**,……The Pennsylvania State University, U.S.A.
Andrew **Rappe**,……University of Pennsylvania, U.S.A.
George **Rossetti**, …… University of Connecticut, U.S.A.
Ekhard **Salje**, ……Cambridge University, United Kingdom
Jan **Seidel**, ……University of New South Wales, Australia
Nava **Setter**, ……EPFL Swiss Federal Institute of Technology, Switzerland
Tae Kwon **Song**, ……Changwon National University, South Korea
Alexander **Tagantsev**, ……Ioffe Institute, Russia
Susan **Trolier-McKinstry**, ……The Pennsylvania State University, U.S.A.
Monique **van der Veen**, …… Delft University of Technology, Netherlands
Rama **Vasudevan**, ……Oak Ridge National Laboratory, U.S.A.
Dwight **Viehland**, …… Virginia Tech, U.S.A.
Satoshi **Wada**, …… University of Yamanashi, U.S.A.

Kyle **Webber**, ……Friedrich-Alexander Universität Erlangen, Germany
Roger **Whatmore**, …… Imperial College, London, United Kingdom
Kui **Yao**, …… Institute of Materials Research and Engineering, Singapore
Nan **Zhang**, …… Xi'an Jiaotong University, China

Exhibitors

aixACCT	Simone Meuth	……meuth@aixacct.com
	Roland Kessels	……kessels@aixacct.com
CTS Corporation	Nick Hajewski	……nick.hajewski@ctscorp.com
Harris	Russell Petrucci	……rpetrucc@harris.com
Noliac	Ole Eldar Andersen	……oea@noliac.com
Polytec	Pam Cravenor	……p.cravenor@polytec.com
PZFlex	Browyn Morgan	……browyn.morgan@pztflex.com
Radiant Technologies	Michelle Bell	……michellebell@ferrodevices.com
Smart Material	Madeleine Daue	……m.daue@smart-material.com
Solmates	Kelly Bruggenwirth	……kelly.bruggenwirth@solmates.nl
TREK	Mary Spohn	……mary.spohn@trekinc.com
Zurich Instruments	Eva Rojcek	……eva.rojcek@zhinst.com

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Publicity Chair	Prof. Wei Ren Xi'an Jiaotong University, China
Conference Secretary	Iaroslav Gaponenko University of Geneva, Switzerland
Conference Coordinator	Sandie Elder Pennsylvania State University, U.S.A.
Local Organizing Committee	Dr. Brian Foley Georgia Institute of Technology, U.S.A.

Conference Information

We hope your stay in Atlanta, Georgia is wonderful and that your time at the sessions is stimulating. Please consider the following information in preparation for the Conference.

- **Name Badges - You must wear your Conference badge to all events.** This is your 'ticket' for the breaks, reception, and banquet, all of which have been included with your registration. Guest tickets are required for anyone who will accompany you to events. Please note that you will need to show a photo identification at the registration desk in order to validate your age: this is in lieu of being required to show your ID at all events at which alcohol will be served.
- **Personal Communications and Recording Devices** – Please help us ensure a collegial atmosphere for the workshop:
  - Turn off all mobile phones in the meeting rooms
  - Do not use any recording devices – audio, video, photographic, etc. – during the meeting sessions or in the poster area without prior approval from those who are presenting.
- **Copyright** - To prevent copyright infringement, it is prohibited to produce photographs, video or sound recordings without the explicit permission of the organizers - especially during presentations, lectures, seminars and poster sessions. In case of violation, the organizers reserve the right to exclude the relevant participants from the conference immediately and without refund of the participation fee.
- **Photographs, Films and Sound Recordings** - During the event, photographs, films and sound recordings may be taken by the organizers without prior approval of the conference participants. These recordings will be used by the organizers or the event partners to document the event on their websites and in publications.
- **Wireless Internet access** – Free Wi-Fi access will be available to all attendees. Eduroam is available throughout the Georgia Tech campus. For non-academic users, additional Wi-Fi connection support will be available at the Registration Desk.
- **Valuables** – Valuables should not be left unattended during the meetings, as we are unable to accept responsibility for any loss. Please keep in mind that the meeting is hosted on a university campus, where students are allowed access to all buildings during normal class hours (7am-6pm).
- **Disclaimer** - The organizers and their auxiliary persons do not assume liability for personal injuries, material or property damages or further unlisted damages caused by participation in the conference.
- **Emergency Services** – For all emergency services, please Dial 911. Additional assistance might be available at the Registration Desk, including limited translation services, for non-emergency items.

Oral Presentation Guidelines

ALL presentations should be transferred to the conference computer (PC. MS Office installed) 30 minutes prior to the start of the session in the room designated for that session.

To clearly identify your presentation, please save it with your first & family name as part of the file name, for example: jane_smith.ppt. At the end of the congress, we systematically remove and delete ALL presentations and associated files.

A limited number of speakers with presentation compatibility issues (MAC to PC) can be accommodated with use of their personal laptops. Both VGA and HDMI connectors are available. We suggest that you bring your own connector if you do have any animations or videos embedded in your presentation.

Speakers requiring use of their own computers should take into account setup and removal times that will be detracted from their original presentation times.

Presentation files must be in Microsoft PowerPoint (.pptx) or PDF (.pdf) format. Presentations with PDF files should only be used in the "full screen mode".

All non-standard characters, films and animations should be embedded.

If your PowerPoint presentation has videos:

- All videos should be in WMV format. In case this is not possible, please make sure to use a standard codec. We cannot guarantee alternative software platforms.
- The presentation and its related files, notably video files, should be in a single folder named for the conference.
- Use of high definition videos and images is not necessary for projection. It is important to limit the size of your document. It will not enhance the image, and may slow down the loading of slides during the presentation.
- We highly recommend that you test your presentation on a PC before the conference, especially if you have embedded **animations.**

Poster Presentation Guidelines

Poster boards will be available on the day of the presentation, at the morning refreshment break for setup of posters.

The board size is 30" x 40". Setup is available in both landscape or portrait mode.

All posters should be secured to the display boards using the attachment method provided to you.

Please remove your poster no later than at the end of the technical sessions on the day of your presentation. All posters remaining on board after 5:30pm will be disposed of.

Social Events

Welcome Reception

The welcome reception will take place at 18:00 on Sunday the 7th of May, after the tutorials. Refreshments and finger food will be served, on the rooftop of the Clough Building, located on the Georgia Tech campus.

Student Social: Craft Beer Tasting

Free for students but open to all attendees, the craft beer tasting at the Monday Night Brewing brewery will take place at 17:30 on Monday the 8th of May. The price of the tasting includes a commemorative glass and six (6) oz. beer samples.

Women in Engineering Event: Adaptive Leadership Workshop

Adaptive leadership is a theory that enhances the ability of individuals and organizations to address complex leadership challenges. These tools are critical in a constantly shifting environment. The practices and techniques of adaptive leadership will enhance your ability to exercise leadership and mobilize others to achieve goals that are important to you, your organization and your community.

Participants will find these tools and concepts valuable as they manage a large research project, exercise leadership in their profession, shepherd an initiative to improve climate or educational outcomes, create a new program or center, etc.
The workshop/luncheon will be held in room 1447 in the Klaus Building.

Conference Banquet

Held in the Wenn Student Center Ballroom, the banquet will give the opportunity for participants to meet their peers and exchange ideas in a relaxing setting. Food and drinks will be served and entertainment will be provided.

Student Photo Competition - Science&Life@ISAF2017

A student photo competition will take place during the 2017 Joint IEEE ISAF-IWATMD-PFM Conference, organized by the student branch of the IEEE UFFC Society. All students are welcome to participate! For the details on the competition, please read below:

The theme of the photo competition is "Science & Life @ ISAF 2017". Your artistic photo should record your life at the conference. It can be anything you find scientific at the conference or just recording the social events, discussing with people, pillaging the buffet stations, enjoying beer at the Monday Night! Always remember to get the permission before taking pictures of other people and their research results! In addition, we require a short description (30-100 words) of the photo. Submit your photo and description to UFFC4students@gmail.com with the subject "Photo Competition-Science & Life @ ISAF 2017." Submissions without this subject will not be considered!
Submission deadline: Sunday (May 7, 2017) 6.00 pm to Wednesday (May 10, 2017) 10.00 am

Three award winners (Gold ($100), Silver ($50), and Bronze ($25)) will be announced and awarded at the Conference Banquet on Wednesday, May 10.

IEEE UFFC-S Ferroelectrics Awards

The IEEE UFFC Society presents three annual awards to leading scientists and engineers working in the field of ferroelectrics.

The IEEE UFFC Ferroelectrics Recognition Award (FRA) honors members of the ferroelectrics community for outstanding achievements in their scientific work as well as in promoting the ferroelectrics community. The recipient receives a plaque, certificate, and an honorarium in the amount of $2,000 USD.
The 2017 recipient of the IEEE UFFC FRA will be announced at the Conference Banquet on Wednesday, May 10.

The IEEE UFFC Ferroelectrics Young Investigator Award (FYIA) recognizes scientists/engineers (aged 40 and younger at the time of nomination) for their achievements and contributions to fundamental research, integration, application, or education in the field of ferroelectrics. The recipient receives a plaque, certificate, and an honorarium in the amount of $2,000 USD.
The 2017 recipient of the IEEE UFFC FYIA will be announced at the Conference Banquet on Wednesday, May 10.

The IEEE Robert E. Newnham Ferroelectrics Award recognizes investigators in the field of dielectric, piezoelectric and ferroic materials that have contributed significantly to the understanding of structure-property relations. The award is given at any stage of the career for an outstanding contribution or for overall contributions to the field during the career, resulting in measurable impact. The award, commenced in 2016, is named in honor of Robert E. Newnham to recognize his leading role in understanding the relationships between structure and properties of materials and to honor him as a scientist, teacher and an advisor to numerous researchers and engineers. The award comes with a plaque, certificate, and a $2,000 USD honorarium.
The 2017 recipient of the IEEE UFFC Robert E. Newnham Ferroelectrics Award will be announced at the Conference Banquet on Wednesday, May 10.

Student Poster Competition

Some of the best technical work submitted for consideration in this Conference have been selected by a jury, through a double blind selection process as Student Poster Finalists. These posters (in addition to the original format of presentation) will be presented by the Finalists on Monday, May 8 during the lunch poster session.

A number of posters/students will be then awarded a final prize. The winners will be announced at the Conference Banquet on Wednesday, May 10.

2017 IEEE ISAF-IWATMD-PFM

Schedule

Sunday, May 7, 2017

7:30 am - 5:00 pm	**Registration**	Wenn Student Center, 3rd floor atrium
8:30 am -10:00 am	**Tutorials**	Wenn Student Center – Rooms 319/320
10:00 am -10:30 am	Refreshment Break	
10:30 am -12:00 pm	**Tutorials**	Wenn Student Center – Rooms 319/320
12:00 pm -1:00 pm	Lunch Break	
12:30 pm -2:30 pm	**Hands-on Workshop Session I**	Love Building – Rooms 183/185
1:00 pm -2:30 pm	**Tutorials**	Wenn Student Center – Rooms 319/320
2:30 pm -3:00 pm	Refreshment Break	
3:00 pm -4:30 pm	**Tutorials**	Wenn Student Center – Rooms 319/320
3:00 pm -5:00 pm	**Hands-on Workshop Session II**	Love Building – Rooms 183/185
6:00 pm -8:00 pm	**Welcome Reception**	Clough Building Rooftop Garden

Monday, May 8, 2017

7:00 am - 4:00 pm	**Registration**	Registration Desk – Klaus Building
8:30 am -9:30 am	**Plenary Session I: Prof. Clive Randall**	Wenn Student Center Ballroom
9:30 am -10:00 am	Refreshment Break	
10:00 am - 12:00 pm	**Session I** - PNR and Domains - Bi-based Materials - Strain via Elastic and Piezoelectric Measurements - Array-based Devices and MEMS	Klaus Building Room 1456 Room2443 Room 1443 Room2456
12:00 pm -2:00 pm	Lunch Break	
12:00 pm -2:00 pm	**Poster Session I**	Klaus Building Atrium
2:00 pm -4:00 pm	**Session II** - Synthesis-property Relationship in Thin Films - Processing of Ferroelectric Materials for End Applications - Devices - New Approaches and Defects	Klaus Building Room 2456 Room 2443 Room 1443 Room 1456
5:30 pm -7:30 pm	**Craft Beer Tasting, Student Social**	Monday Night Brewing 670 Trabert Ave. NW, Atlanta, GA

Tuesday, May 9, 2017

7:30 am -8:30 am	**Registration**	Klaus Building
8:30 am -9:30 am	**Plenary Session II**: **Prof. Elizabeth Dickey**	Wenn Student Center Ballroom
9:30 am -10:00 am	Refreshment Break	
10:00 am - 12:00 pm	**Session III**	Klaus Building
	- Polar Interactions and Metastabilities	Room 1443
	- Ferroelectric-based Memories and Transistors	Room 2456
	- Transducer Materials	Room 2443
	- Signal Contribution	Room 1456
12:00 pm - 2:00 pm	Lunch Break	
12:00 pm - 2:00 pm	**Poster Session II**	Klaus Building Atrium
2:00 pm -3:30 pm	**Session IV**	Klaus Building
	- Organic Piezoelectrics, Composites	Room 2456
	- Light-interaction	Room 1443
	- L. Eric Cross Memorial	Room 2443
	- Role of Interface	Room 1456
3:30 pm -4:00 pm	Refreshment Break	
4:00 pm -5:30 pm	**Session V**	Klaus Building
	- Processing Optimization	Room 2456
	- Local Order and Defects in Lead-free	Room 1443
	- L. Eric Cross Memorial	Room 2443
	- Switching Dynamics	Room 1456

Wednesday, May 10, 2017

8:00 am -9:00 am	**Plenary Session III: Prof. Marty Gregg**	Wenn Student Center Ballroom
9:00 am -10:00 am	**Plenary Session IV: Dr. Scott Smith**	Wenn Student Center Ballroom
10:00 am -10:30 am	Refreshment Break	
10:30 am - 12:00 pm	**Session VI**	Klaus Building
	- Lead-Free Piezoelectrics	Room 2456
	- Domains and Domain Walls	Room 1443
	- Thermal and Dynamic Behaviors of PZT	Room 1456
	- Energy Harvesting	Room 2443
12:00 pm - 2:00 pm	Lunch Break	
12:00 pm - 2:00 pm	**Women in Engineering Session** and Luncheon	Klaus Building – Room 1447
2:00 pm -3:30 pm	**Session VII**	Klaus Building
	- Multiferroics, BFO Part I	Room 1456
	- Ferroelectrics, Reliability	Room 2456
	- Jan Fousek Memorial	Room 1443
	- Transducers I	Room 2443
3:30 pm -4:00 pm	Refreshment Break	

4:00 pm -5:30 pm	**Session VIII** - Multiferroics, BFO Part II - Surfaces and Interfaces - Jan Fousek Memorial - Transducers II	Klaus Building Room 1456 Room 2456 Room 1443 Room 2443
6:00 pm -10:00 pm	**Banquet Dinner**	Wenn Student Center Ballroom

Thursday, May 11, 2017

8:30 am -9:30 am	**Plenary Session V: Prof. Haosu Luo**	Wenn Student Center Ballroom
9:30 am -10:00 am	Refreshment Break	
10:00 am -12:00 pm	**Session IX** - Superlattices, Films - BFO: Structure and Properties - Processing and Characterization - Single Crystals I	Klaus Building Room 1443 Room 1456 Room 2456 Room 2443
12:00 pm -1:30 pm	Lunch Break	
1:30 pm -4:00 pm	**Session X** - Nanoscale Ferroelectrics and Modeling - Lead-free, Phase Boundaries - Electrocalorics - Single Crystals II	Klaus Building Room 1456 Room 1443 Room 2456 Room 2443
4:00 pm -4:30 pm	Refreshment Break	
4:30 pm -5:30 pm	**Plenary Session VI: Prof. Paul Muralt**	Wenn Student Center Ballroom
5:30 pm -6:00 pm	**Conference Closing**	

	Tutorials I	Tutorials II	PFM Workshop
8:30	*Challenges in processing of bulk and thin film ferroelectric oxides* Alp Sehirlioglu & Brady Gibbons	*Electro-mechanical Surface Properties by Force Microscopy* Neus Domingo	
10:00	Coffee Break		
10:30	*Mechanical properties, reliability and failure in ferroelectric materials* Chris Lynch	*PFM - can one escape from the artifacts all around this technique?* Elisabeth Soergel	
12:30	Lunch Break		Lunch
13:00	*Piezoelectric sensors, actuators and transducers: design, fabrication, characterization and applications* Xiaoning Jiang	*Morphotropic phase boundary and defects and domain walls* Dragan Damjanovic	*PFM Hands-on Workshop* Rama Vasudevan, Nina Balke, and Stephen Jesse
14:30	Coffee Break		
15:00	*Piezoelectric films in FBARs and other devices* Sandy Cochran	*Insights to ferroelectric perovskites by diffuse scattering techniques* Jiri Hlinka	*PFM Hands-on Workshop* Rama Vasudevan, Nina Balke, and Stephen Jesse
16:30			

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

Summary Technical Session

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

Session I	PNR and Domains		Session VI	Lead-free Piezoelectrics
	Bi-based Materials			Domains and Domain Walls
	Strain via Elastic and Piezoelectric Measurement			Thermal and Dynamic Behaviors of PZT
	Array-based Devices and MEMS			Energy Harvesting
Session II	Synthesis-property Relationship in Thin Films		Session VII	Multiferroics, BFO Part I
	Processing of Ferroelectric Materials for End Applications			Ferroelectrics, Reliability
	Devices			Transducers 1
	New Approaches and Defects			Fousek Memorial Session I
Session III	Polar Interactions and Metastabilities		Session VIII	Multiferroics, BFO Part II
	Ferroelectric-based Memories and Transistors			Surface and Interfaces
	Transducer Materials			Transducers II
	Signal Contributions			Fousek Memorial Session II
Session IV	Organic Piezoelectrics, Composites		Session IX	Superlattices, Films
	Light-interaction			BFO: Structure and Properties
	Cross Memorial			Processing and Characterization
	Role of Interfaces			Single Crystals I
Session V	Processing Optimization		Session X	Nanoscale Ferroelectrics and Modeling
	Local Order and Defects in Lead-free			Lead-free, Phase Boundaries
	Cross Memorial			Electrocalorics
	Switching Dynamics			Single Crystals II

Sunday, May 7, 2017

7:30 AM – 5:00 PM	**Registration** **Wenn Student Center**		
	Tutorials		
8:30 AM – 10:00 AM	**Challenging in Processing of Bulk and Thin Film Ferroelectric Oxides** *Alp Sehirlioglu and Brady Gibbons* Wenn Student Center – Room 319	**Electro-mechanical Surface Properties by Force Microscopy** *Neus Domingo* Wenn Student Center – Room 320	
10:00 AM – 10:30 AM	**Refreshment Break**		
10:30 AM – 12:00 PM	**Mechanical Properties, Reliability and Failure in Ferroelectric Materials** *Chris Lynch* Wenn Student Center – Room 319	**PFM - Can one Escape from the Artifacts all Around this Technique?** *Elisabeth Soergel* Wenn Student Center – Room 320	
12:00 PM – 1:00 PM	**Lunch Break**		
12:30 PM – 2:30 PM	**Piezoelectric Sensors, Actuators and Transducers: Design, Fabrication, Characterization and Applications** *Xiaoning Jiang* (1:00pm – 2:30pm) Wenn Student Center – Room 319	**Morphotropic Phase Boundary and Defects and Domain Walls** *Dragan Damjanovic* (1:00pm – 2:30pm) Wenn Student Center – Room 320	**Hands-on Workshop Session I** *Rama Vasudevan, Nina Balke, and Stephen Jesse* (12:30pm – 2:30pm) Love Building – Room 183
2:30 PM – 3:00 PM	**Refreshment Break**		
3:00 PM – 4:30 PM	**Piezoelectric Films in FBARs and Other Devices** *Sandy Cochran* (3:00pm – 4:30pm) Wenn Student Center – Room 319	**Thermal Characterization of Ferroelectric Materials** *Brian Foley* (3:00pm – 4:30pm) Wenn Student Center – Room 320	**Hands-on Workshop Session II** *Rama Vasudevan, Nina Balke, and Stephen Jesse* (3:00pm - 5:00pm) Love Building – Room 185
6:00 PM – 8:00 PM	**Welcome Reception** Rooftop of the Clough Building		

Monday, May 8, 2017

8:00 AM – 8:30 AM	**Welcome and Introductory Remarks** Wenn Student Center Ballroom			
8:30 AM – 9:30 AM	**Plenary Session I** Wenn Student Center Ballroom **Session Chair:** Nazanin Bassiri-Gharb **Cold Sintering - Rethinking What We Thought We Knew in Electroceramics,** *Prof. Clive Randall*			
9:30 AM – 10:00 AM	**Refreshment Break**			
10:00 PM – 12:00 PM	**SESSION I**			
	PNR and Domains **Room 1456**	**Bi-based Materials** **Room: 2443**	**Strain via Elastic and Piezoelectric Measurement** **Room: 1443**	**Array-based Devices and MEMS** **Room: 2456**
	Session Chair: Elena Buixaderas	**Session Chair: Barbara Malic**	**Session Chair: John Daniels**	**Session Chair: Takeshi Yoshimura**
10:00AM	**INVITED -** (10:00AM – 10:30AM) **Why Nanopolar Regions Matter in Tunable Dielectrics, Flexoelectrics, and Photovoltaics** *Lauren M. Garten, David Moore, Shyam Dwaraknath, Sanjini Nanayakkara, Matthew Burch, Arnab Sen Gupta, Ryan Haislmaier, Venkataraman Gopalan, Elizabeth Dickey, Kristin Persson, David Ginley, and Susan Trolier-McKinstry*	**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*	**INVITED -** (10:00AM – 10:30AM) **Elastic Measurements of Ferroelectrics for Probing the Piezoelectric Response and Structural Defects** *Francesco Cordero*	**What Is Needed for the PiezoMEMS Applications of the Future?** *R.Q. Rudy and R.G. Polcawich*
10:15AM – 10:30AM				**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*
10:30AM – 10:45AM	**Manipulation of Domain Structure in {100} Tetragonal Pb(Zr, Ti)O_3 Nanorods by Charge Screening** *Tomoaki Yamada, D. Ito, T. Sluka, N. Setter, O. Sakata, T. Namazu, H. Funakubo, M. Yoshino, and T. Nagasaki*	***Piezoelectrics: Putting the "Squeeze" on New Materials*** *Michelle Dolgos*	***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, Tedi-Marie Usher, Marko Vrabelj, Lovro Fulanovic, Hana Ursic, Barbara Malic, Igor Levin, and Jacob L. Jones*	**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*

10:45AM – 11:00AM	**Digital Holographic Tomography of Periodically Poled Lithium Niobate: A Challenge for Artificial Neural Networks** *Pavel Mokrý, Pavel Psota, Jan Václavík, Roman Doleček, David Vápenka, Juraj Sládek, and Vít Lédl*		**Simultaneous Time-Resolved Measurements of Polarization and Strain Dynamics to Explore Switching in Ferroelectric/ Ferroelastic Materials** *Jan Schultheiss, Y.A. Genenko, S. Zhukov, R. Khachaturyan, L. Liu, J.E. Daniels, and J. Koruza*	**Piezoelectric Microelectromechanical Systems (PiezoMEMS) for Adjustable X-Ray Optics** *Julian Walker, T. Liu, M. Tendulkar, D. Burrows, T.N. Jackson, and S. Trolier-McKinstry*
11:00AM – 11:15AM	**Interactions Between Point Defects and Ferroelectric Domain Walls** *D.R. Småbråten, L. Xia, S.H. Skjærvø, T. Tybell, and Sverre Magnus Selbach*	***In situ* Poling and the Strong Post-poling Relaxation of non-180° Domain Texture in Bismuth Ferrite Ceramics** *Lisha Liu and John E Daniels*	**Measuring Absolute Piezoelectric Displacement with an AFM** *Joe T. Evans, S.T. Smith, N.B. Montross, and S.P. Chapman*	**Finite Element Simulation of Switchable and Tunable Resonators** *Daw Adersah and T.S. Kalkur*
11:15AM – 11:30AM	**Optical Properties of Domain Walls in Periodically Poled $LiNbO_3$ and $LiTaO_3$ Studied by First-Principle Calculation and Raman Spectroscopy** *Michael Rüsing, S. Neufeld, S. Sanna, G. Berth, W. G. Schmidt, and A. Zrenner*	**Rare-Earth Modified Bismuth Ferrite Ceramics: Composition, Structure and Properties from Local to Macroscopic Scales** *Julian Walker, D. Alikin, S. Trolier-McKinstry, and T. Rojac*	**Large Piezoelectricity in Electric-Field Modified Single Crystals of $SrTiO_3$** *Semën Gorfman, E. Mehner, C. Richter, B. Khanbabaee, J. Hanzig, H. Stöcker, M. Zschornak, T. Leisegang, U. Pietsch, and D.C. Meyer*	**Finite Element Modeling of Piezoelectric Nanobeams with Surface and Flexoelectricity Effects** *Shijie Zheng and H.T. Wang*
11:30AM – 11:45AM	**Ferroelectric Domain Continuity Over Grain Boundaries** *Sukriti Mantri, Jette Oddershede, Dragan Damjanovic, and John E. Daniels*		**INVITED -** (11:30AM – 12:00PM) **Lattice Strain and Domain Contributions in Piezoelectric PZT** *Nan Zhang, Semën Gorfman, Hiroko Yokota, A.M. Glazer, Wei Ren, and Z.-G. Ye*	**Design of "Hard" $BiScO_3$-$PbTiO_3$ Ceramics for Shear-Bending Mode Actuator Using at High Temperature** *Jianguo Chen, Jianxin Wei, and Jinrong Cheng*
11:45AM – 12:00PM	**Domain Configuration in (1-*x*) $Pb(Mg_{1/3}Nb_{2/3})O_3$-*x*$PbTiO_3$ Ceramics Analysed by Transmission Electron Microscopy** *Mojca Otonicar, H. Ursic, D. Alikin, M. Vrabelj, A. Bencan, B. Malic and T. Rojac*	**Exploring Next Generation High Temperature Ferroelectrics: $35Bi(Mg_{1/2}Ti_{1/2})O_3$-$65PbTiO_3$ Thin Films** *Carl S. Morandi, S. Trolier-McKinstry, K.R. Udayakumar, S. Bhaskar, and J. Rodriguez*		**High Power Multilayer Co-Fired Step-Up Piezoelectric Transformers** *A. Erkan Gurdal, S. Tuncdemir, S. Dursun, D. Fridkin, and C. A. Randall*
12:00 PM – 2:00 PM	**Lunch Break**			

POSTER SESSION I

Klaus Building Atrium - 12:00 PM – 2:00 PM

Student Poster Competition Finalists

I.1 Quantification of Defect-Defect Interactions in Ferroelectric Materials
Steven J. Brewer, S.C. Williams, H. Zhou, R.Q. Rudy, M. Rivas, R.G. Polcawich, C.D. Cress, E.R. Glaser, J.L. Jones, and N. Bassiri-Gharb

I.2 Atomistic Modeling of Ageing in Ferroelectrics
Jacob B.J. Chapman, R.E. Cohen, A.V. Kimmel and D.M. Duffy

I.3 Point Defects in (001)-strained $BiFeO_3$
Lu Xia and Sverre M. Selbach

I.4 Photoelectromotive Force under Transverse-Moving Pulsed Illumination in the $Bi_{12}SiO_{20}$ and $Bi_{12}TiO_{20}$ Single Crystals *
Tatiana A. Kornienko, S.M. Shandarov, M.G. Kisteneva, and A.L. Tolstik

I.5 Ferroelectric Domain Continuity over Grain Boundaries
Sukriti Mantri, Jette Oddershede, Dragan Damjanovic, and John E. Daniels

I.6 *In-situ* Poling and the Strong Post-poling Relaxation of non-180° Domain Texture in Bismuth Ferrite Ceramics
Lisha Liu and John E Daniels

I.7 Influence of Process Conditions on Structural and Electrical Properties of $Hf_{1-x}Zr_xO_2$: Dead Layer Effect and Defect Trapping
Franz Fengler, T. Mittmann, M.H. Park, C. Richter, T. Mikolajick, and U. Schroeder

I.8 Improving Reliability in Piezoelectric Films
Betul Akkopru-Akgun, M.T. Lanagan, and S. Trolier-McKinstry

I.9 Mechanical Reliability of Piezoelectric Microelectromechanical Systems $Pb[(Zr_{0.52}Ti_{0.48})_{0.98}Nb_{0.02}]O_3$ Films
Kathleen Coleman, J. Walker, H.G. Yeo, and S. Trolier-McKinstry

I.10 Probing the Role of Surface Water in Ferroelectric Domain Charge Dynamics
Iaroslav Gaponenko, N. Domingo, N. Stucki, A. Verdaguer, and P. Paruch

I.11 Tuning Light-induced Polarization Screening of Ferroelectric Materials by Water
Fanmao Liu, I. Fina, F. Sánchez, and J. Fontcuberta

I.12 Local Writing and Characterization of Individual Charged Conducting Domain Walls in y-cut $LiNbO_3$ (MgO 5% mol) Single Crystals
James P.V. McConville, M.P. Campbell, A. Kumar, and J.M. Gregg

I.13 Simultaneous Time-Resolved Measurements of Polarization and Strain Dynamics to Explore Switching in Ferroelectric/Ferroelastic Materials
Jan Schultheiss, Y. A. Genenko, S. Zhukov, R. Khachaturyan, L. Liu, J.E. Daniels and J. Koruza

I.14 Domain Reorientation and Extrinsic Scaling Effects in Polycrystalline, {001} Textured $PbZr_{0.3}Ti_{0.7}O_3$ Thin Films
Lyndsey M. Denis, G. Esteves, J. Walker, H. Zhou, M. Wallace, C. Fancher, J.L. Jones, and S. Trolier-McKinstry

I.15 Electric-field-induced Polarization Rotation in $PbZb_{0.5}Ti_{0.5}O_3$ Revealed by *in-situ* Pair Distribution Function Study
Changhao Zhao, Dong Hou, Ching-Chang Chung, Jacob L. Jones

I.16 Periodic Nano-domain Patterns in Relaxor Single Crystals
Wei-Yi Chang, Ching-Chang Chung, Chih-hao Chang, Jacob L. Jones, Jian Tian, and Xiaoning Jiang

I.17 Losses and Heat Generation of Piezoelectric Ceramics by Polarization Orientation
Minkyu Choi, T. Scholehwar, E. Hennig, and K. Uchino

I.18 EMAT Phased Array Probe for Detecting Surface Cracks
Julio Isla and Frederic Cegla

I.19 Current Construction Advancements of an Ultrasonic Phased Array Transducer for Future Deployment Within an Advanced Test Reactor Loop for in-use Monitoring
Galestan Mackertich Sengerdy, and B.R. Tittmann

I.20. Highly (100)-Oriented Metallic $LaNiO_3$ Grown by RF Magnetron Sputtering
Xiao Di and P. Muralt

I.21 Self-Assembled Monolayer-Assisted Inkjet Printing of PZT Films on Platinized Silicon
Nicholas Godard, D. Sette, S. Glinsek, and E. Defay

I.22 Strongly {001} Oriented Bimorph Thick PZT Films Grown by High Temperature rf- Magnetron Sputtering for a Non-resonant Piezoelectric Energy Harvester
Hong Goo Yeo, Tiancheng Xu, Shad Roundy, and Susan Trolier-McKinstry

I.23 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

I.24 Anomalous Enhancement in Photocatalytic Rate by Stabilizing a Metastable Phase in a $BiFeO_3$-Based Photocatalyst
Narayan Bastola, Sangeeta Adhikari, Giridhar Madras, and Rajeev Ranjan

I.25 How does Cyclic Electrical Loading Influence the Electrocaloric Effect in PMN-xPT?
Andraz Bradeško, M. Vrabelj, L. Fulanović, M. Otoničar, Z. Kutnjak, B. Malič, and T. Rojac

I.26 Solid state Cooling Device Based on Electrocaloric Ceramic Multilayers
Tian Zhang, Xiaoshi Qian, Haiming Gu, and Q. M. Zhang

I.27 Nonlinear Electric Field Dependence of Electrocaloric Effect in (001)-epitaxial $(Ba,Sr)TiO_3$ Thin Films
Shogo Matsuo, T. Yamada, T. Kamo, H. Funakubo, M. Yoshino, and T. Nagasaki

I.28 Tunable Interdigital Capacitors and Phase Shift Unit Cell Fabricated on $Ba_{0.29}Sr_{0.71}TiO_3$ Grown by Hybrid MBE
Cedric J. G. Meyers, C.R. Freeze, S. Stemmer, X. Lan, L. Chau, and R.A. York

I.29 Fabrication and Testing of Electromechanical Actuation Devices Based on Gd-doped Ceria Thin Films
Eran Mishuk, E. Makagon, E. Wachtel, S. Cohen, A.D. Ushakov, D.O. Alikin, A.A. Esin, A. Tselev, K. Rechav, R. Popovitz-Biro, V. Ya. Shur, A.L. Kholkin, and I. Lubomirsky

I.30 Controlled Functionalization of Poly(4-methyl-1-pentene) Films for High Energy Storage
Guan Wang, M. Zhang, Z. Xu, and L. Zhang

Contributed Posters

I.31 Effects of Sintering Temperature on Structure, Ferroelectric and Piezoelectric Properties of 0.71BF-0.29BT Ceramic
Jian-Xin Wei, Jin-Rong Cheng, and Jian-Guo Chen

I.32 Lead-free KN-NBZ Piezoelectric Ceramics
Stephan Collins and A.J. Bell

I.33 Hard-Piezoelectric Ceramics for Low Temperature Co-Fired Multilayer Piezoelectric Transformers
Sinan Dursun, A.E. Gurdal, S. Tuncdemir, D. Fridkin, and C.A. Randall

I.34 Stabilizing High Energy Piezoelectric Polymorphs
Lauren M. Garten, Riley Whitehead, John Magnum, Shyam Dwaraknath, Laura Schelhas, Michael F. Toney, Julian Walker, Brian Gorman, Paul Ndione, Susan Trolier-McKinstry, Kristin Persson, and David Ginley

I.35 Textured Lead-free Piezoelectrics for High-Frequency Ultrasound Imaging
Astri Bjørnetun Haugen, Erling Ringgaard, and Franck Levassort

I.36 Room Temperature Crystallographic Phase analysis of (1-x) $KNbO_3$-x$CaZrO_3$ lead-free piezoelectric materials.
Samuel J. Parry and A.J. Bell

I.37 Synthesis, Dielectric and Ferroelectric Behaviour of Lead-free KBT-BT Ceramics
Karuppanan Aravinth and P. Ramasamy

I.38 Investigation of Electrical Properties in a New Lead-free (100-*x*)($Li_{0.12}Na_{0.88}$)NbO_3-*x*$BaTiO_3$ (0 ≤ *x* ≤ 40) Piezoelectric System
Ajit Kulkarni and Supratim Mitra

I.39 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

I.40 Properties and Structures of Nonstoichiometric (K,Na)NbO_3-based Lead-free Ceramics
Jie Xing, Zhi Tan, Lixu Xie, Jiagang Wu, Dingquan Xiao, and Jianguo Zhu

I.41 Observation of Room Temperature Ferroelectricity in $LiNbO_3$, $KNbO_3$ and $Na_{0.9}Li_{0.1}NbO_3$ Ceramics Synthesized by Conventional Solid State Reaction
Viancy Isaza-Zapata, C. Maya, A. Gómez, V.H. Zapata, O. Morán, and J.L. Izquierdo

I.42 Synthesis of Single-Crystalline Lithium Tantalate Nanorods – Piezoelectric and Non-Linear Optic Properties
Prem Jaschin and K.B.R. Varma

I.43 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

I.44 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 Afifi, and J.A. Turner

I.45 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

I.46 Structure-Processing Relations in $PbZr_xTi_{1-x}O_3$ 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

I.47 Far-From-Equilibrium Processing of $PbZr_xTi_{1-x}O_3$ 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

I.48 Targets Modification During NBT Thin Film Deposition
Sergey A. Popov, T.V. Kruzina, Yu.N. Potapovich, M.P. Trubitsyn, and O.S. Rutskyi

I.49 Multifunctional Molecular Ferroelectric Thin Films
Zhuolei Zhang, Peng-Fei Li, Yuanyuan Tang, Andrew J Wilson, Katherine Willets, Manfred Wuttig, Ren-Gen Xiong, and Shenqiang Ren

I.50 Direct Evidence of Spin Cylcoid in Strained Nanoscale Bismuth Ferrite Thin Film
J. Bertinshwa, R. Maran, S.J. Callori, Vidya Ramesh, J. Cheung, S.A. Danilkin, W.T. Lee, S. Hu, J. Seidel, N. Valanoor, and C. Ulrich

I.51 Stability of Ferroelectric Phase in Epitaxial HfO_2-based Films
Takanori Mimura, Kiriha Katayama, Takao Shimizu, Takanori Kiguchi, Akihiro Akama, Toyohiko J. Konno, Osami Sakata, and Hiroshi Funakubo

I.52 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

I.53 Remarkably Enhanced Photocatalytic Activity in $Bi_{1-x}Ba_xFeO_3$ Prepared by Sol-Gel Method
Chenlan Zhang, Tong Tong, Jianguo Chen, Dengren Jin, and Jinrong Cheng

I.54 Ceramic/Polymer Microwave Composites via the Cold Sintering Process
Dawei Wang, D. Zhou, and I.M. Reaney

I.55 $[001]_c$ 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

I.56 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

I.57 Investigation of Noise Characteristics of Phosphorous Chalcogenide Crystal in the Vicinity of Phase Transition
Ilona Zamaraitė, Jonas Matukas, Sandra Pralgauskaite, Andrius Džiaugys, Yulian Vysochanskii, and Juras Banys

I.58 Dynamic Observation of Nanoscale Domain Switching Behaviors in Ferroelectric HfO_2 films Using Scanning Nonlinear Dielectric Microscopy
Yoshiomi Hiranaga, T. Mimura, T. Shimizu, H. Funakubo, and Y. Cho

I.59 Dielectric Relaxation in $Ca_5Nb_4TiO_{17}$ Ceramics
Chunchun Li, Xiaoyong Wei, Haixue Yan, and Michael J. Reece

I.60 Vibrational Signatures of Ti and Fe Doped Lithium Niobate
Peter Mackwitz, M. Rüsing, G. Berth, and A. Zrenner

I.61 Complex Impedance Spectra of Amorphous and Glass-ceramic Li_2O-$7GeO_2$ Compounds
Oleksii O. Nesterov, M.P. Trubitsyn, S.N. Plyaka, and M.D. Volnyanskii

I.62 PRAP Version 3.1
Ron Tasker

I.63 Reliability in Patterned PZT Films for MEMS Applications
Jung In Yang, S.Y. Lee, S.W. Ko, and S. Trolier-McKinstry

I.64 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

I.65 Ferroelasticity in Organolead Halide Perovskite MAPbI3
Tao Li, E. Strelcov, Q. Dong, J. Chae, Y. Shao, Y. Deng, A. Centrone2, J. Huang, A. Gruverman

II.66 Big/Deep Data Approaches for Investigations of the Tip-Induced Ferroelectric Switching
A.V. Ievlev and S.V. Kalinin

II.67 Non-destructive Determination of Collagen Fibril Width in Extruded Collagen Fibers by Piezoresponse Force Microscopy
A. Bazaid, S.M. Neumayer, J. Guyonnet, A. Sorushanova, D. Zeugolis, and Brian J. Rodriguez

2:00 PM – 4:00 PM	**SESSION II**			
	Synthesis-property Relationship in Thin Films **Room: 2456**	**Processing of Ferroelectric Materials for End Applications** **Room: 2443**	**Devices** **Room: 1443**	**New Approaches and Defects** **Room: 1456**
	Session Chair: Nathalie Lemee	**Session Chair: Mari-Ann Einasrud**	**Session Chair: Stephen Ducharme**	**Session Chairs: Raman Vasudevan and Sabine Neumayer**
2:00PM	**INVITED -** (2:00PM – 2:30PM) **Lead-free Piezoelectric $(Na,Bi)TiO_3$-$BaTiO_3$ Thin Films and Their Application** *Eiji Fujii, Y. Tanaka, T. Harigai, and H. Adachi*	**INVITED -** (2:00PM – 2:30PM) **Piezoelectric Enhancement of Bismuth-based Piezoelectric Materials with Pseudo-cubic Symmetry Based on Nano/Macro Complex Domain Configurations** *Satoshi Wada, R. Ariizumi, T. Aizawa, Sarah Najwa, S. Ueno, N. Kumada, C. Moriyoshi, and Y. Kuroiwa*	**Step-up DC to DC Converter based on Polarization Switching in Ferroelectric Capacitors** *Abdulaziz Alateeq and Thottam S. Kalkur*	**G-Mode KPFM: Bringing Kelvin Probe Force Microscopy into the Information Age** *L. Collins, A. Belianinov, S. Somnath, N. Balke, S.V. Kalinin, and Stephen Jesse*
2:15PM – 2:30PM			**A Novel Compact Tunable Dual-Band Bandstop Filter (DBBSF) with Spurline and Stepped- Impedance Resonator Loaded with BST Capacitors** *Hamad Alrwuili and T.S.Kalkur*	**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*
2:30PM – 2:45PM	**Deposition of Epitaxial PMN-PT on Silicon Wafers for Piezoelectronic Transduction Memory Devices** *Matthijn Dekkers, M. Nguyen, N. Hildenbrand, S. Abel, F. Eltes, J. Fompeyrine, and P. Wittendorp*	**Study of Bonding Utilizing Cold Sintering for Ceramic Adhesives for High-temperature Applicable Energy Harvesting Piezoelectric Device** *Wei-Ting Chen, Ahmet Erkan Gurdal, Safakcan Tuncdemir, Jing Guo, Hanzheng Guo, and Clive. A. Randall*		**Full Information Acquisition in Piezoresponse Force Microscopy for Ultrafast imaging of Polarization Switching** *Suhas Somnath, S.V. Kalinin, and S. Jesse*
2:45PM – 3:00PM	**Implications of Ferroelectricity During the Growth of Ferroelectric Superlattices** *Rui Liu, Alec Sun, Benjamin Bein, Hsiang-Chun Hsing, Anna Gura, Giulia Bertino, Jin-Wen Lai, and Matthew Dawber*	**Hydrothermal Assisted Cold Sintering of Lead Zirconate Titanate (PZT-5A) Powder** *Dixiong Wang, C.S. Morandi, and S. Trolier-McKinstry*	**Biocompatible Lithium Niobate for Sensing and Microfluidics Applications** *N.C. Carville, D. Kilinc, S.M. Neumayer, M. Manzo, A. Blasiak, M.A. Baghban, A. Al-Adli, R.M. Al-Shammari, J.H. Rice, G.U. Lee, K. Gallo, and Brian J. Rodriguez*	**Machine Learning and Spectroscopic Scanning Probe Microscopy: a Magnetoelectric Composite Case Study** *Harsh Trivedi, V.V. Shvartsman, D.C. Lupascu, and R.C. Pullar*

3:00PM	**RF Reactive Sputtering AlN Thin Film at Room Temperature for CMOS-compatible MEMS Application** *Wenjuan Liu, W.J. Xu, W.Z. Wang, L.M. He, J. Zhou, K. Radhakrishnan, H. Yu, and J.Y. Ren*	**Enhanced Piezoelectric Properties in $[001]_c$ Textured PIN-PMN-PT Ternary Ceramics** *Yunfei Chang, B. Watson, E. Kupp, M. Fanton, R. Meyer Jr., and G.L. Messing*	**Electrospun PVDF-TrFE Piezoelectric Nanofiber Membrane for Tissue Engineering Applications** *Aochen Wang, Ming Hu, Xiaodi Zhang, Jinxi Zhang , and Kailiang Ren*	**INVITED** - (3:00PM – 3:30PM) **Topological Structures in Ferroic Materials as Nanoscale Functional Elements** *Jan Seidel*
3:15PM – 3:30PM	**Self-limiting Growth of Barium Titanate via Molecular Beam Epitaxy** *Timothy A. Morgan, M. Zamani-Alavijeh, G. Story, W. Schroeder, A.V. Kuchuk, M. Benamara and G.J. Salamo*	**Manufacturing Grain Textured Piezoelectric Ceramic Transducer Components** *Mark A. Fanton, R.J. Meyer, E.R. Kupp, B.H. Watson, Y. Chang, R.L. Walton, H.E. Payne, and G.L. Messing*		
3:30PM – 3:45PM	**Influence of Process Conditions on Structural and Electrical Properties of $Hf_{1-x}Zr_xO_2$: Dead Layer Effect and Defect Trapping** *Franz Fengler, T. Mittmann, M.H. Park, C. Richter, T. Mikolajick, and U. Schroeder*	**Textured PMNT Research and Development at PSU** *Richard J. Meyer Jr., G Messing, M. Fanton, E. Kupp, Y. Chang, and B. Watson*	**A Lightweight, Low Power Consumption De-Icing System for Composite Aircrafts using Macro Fiber Composites** *Alan Giles and Thomas Daue*	**Local Probe Studies of Switching and Current Dynamics in $Pb(Zr_{0.2}Ti_{0.8})O_3$ Thin Films** *Phillippe Tückmantel, I. Gaponenko, S. Gariglio, B. Ziegler, J. Agar, L.W. Martin, and P. Paruch*
3:45PM – 4:00PM		**Phase Formation, Crystal Growth, Crystal Structure and Piezoelectric Properties of $Ca_3TaAl_3Si_2O_{14}$ Single Crystal** *Yuui Yokota, Y. Ohashi, A. Yamaji, S. Kurosawa, K. Kamada, and A. Yoshikawa*	**Fabrication and Testing of Electromechanical Actuation Devices based on Gd-doped Ceria Thin Films** *Eran Mishuk, E. Makagon, E. Wachtel, S. Cohen, A.D. Ushakov, D.O. Alikin, A.A. Esin, A. Tselev, K. Rechav, R. Popovitz-Biro, V.Ya. Shur, A.L. Kholkin, and I. Lubomirsky*	**Chemical State Evolution in Ferroelectric Films During Polarization and Electroresistive Switching: Secondary Ion Mass Spectrometry Study** *Anton V. Ievlev, C.C. Brown, P. Maksymovych, S.V. Kalinin, and O.S. Ovchinnikova*
5:30 PM – 7:30 PM	**Craft Beer Tasting, Student Social** Monday Night Brewing			

Tuesday, May 9, 2017

8:30 AM – 9:30 AM	**Plenary Session II** Wenn Student Center Ballroom **Session Chair:** Dragan Damjanovic **Lattice Defects in Ferroelectric Oxides and Their Interactions with Electric Fields -** Prof. Elizabeth Dickey			
9:30 AM – 10:00 AM	**Refreshment Break**			
10:00 AM – 12:00 PM	**SESSION III**			
	Polar Interactions and Metastabilities **Room: 1443**	**Ferroelectric-based Memories and Transistors** **Room: 2456**	**Transducer Materials** **Room: 2443**	**Signal Contribution** **Room: 1456**
	Session Chair: Lauren Garten	**Session Chair: Vincent Garcia**	**Session Chair: Dragan Damjanovic**	**Session Chair: Lane Martin**
10:00AM	**INVITED -** (10:00AM – 10:30AM) **Polar Metastable States in Antiferroelectrics** *Elena Buixaderas*		**High Power Piezoelectric Characterization System – New Generation -** *Minkyu Choi and Kenji Uchino*	**INVITED -** (10:00AM – 10:30AM) **"Strange Ferroelectrics": Why So Many Materials Appear to Show Piezo/Ferroelectric Behaviors During Nanoscale Measurements** *Rama K. Vasudevan, N. Balke, A. Ievlev, O. Ovchinnikova, P. Maksymovych, S. Jesse and S.V. Kalinin*
10:15AM – 10:30AM		**Ferroelectric Properties of an Innovative FeFET with 3.3V Writing, 10^9 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*	
10:30AM		**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*	**INVITED** – (10:30AM – 11:00AM) **Advanced Mechanical Characterization for Piezoelectric Automotive Sensor Applications** *Gunnar Picht and S. Frank*	**Mechanical Reading of Ferroelectric Polarization** *Kumara Cordero-Edwards, A. Abdollahi, J. Sort, N. Domingo, and G. Catalán*
10:45AM – 11:00AM	**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*

11:00AM	**Defect Dipole Enhanced Electromechanical Coupling** *Ronald E. Cohen, Shi Liu, and Muhtar Ahart*	**Anti-Ferroelectric HfO_2 or ZrO_2: a Key Material for Novel Anti-Ferroelectric Non-volatile Memories** *M. Pešić, M. Hoffmann, C. Richter, S. Slesazeck, T. Mikolajick, and Uwe Schroeder*	**INVITED** – (11:00AM – 11:30AM) **Phenomenology of Transducer Materials** *George A. Rossetti, Jr.*	**Converse Flexoelectric Effects in PFM** *Neus Domingo, A. Abdollahi and G. Catalán*
11:15AM	**Stress-Dependent Bulk Photovoltaic Effect in Donor-Doped $LiNbO_3$: Relation Between Defect Structure, Band Structure and Dielectric Properties** *S. Nadupalli and Torsten Granzow*	**Ferroelectric Probe Data Storage Using HfO_2-Based Thin-Film Recording Media** *Yoshiomi Hiranaga, T. Mimura, T. Shimizu, H. Funakubo, and Y. Cho*		**INVITED –** (11:15AM – 11:45AM) **Probing Genuine Piezoresponse in Piezoresponse Force Microscopy** *Yunseok Kim*
11:30AM – 11:45AM	**Dielectric Properties of Lithium Niobate from mHz to Optical Frequencies** *Charlotte Cochard, T. Spielmann, N. Balhawane, A. Halpin, and T. Granzow*	**Controlling Magnetization using Patterned Electrodes on a Piezoelectric Film** *Chris S. Lynch and J. Cui*	**Modeling the Effect of Porous Structure on Poling Behavior of Ferroelectric Ceramics** *James I. Roscow, Y. Zhang, R.W.C Lewis, J. Taylor, and C.R. Bowen*	
11:45AM – 12:00PM	**Symmetry Breaking and Direct Evidence of Polar Regions In Paraelectric Phase of BaTiO3-Based Ferroelectrics** *Sina Hashemi Zadeh, Emad Oveisi, Sandro De Zanet, Andreja Bencan, Goran Drazic, Tadej Rojac, and Dragan Damjanovic*	**Non-volatile Ferroelectric Mechanical Memory** *Glen R. Fox, J.S. Pulskamp, and R.G. Polcawich*	**Manufacturing Technologies for Ultrasonic Transducers in a Broad Frequency Range** *S. Gebhardt, P. Günther, K. Hohlfeld, and Holger Neubert*	**Observation of Ferroelectric Domain Structure by Direct Piezoelectric Effect** *Takeshi Yoshimura, Kento Kariya, and Norifumi Fujimura*
12:00 PM – 2:00 PM	**Lunch Break**			

POSTER SESSION II

Klaus Building Atrium - 12:00 PM – 2:00 PM

II.1 Dielectric Properties of Multiferroic Ceramics of the $Bi_{1-x}La_xFe_{0.50}Sc_{0.50}O_3$ Metastable Solid Solutions System
I. Zamaraite, A.V. Konovalova, O.V. Ignatenko, A.V. Pushkarev, Yu.V. Radyush, N.M. Olekhnovich, A.D. Shilin, V.V. Rubanik, A. Stanulis, A. Kareiva, M. Ivanov, R. Grigalaitis, Jūras Banys, D.D. Khalyavin, and A.N. Salak

II.2 Magnetodielectric Properties of CuO and MnO_2 Modified $BiFeO_3$-$BaTiO_3$ Solid Solution
Amit Kumar, Narayan Bastola, and Rajeev Ranjan

II.3 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

II.4 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

II.5 $NaNbO_3$ Based Lead-free Antiferroelectric Ceramics
Lisheng Gao, Hanzheng Guo, Shujun Zhang, and Clive A. Randall

II.6 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

II.7 Room Temperature Ferroelectricity and Magnetoelectric Coupling in $Sr_3Co_2Fe_{24}O_{41}$ Hexaferrite
Anurag Gaur and Pawan Kumar

II.8 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

II.9 Distribution of Local Structures in Lead-Free Relaxor Ferroelectrics: $(Bi_{1/2}Na_{1/2})TiO_3$-$BaTiO_3$ Investigated with Na NMR
Pedro B. Groszewicz, H. Breitzke, M. Gröting, W. Jo, R. Dittmer, E. Sapper, K. Albe, G. Buntkowsky, and J. Rödel

II.10 Zero-temperature Landau-Devonshire Potential for $BiFeO_3$ from the First Principles
P. Marton, A. Klíč, M. Paściak, and J. Hlinka

II.11 Relation of the Structure and Magnetic and Dielectric Properties of the Core/Shell Composite $Co_{1-x}Ni_xFe_2O_4$
Ulisis Salazar-Kuri , J.O. Estevez, N. R. Silva, and M.E. Mendoza

II.12 Strain and Magnetic Field Induced Spin-Structure Transitions in Multiferroic $BiFeO_3$
A. Agbelele, Daniel Sando, C. Toulouse, C. Paillard, R.D. Johnson, R. Rüffer, A.F. Popkov, C. Carrétéro, P. Rovillain, J.-M. Le Breton, B. Dkhil, M. Cazayous, Y. Gallais, M.-A. Méasson, A. Sacuto, A.K. Zvezdin, A. Barthélémy, J. Juraszek, and M. Bibes

II.13 Domain Wall Orientation and Domain Shape in $KTiOPO_4$ Crystals
Vladimir Shur, E.M. Vaskina, E.V. Pelegova, M.A. Chuvakova, A.R. Akhmatkhanov, M. Ivanov, and A.L. Kholkin

II.14 Forward Domain Growth in Uniaxial Ferroelectrics
Vladimir Shur, D.O. Alikin, A.P. Turygin, A.V. Ievlev, and S.V. Kalinin

II.15 Periodic Domain Patterning by Electron Beam in Lithium Niobate Single Crystals Modified by Proton Exchange
D.S. Chezganov, E.O. Vlasov, D.K. Kuznetsov, A.R. Akhmatkhanov, L.V. Gimadeeva, M.M. Neradovskiy, E.A. Neradovskaya, M.A. Chuvakova, H. Tronche, F. Doutre, P. Baldi, M. P. De Micheli, and Vladimir Shur

II.17 Pressure Dependence of the Soft Mode Close to the Ferroelectric-Paraelectric Transition in $PbTiO_3$
Hamit Yurtseven and A. Kiraci

II.18 In-situ X-ray Diffraction Study of Gamma Irradiation Effects on Ferroelectric Thin Films
Hanhan Zhou, S. J. Brewer, M. Rivas, R.Q. Rudy, R.G. Polcawich, E.R. Glaser, C.D. Cress, N. Bassiri-Gharb, and J.L. Jones

II.19 Ferroelectric Film Dynamics Simulated by a Second-order Time-dependent Landau Model
Michael S. Richman, Paul Rulis, and Anthony N. Caruso

II.20 A Phenomenological Micromechanical Constitutive Model for General Ferroelectric Materials: 95/5 PZT
Wen D. Dong and J. Robbins

II.21 Structural and Dielectric Properties in Nd^{3+} Doped Bi-Cobaltite Nanoparticles
Muhammad Anis-ur-Rehman, F. Ahmed, and A. Munir

II.22 Effect of Parameter Variation in UTBB FDSOI-NCFET
Bhaskar Awadhiya and P.N. Kondekar

II.23 Dielectric Properties of $BaTiO_3$-$KNbO_3$ Composites
Sergejus Balčiūnas, Maksim Ivanov, Jūras Banys, and Satoshi Wada

II.24 Focused Ion Beam Methodologies Pave the Way for "Ferroelectronics": Release the Kraken
Stuart R. Burns, J.M. Gregg, and N. Valanoor

II.25 Bismuth Nickel Niobate with Small Negative Temperature Coefficients of Dielectric Constant
Xiukai Cai, Xiaobo Sun, and Lufeng Pang

II.26 Interface Diffusion of Silver Electrode into Bismuth-based Ceramics and its Effects on the Dielectric Properties
Xiukai Cai, Xiaobo Sun, and Lufeng Pang

II.27 The Structure and Dielectric Properties of Bismuth-Nickel-Niobium Oxide Based Ceramics
Xiukai Cai, Xiaobo Sun, and Lufeng Pang

II.29 Electrocaloric Effect in BNKT-based and $PbZrO_3$-based Ceramics
Zhongming Fan, Zunping Xu, Xiaoming Liu, and Xiaoli Tan

II.30 Electrocaloric Effects and Temperature Distribution Analysis of $BaTiO_3$-based Ceramics and Multi-layer Capacitor
Hiroshi Maiwa

II.31 Electrocaloric Effect in Ferroelectric Thin Film
Jinbin Wang and B. Li

II.32 Lead Zirconate Titanate Thin Films for a 2D Ultrasound Array
Christopher Y. Cheng, Y. Qiu, L. Hay, S. Cochran, and S. Trolier-McKinstry

II.33 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

II.34 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

II.35 Chemical Solution Deposition of Piezo Films for Prototype Microelectromechanical Systems (MEMS)
Beth Jones and S. Trolier-McKinstry

II.36 Characterization of PiezoMEMS $PbZr_{0.52}Ti_{0.48}O_3$ with IrO_2/Pt, IrO_2, and Pt Bottom Electrodes
Daniel M. Potrepka, H. Yu, M. Aindow, M. Rivas, G.R. Fox, and R.G. Polcawich

II.37 Determination of Elastic Modulus of IrO_2 Thin Films for PiezoMEMS Applications
Manuel Rivas, G. Song, R.Q. Rudy, B. Hanrahan, S.W. Lee, B. Huey, and R.G. Polcawich

II.38 Dielectric Behavior and Non-ohmic Behavior of CCTO/SiO_2 Composites
Hossein Talebinezhad, Y. Tong, X. Lu, and Z.Y. Cheng

II.39 Fabrication and Characterization of Perovskite Oxynitride Dielectrics
Takuya Hoshina, A. Sahashi, K. Kanehara, H. Takeda, and T. Tsurumi

II.40 Reduced Hysteresis Model and Temperature Dependency of Multilayer Piezo Actuators
Charles Mangeot

II.41 HfO_2/HfO_{2-x} Bilayer Structures for Multilevel Resistive Switching and Visualization of Oxygen Deficiencies by Electron Holography
Gang Niu, M. A. Schubert, S. U. Sharath, P. Zaumseil, S. Vogel, C. Wenger, E. Hildebrandt, S. Bhupathi, E. Perez, L. Alff, M. Lehmann, T. Schroeder, and T. Niermann

II.42 Paper Transistors with Organic Ferroelectric P(VDF-TrFE) Films
Min Gee Kim and Byung Eun Park

II.43 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

II.44 Improved Tunability of (Ba,Sr)TiO_3-$Ba_4Ti_{13}O_{30}$ Composite Ceramics by Infiltrate $BaTiO_3$
Rui Zheng, Dengren Jin, Kai Xu, Hanting Dong, Jinrong Cheng, and Jianguo Chen

II.45 New Methodology to Determine the Dielectric Constant and Loss at the Resonance/Antiresonance Frequency Range
Hossein Daneshpajooh, K. Uchino, and M. Choi

II.46 Influence of the Measurement System on the Nondestructive Pyroelectric Evaluation of Embedded Piezoelectric Transducers
Agnes Eydam, G. Suchaneck, and G. Gerlach

II.47 Piezoelectrets: Novel Transducer Materials for Mechanic and Acoustic Applications
Biao Zhu, Xiaoqing Zhang, Peng Fang, Jie Zheng, Tao Liu, Zeyang Xia, and Guanglin Li

II.48 Non-resonant Magnetoelectric Energy Harvester
Peter Finkel and M. Staruch

II.49 Efficient Power Generation via Controlled Porosity in Ferroelectric Polymers
Mohammad Mahdi Abolhasan, M. Naebe, K. Shirvanimoghadam, and K. Asadi

II.50 On the Optimal Electric Load for Ultrasound Energy Receivers
Mikel Gorostiaga, M. C. Wapler, and U. Wallrabe

II.51 Piezoelectric Composite Modules for Sensing and Energy Conversion from Road
Ruyan Guo, Bryan Gamboa, Dipon Wasim, George Nall, Juan Tamez, Kalyan Chakravavarthy, Mayur Pole, Pratheek Gopalakrishnan, Shuza Binzaid, and Amar Bhalla

II.52 Pyroelectric Energy Conversion Cycles Tailored for Antiferroelectrics
Brendan M. Hanrahan, Y. Espinal, C.J. Neville, and A.N. Smith

II.53 A New Interface Technique for Vibration-based Energy Harvesting using Synchronous Switch and Intermediate Capacitor
Hongtao Wang and Baoqiang Zhang

II.54 Porous PZT with Aligned Porosity and Improved Pyroelectric and Piezoelectric Properties for Energy Harvesting Applications
Yan Zhang, Mengying Xie, James Roscow, and Chris R. Bowen

II.55 Design, Simulation and Experimental Evaluation of Tri-Phasic Piezoelectric Composite Transducers
Amar Bhalla, Juan P. Tamez, and Ruyan Guo

II.56 High Temperature Poling and Aging Behavior in PIN-PMN-PT Single Crystals
Adam A. Heitmann, D.P. Sherman, and R. Pérez-Moyet

II.57 Characterization of Lead Titanate Single Crystals Grown by Self-Flux Technique
Thomas E. Hooper, A.J. Bell

II.58 Effect of Heat Treatment on Impedance Spectra of $Na_{0.5}Bi_{0.5}TiO_3$ Single Crystal
T.V. Kruzina, Vasyl M. Sidak, M.P. Trubitsyn, S.A. Popov, A. Yu. Tuluk, J. Suchanicz

II.59 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

II.60 Investigation of Morphotropic Phase Boundaries in the PIN-PSN-PT Ferroelectric Systems with High T_{rt} and T_c Phase Transition Temperatures
Dabin Lin, Fei Li, Shujun Zhang, Edward Gorzkowski, and Thomas R. Shrout

II.61 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

II.62 Finite Element Modeling of Transducers using the ATILA++ Code
Pascal Mosbah, R.J. Meyer, D.C. Markley, and J. Roland

II.63 ONR's Research Program on Acoustic Transduction Materials and Devices
Harold Robinson, W.A. Smith, C. Wu

II.64 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

II.65 Multi Bio Ultra Sounds Simulation Application
Yohachi Yamashita

II.66 Piezo1D 1.0
Ron Tasker

II.67 Modeling of Lamb Waves Excited by Inter-digital Transducers Deposited on Piezoelectric Plates
Tai-Ho Yu

II.68 Research on the Fluid Dynamic Characteristics of Piezoelectric Micro-jet
Kai Li*, Jun-kao Liu, Rui Yang and Wei-shan Chen

II.69 Mechanisms of Thermal Depolarization in Lead-free Relaxor / Semiconductor Composites
K. V. Lalitha, J. Rodel, L. Riemer, P. Groszewicz and J. Koruza

2:00 PM – 3:30 PM	**SESSION IV**			
	Organic Piezoelectrics, Composites **Room: 2456**	**Light-interaction** **Room: 1443**	**L. Eric Cross Memorial** **Room: 2443**	**Role of Interface** **Room: 1456**
	Session Chair: Shireen Adenwalla	**Session Chair: Torsten Granzow**	**Session Chair:** **Susan Trolier-McKinstry**	**Session Chair: Yunseok Kim**
2:00PM	**INVITED** – (2:00PM – 2:30PM) **A Nanoporous Piezoelectric Material: Metal-Organic Framework ZIF-8** *Moiqui van der Veen, M. Ivanov, S. Van Cleuvenbergen, I. Stassen, Y. Zhang, B. Champagne, and A.L. Kholkin*		**L.E. Cross – In Memorium** *S. Trolier-McKinstry*	**INVITED** – (2:00PM – 2:30PM) **Non-Ising and Chiral Ferroelectric Domain Walls: Insights from Nonlinear Optical Microscopy** *Salia Cherifi-Hertel, H. Bulou, R. Hertel, G. Taupier, K. D. Dorkenoo, C. Andreas, J. Guyonnet, I. Gaponenko, K. Gallo, P. Paruch*
2:15PM		**Anomalous Enhancement in Photocatalytic Rate by Stabilizing a Metastable Phase in a BiFeO3-Based Photocatalyst** *Bastola Narayan, Sangeeta Adhikari, Giridhar Madras and Rajeev Ranjan*	**INVITED** – (2:15PM – 2:45PM) **Lead Scandium Tantalate: From B-Sites through Thermal Sights to Cool Nights** *Roger W. Whatmore, S. Crossley, B. Nair, X. Moya, N.D. Mathur, G.T. Andrews, S. Spencer, M.J. Clouter, and R. Beanland*	
2:30PM	**Flexible Lead Free Piezoelectric Composites for Energy Harvesting Applications** *Pim Groen*	**A Multiferroic on the Brink: Modulation of Ferroelectric, Magnetic, and Optical Response using Strain-induced Transitions in $BiFeO_3$ films** *Daniel Sando, T. Young, Y. Zhou, C. Carrétéro, V. Garcia, S. Fusil, A. Barthélémy, M. Bibes, P. Munroe, and V. Nagarajan*		**Adsorbates and Surface Screening at the Ferroelectric Oxide Surfaces: A Synchrotron Ambient Pressure X-Ray Photoelectron Spectroscopy (XPS) Study** *Albert Verdaguer, K. Cordero, L. Rodriguez, M.J. Esplandiu, C. Escudero, V. Pérez, A. Calò, and N. Domingo*
2:45PM		**Optically-Induced Polarization Switching in $MoS_2/BaTiO_3$ Heterostructures** *Tao Li, A. Lipatov, H.-W. Lee, J.-W. Lee, C.-B. Eom, A. Sinitskii, and A. Gruverman*	**INVITED – (**2:45PM – 3:15PM) **Ultrafast Switching in Avalanche-driven Ferroelectrics by Supersonic Kink Movements** *Ekhard K.H. Salje, X. Wang, X. Ding, and J.F. Scott*	**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	**PVDF-Ppy Nanofibric Membranes For Peripheral Nerve Lesion Treatments** *Liangxi Li and Zhongyang Cheng*	**INVITED** – (3:00PM – 3:30PM) **The Bulk Photovoltaic Effect in Polar Oxides for Robust and Efficient Solar Energy Harvesting** *Andrew M. Rappe, L.Z. Tan, S.M. Young, F. Zheng, F. Wang, Y. Qi, J.E. Spanier, V.M. Fridkin, A.R. Akbashev, A. Polemi, Z. Gu, C.J. Hawley, D. Imbrenda, G. Xiao, A.L. Bennett-Jackson, and C.L. Johnson*		**INVITED –** (3:00PM – 3:30PM) **Interface Dependent Domain Growth and Charge Transport Control in Lithium Niobate** *Sabine M. Neumayer*
3:15PM – 3:30PM	**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*		**Cross-Fertilization: Electrostriction, Devonshire and High Temperature Transducers** *Andrew J. Bell*	
3:30 PM – 4:00 PM	**Refreshment Break**			

4:00 PM – 5:30 PM	**SESSION V**			
	Processing Optimization **Room: 2456**	**Local Order and Defects in Lead-free** **Room: 1443**	**L. Eric Cross Memorial** **Room: 2443**	**Switching Dynamics** **Room: 1456**
	Session Chair: Hisao Suzuki	**Session Chair: Kyle Webber**	**Session Chair: Susan Trolier-McKinstry**	**Session Chair: Jan Seidel**
4:00PM	**Control of PbO Loss during Sintering of PZT: Laboratory vs Industry** *Martin Safar, M. Zabcik and T. W. Button*	**INVITED –** (4:00 – 4:30) **Compositional Dependence of Disorder in $Na_{½}Bi_{½}TiO_3$-x%$BaTiO_3$** *P.K.M. Tung, J. Hudspeth, M. Marton and John E. Daniels*	**INVITED –** (4:00PM – 4:30PM) **What is so Interesting about Antiferroelectrics: A Walk in Lesser-Known Footsteps of Prof. Eric Cross** *Nava Setter*	**INVITED –** (4:00PM – 4:30PM) **Controlling Emergent Structures and Properties in Epitaxial Ferroelectric Films** *Lane W. Martin*
4:15PM	**Release and Transfer of Thin-Film $Pb(Zr_{0.52}Ti_{0.48})O_3$ onto Thin Polyimide Substrate** *Tianning Liu, M. Wallace, Thomas N. Jackson, and S. Trolier-McKinstry*			

4:30PM – 4:45PM	**Inkjet Printing of $LaNiO_3$ Electrodes for Ferroelectric Applications** *Aleksander Matavž, B. Malič, and V. Bobnar*	**Structural Disorder of $Bi_{0.5}K_{0.5}TiO_3$ Studied by Total Scattering and DFT** *Bo Jiang, Tor Grande, and Sverre M. Selbach*	**Recent Advances in Materials for Piezoelectric Transducers** *Dragan Damjanovic*	**Mesoscale Correlative Electro-Chemo-Mechanical Response in Ferroelectric Solid Solutions** *Iaroslav Gaponenko, L.A. Griffin, S. Brewer, R. Vasudevan, S. Zhang, and N. Bassiri-Gharb*
4:45PM	**Optimizing Lead Content in a Low Temperature Solution Processed PZT Film** *Reijiro Shimura, P.T. Tue, T. Shimoda, and Y. Takamura*	**Use of Bayesian Inference in Characterization of Ceramic Materials: An Introduction and Applications in Ferroelectrics** *Jacob L. Jones, Thanakorn Iamsasri, Jonathon Guerrier, Chris M. Fancher, John E. Daniels, Alexandra Larsen, Alyson G. Wilson, Brian Reich, and Ralph C. Smith*	**INVITED** – (4:45PM – 5:15PM) **Journey of a Life-time Down Ferroelectrics-Road with Professor Cross** *Dwight Viehland*	**Nanoscale Piezoelectric Response and Domain Relaxation of $(K,Na)NbO_3$-Based Lead-Free Perovskite with Abnormal Grain Growth** *Ke Wang, Tian-Lu Men, Wei Sun and Jing-Feng Li*
5:00PM – 5:15PM	**A Proposal of New Buffer Layer for Depositing (110)-oriented Perovskite Thin Films on (111)$Pt/SiO_2/Si$ Substrates** *Kiyoshi Uchiyama, T. Sato, A. Akama, T. Kiguchi, T.J. Konno, N. Oshima, D. Ichinose, and H. Funakubo*	**Electrical Fatigue Behavior of Li,Sb and Ta doped KNN Ceramics** *Orapim Namsar, Chunmanus Uthaisar, and Soodkhet Pojprapai*		**Structural Phase and Polarization Pattering of Strained BFO Thin Films** *Sabine M. Neumayer, N. Browne, D. Edwards, A. Naden, N. Bassiri-Gharb, A. Kumar, and B.J. Rodriguez*
5:15PM – 5:30PM			**Elution of Lead from PZT to Acid Rain** *Takaaki Tsurumi, B.S. Takezawa, T. Hoshina, and H. Takeda*	**Size-effects in Layered Ferrielectric $CuInP_2S_6$** *Petro Maksymovych, Marius Chyasnavichyus, Michael A. Susner, and Michael A. McGuire*

Wednesday, May 10, 2017

8:00 AM – 9:00 AM	**Plenary Session III** Wenn Student Center Ballroom **Session Chair:** Takaaki Tsurumi **Seeking Simple Truth in Complex Materials: Wrestling with Ferroelectrics,** *Prof. Marty Gregg*
9:00 AM – 10:00 AM	**Plenary Session IV** Wenn Student Center Ballroom **Session Chair:** Takaaki Tsurumi **Medical Ultrasound Transducers: Piezoelectrics at Work,** *Dr. Scott Smith*
10:00 AM – 10:30 AM	**Refreshment Break**

10:30 AM – 12:00 PM	**SESSION VI**			
	Lead-Free Piezoelectrics **Room: 2456**	**Domains and Domain Walls** **Room: 1443**	**Thermal and Dynamic Behaviors of PZT** **Room: 1456**	**Energy Harvesting** **Room: 2443**
	Session Chair: Julia Glaum	**Session Chair: Andreja Bencan**	**Session Chair: Francesco Cordero**	**Session Chair: Takeshi Yoshimura**
10:30AM	**INVITED** – (10:30AM – 11:00AM) **Influence of Compressive Stress on the Piezoelectric and Dielectric Behavior of Lead-Free Ferroelectrics: Shifting Phase Boundaries** *Kyle G. Webber and F.H. Schader*	**Domain and Domain Wall Imaging with Low Energy Electrons** *Nicholas Barrett, J.E. Rault, T.O. Mentes, A. Locatelli, G.F. Nataf, M. Guennou, J. Kreisel, P. Hicher, R. Haumont, L. Tortech, C. Mathieu, and D. Martinotti*	**Temperature Dependence of Field-responsive Mechanisms in Lead Zirconate Titanate Investigated Using Laboratory X-ray Diffraction** *Ching-Chang Chung, C.M. Fancher, R. Chen, C. Isaac, A. Kynast, J. Nikkel, E. Hennig, and J.L. Jones*	**INVITED** – (10:30AM – 11:00AM) **Metamaterial-enhanced Elastic Wave Energy Harvesting Concepts** *Serife Tol, F.L. Degertekin, and Alper Erturk*
10:45AM – 11:00AM		**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 $PbZr_{0.3}Ti_{0.7}O_3$ Thin Films** *Lyndsey M. Denis, G. Esteves, J. Walker, H. Zhou, M. Wallace, C. Fancher, J.L. Jones, and S. Trolier-McKinstry*	
11:00AM – 11:15AM	**Leakage Currents in Bi-Based Piezoelectric Thin Films** *Joel Walenza-Slabe and Brady Gibbons*	**Backscattered Scanning Electron Microscopy Domain Imaging of Ferroelectric Films: *in operando* Ferroelectric Domain Structure Characterization** *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*
11:15AM – 11:30AM	**Dielectric and Piezoelectric Properties of $Ba_{1-x}Ca_xTi_{1-y}Zr_yO_3$ Thin Films** *C.J.M. Daumont, Q. Simon, S. Payan, P. Gardes, P. Poveda, B. Negulescu, M. Maglione, and Jerome Wolfman*	**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*	**Characterization of Domain wall Dynamics in $PbZr_{1-x}Ti_xO_3$ Using X-Ray Photon Correlation Spectroscopy** *Semën Gorfman, A. Bokov, M. Reiser, N. Zhang, Z.-G. Ye, A. Zozulya, and C. Gutt*	**Direct Writing of $BaTiO_3$ Nanocomposites with Tailored Microstructure for Energy Harvesting** *Mohammad Malakooti, A. Nafari, F. Jule, and Henry A. Sodano*

11:30AM	**Cu Co-fired (Na, K)NbO_3 Multilayer Structure toward Piezoelectric Applications** *Lisheng Gao, Hanzheng Guo, Eberhard Hennig, Shujun Zhang, and Clive A. Randall*	**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*	**INVITED** – (11:30AM – 12:00PM) **Linking Pyroelectric Energy Conversion Theory to Practice** *Brendan Hanrahan, Y. Espinal, A. Smith, H. Khassaf, R. Polcawich, and S. Pamir Alpay*	**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*
11:45AM – 12:00PM		**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*
12:00 PM – 2:00 PM	**Lunch Break**			

12:00 PM – 2:00 PM	**Women in Engineering** **Moderator: Brady Gibbons** Klaus Building - Room 1447

2:00 PM – 3:30 PM	**SESSION VII**			
	Multiferroics, BFO Part I **Room: 1456**	**Ferroelectrics, Reliability** **Room: 2456**	**Jan Fousek Memorial** **Room: 1443**	**Transducers I** **Room: 2443**
	Session Chair: Sverre Selbach	**Session Chair: Doru Lupascu**	**Session Chair: Jiri Hlinka**	**Session Chair: Mark Fanton**
2:00PM	**INVITED -** (2:00PM – 2:30PM) **Mapping the Phase Diagram of Multiferroic $BiFeO_3$-$LaFeO_3$ Superlattices** *Patrycja Paruch*	**Improving Reliability in Piezoelectric Films** *Betul Akkopru-Akgun, M.T. Lanagan, and S. Trolier-McKinstry*	**INVITED -** (2:00PM – 2:30PM) **Domain Wall Mobility in Ferroelectric Films** *Susan Trolier-McKinstry*	(2:00PM – 2:15PM) **EMAT Phased Array Probe for Detecting Surface Cracks** *Julio Isla and Frederic Cegla*
2:15PM – 2:30PM		**Functional Response of Monolithic and Hetero-Layered Ferroelectric Thin Films** *Evelyn S. Chin and N. Bassiri-Gharb*		**Principle and Performance of a Novel Soft Material Loudspeaker** *Kun Jia, Kai Wang, and Yicheng Zhang*
2:30PM	**New Route to Design Vertically Aligned Multiferroic Nanocomposites** *Sergey Basov, C. Elissalde, and L. Piraux*	**Investigation of (non) polar Crystallographic Structures of (un) doped HfO_2 Bulk Ceramics and Nanoparticles** *Brienne S. Johnson, C.C. Chung, J. Brodie, S. Jones, W. Straka, B. Zoellner, P. Maggard, and J.L. Jones*	**INVITED** – (2:30PM – 3:00PM) **Tuning Domain Wall Thickness in Non-magnetic Ferroics** *Alexander K. Tagantsev*	**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*
2:45PM – 3:00PM	**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*	**Partial Discharge Characteristics of Ferroelectric Ceramics** *T. Hang, Julia Glaum, Yuri Genenko, T. Phung, and M. Hoffman*		
3:00PM	**Fabrication and Characterization of Nanoimprinted Organic-Inorganic Multiferroic Nanocomposites** *Pedro Sá, Bernard Nysten, Luc Piraux, and Alain M. Jonas*	**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*	**INVITED** – (3:00PM – 3:30PM) **Role of Domain Patterns in Ferroelectrics: From Basic Ideas to Phase-field Simulations** *Pavel Mokry*	**A Performance Study of Various Piezoelectric Crystals Based Through Wall Data Communication Systems at Elevated Temperature** *Suresh Kaluvan and Haifeng Zhang*

3:15PM – 3:30PM	**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. Trolier-McKinstry*		**Fabrication and Acoustic Characterization of BNT-Based Ultrasonic Therapeutic Transducer** *Elaheh Taghaddos, T. Ma, Q. Zhou, H. Zhong, M. X. Wan, and A. Safari*
3:30 AM – 4:00 PM	**Refreshment Break**			

4:00 PM – 5:30 PM	**SESSION VIII**			
	Multiferroics, BFO Part II **Room: 1456**	**Surfaces and Interfaces** **Room: 2456**	**Jan Fousek Memorial** **Room: 1443**	**Transducers II** **Room: 2443**
	Session Chair: Tae Kwon Song	**Session Chair: Elisabeth Soergel**	**Session Chair: Jiri Hlinka**	**Session Chair: Kui Yao**
4:00PM	**Deterministic Control over Symmetry States in Mixed Phase $BiFeO_3$** *Davie Edwards, N. Browne, K. Holsgrove, A. Naden, S.O. Sayedaghaee, B. Xu, S. Prosandeev, D. Wang, D. Mazumdar, A. Gupta, S. Neumayer, B. Rodriguez, N. Bassiri-Gharb, S.V. Kalinin, M.A. Arredondo, R.G.P. McQuaid, L. Bellaiche, J.M. Gregg, and A. Kumar*	**Tailoring Ferroelectric Surfaces for Demanding Applications from the Bottom Up** *B. Bein, M.H. Yusuf, A. Gura, G. Bertino, J.-W. Lai, B. Pamuk, M.V. Fernandez Serra, and Matthew Dawber*	**INVITED** – (4:00PM – 4:30PM) **A Tribute to Jan Fousek: Domains and Polar Clusters in Modern Non-Linear Dielectric Materials** *Clive Randall*	**End-Fire Ring Driven Flextensional Transducer** *Alex L. Butler and John L. Butler*
4:15PM – 4:30PM	**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** *Rama Vasudevan, S.V. Kalinin, Ye Cao, Evgheni Eliseev, and Anna N. Morozovska*		**Mechanical Pre-Stressing a Transducer through a Negative DC Bias Field** *Stephen C. Butler*
4:30PM	**Ferromagnetism in $BiFe_{1-x}Co_xO_3$ Thin Films and the Correlation Between Ferroelectric and Ferromagnetic Domains** *Hajime Hojo, R. Kawabe, K. Shimizu, H. Yamamoto, K. Mibu, and M. Azuma*	**Probing the Role of Surface Water in Ferroelectric Domain Charge Dynamics** *Iaroslav Gaponenko, N. Domingo, N. Stucki, A. Verdaguer, and P. Paruch*	**INVITED** – (4:30PM – 5:00PM) ***Domain-Enhanced Electromechanical Properties of Ferroelectrics Using Numerical Simulations*** *Pavel Marton, P. Ondrejokvic, V. Stepkova, A. Klíč, I. Rychetský, and J. Hlinka*	**Temperature and Stress-dependent Single Crystal Properties for High Power SONAR Applications** *Raphaël Lardat, Thomas Leissing, and Thomas Pastureaud*

4:45PM	**INVITED** - (4:45PM – 5:15PM) **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*	**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*		**INVITED** – (4:45PM – 5:15PM) **Modeling of Phononic Crystals based on Piezoelectric Materials: Effective Properties and Tunability** *Anne-Christine Hladky-Hennion, C. Vasseur, B. Dubus, A. Bâlé, F. Levassort, and M. Pham Thi*
5:00PM		**Tuning Light-induced Polarization Screening of Ferroelectric Materials by Water** *Fanmao Liu, I. Fina, F. Sánchez, and J. Fontcuberta*	**INVITED** – (5:00PM – 5:30PM) **Ferroelectric Domains — Formation, Engineering and Dynamics** *Wenwu Cao*	
5:15PM – 5:30PM	**$EuTiO_3$: A Magneto-Optical Device for Light Modulation** *Annette Bussmann-Holder, K. Roleder, and J. Köhler*	**$La_{1-y}Sr_yMnO_3$ / $Ba_{1-x}Sr_xTiO_3$ Junction Band Structure Tuning Through Combinatorial Interface Chemical Modulation** *Antoine Ruyter, J. Wolfman, B. Negulescu, P. Andreazza, C. Autret, and J. Sakai*		**Tunable Elastic Metamaterial based on Piezoelectric Transducer** *Pavel Marton, J. Nečásek, J. Václavík, and P. Mokrý*
6:00 PM – 10:00 PM	**Banquet Dinner** Wenn Student Center Ballroom			

Thursday, May 11, 2017

8:30 AM – 9:30 AM	**Plenary Session V** Wenn Student Center Ballroom **Session Chair:** Scott Smith **Investigation of Relaxor-PT Single Crystals for Device Applications,** *Prof. Haosu Luo*
9:30 AM – 10:00 AM	**Refreshment Break**

10:00 AM – 12:00 PM	SESSION IX			
	Superlattices, Films **Room: 1443**	**BFO: Structure and Properties** **Room: 1456**	**Processing and Characterization** **Room: 2456**	**Single Crystals I** **Room: 2443**
	Session Chair: Eiji Fujii	**Session Chair: Gunnar Picht**	**Session Chair: Brahim Dkhill**	**Session Chair: Fei Li**
10:00AM	**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) **Atomic-Scale Structural and Chemical Analysis of Domain Walls in Bismuth Ferrite** *Andreja Bencan, G. Drazic, H. Ursic, N. Sakamoto, B. Jancar, G.Tavcar, M. Makarovic, J. Walker, B. Malic, D. Damjanovic, and T. Rojac*	**Self-Assembled Monolayer-Assisted Inkjet Printing of PZT Films on Platinized Silicon** *Nicolas Godard, D. Sette, S. Glinsek, and E. Defay*	**Piezoelectric Single Crystal Standard** *Lynn M. Ewart and Zuo-Guang Ye*
10:15AM – 10:30AM			**Fabrication and Characterization of Mechanical Resonators Integrating Microcontact Printed PZT Films** *Daisuke Saya, D. Dezest, A.J. Welsh, O. Thomas, F. Mathieu, T. Leichle, L. Nicu, and S. Trolier-McKinstry*	**Broadband Acoustic Transduction Utilizing Phase Transformation in Ferroic Relaxor Mechanically Biased PIN-PMN-PT Single Crystal** *Peter Finkel and M. Staruch*
10:30AM	**Understanding Polarization Asymmetry and Precise Tuning of the Built-in bias in $PbTiO_3$ Based Superlattice Thin Films** *Hsiang C. Hsing, Simon Divilov, Joe Garlow, Mohammed H. Yusuf, John Bonini, Joe Bennett, Yimei Zhu, Premala Chandra, Karin M. Rabe, Xu Du, Maria V. Fernandez Serra, and Matthew Dawber*	**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, I. Vrejoiu, A. Herpers, R. Dittmann, and D.A. MacLaren*	**Optimizing Lead Content in a Low Temperature Solution Processed PZT Film** *Reijiro Shimura, P.T. Tue, T. Shimoda, and Y. Takamura*	**INVITED** – (10:30AM – 11:00AM) **The Contribution of Polar Nanoregions to Electromechanical Properties in Ferroelectric Crystals and Ceramics** *Fei Li, Shujun Zhang, Zhuo Xu, Long-Qing Chen, and Thomas R. Shrout*
10:45AM – 11:00AM	**Nanoscale Bubble Domains in Ultrathin Ferroelectric Films** *Nagarajan Valanoor, Qi Zhang, Lin Xie, Guangqing Liu, Sergei Prokhorenko, Yousra Nahas, Xiaoqing Pan, Laurent Bellaiche, and Alexei Gruverman*	**Deterministic Control over Conducting States in Morphotropic $BiFeO_3$ using Electrical Bias and Uniaxial Stress: Towards Piezoresistive Applications** *Niall Browne, D. Edwards, K. Holsgrove, A.B. Naden, S.O. Sayedaghaee, B. Xu, S. Prosandeev, D. Wang, D. Mazumdar, A. Gupta, S.V. Kalinin, M.A. Arredondo, R.G.P. McQuaid, L. Bellaiche, J.M. Gregg, and A. Kumar*	**Measurement Method of Multi-Layer Piezoelectric Polarity-Inverted Structure Using Scanning Nonlinear Dielectric Microscopy** *Hiroyuki Odagawa, Y. Tanaka, T. Yanagitani, and Y. Cho*	

11:00AM– 11:15AM	**Nanoscale Origins of Ferroelastic Domain Wall Mobility in Ferroelectric Multilayers** *Nagarajan Valanoor, Hsin-Hui Huang, Zijian Hong, Huolin L. Xin, Dong Su, Long-Qing Chen, Guanzhong Huang, and Paul R. Munroe*	**Real-Space Imaging of Non-Collinear Antiferromagnetic Order with a Single Spin Magnetometer** *Vincent Garcia, I. Gross, W. Akhtar, L.J. Martinez, S. Chouaieb, K. Garcia, C. Carrétéro, A. Barthélémy, P. Appel, P. Maletinsky, J.-V. Kim, J.-Y. Chauleau, N. Jaouen, M. Viret, M. Bibes, S. Fusil, and V. Jacques*	**Controlled Functionalization of Poly(4-methyl-1-pentene) Films for High Energy Storage** *Guan Wang, M. Zhang, Z Xu, and L. Zhang*	**Periodic Nano-domain Patterns in Relaxor Single Crystals** *Wei-Yi Chang, Ching-Chang Chung, Chih-hao Chang, Jacob L. Jones, Jian Tian, and Xiaoning Jiang*
11:15AM – 11:30AM	**Large Strain Control of Magnetization in Magnetostrictive Films on Single Crystal PIN-PMN-PT** *Margo Staruch, S.F. Cheng, K. Bussmann, and P. Finkel*	**Enhanced Piezoelectric Response Due to Polarization Rotation in Co-substituted $BiFeO_3$ Epitaxial Thin Films** *Keisuke Shimizu, H. Hojo, Y. Ikuhara, and Masaki Azuma*	**Bismuth Based Pyrochlore Dielectric Thin Films Deposited at Low Temperature for Thin Film Multilayer Capacitor Applications** *Wei Ren, Fan He, and Peng Shi*	**Micromachining of PIN-PMN-PT Crystals Using Ultra-short Pulse Laser Ablation** *Alena Kaiser, N. Neumann, A. Günther and M. Panzner*
11:30AM – 11:45AM	**Controlling the Intrinsic Polarization State in RF Sputtering Grown Ferroelectric Ultrathin Films** *Christian Weymann, C. Lichtensteiger, S. Fernandez-Pena, J.-M. Triscone, and P. Paruch*		**Tunable Interdigital Capacitors and Phase Shift Unit Cell Fabricated on $Ba_{0.29}Sr_{0.71}TiO_3$ Grown by Hybrid MBE** *Cedric J. G. Meyers, C. R. Freeze, S. Stemmer, X. Lan, L. Chau, and R.A. York*	**The Impact of Local Structure on Macroscopic Properties of ABO_3 Perovskite Relaxor** *Shujun Zhang, Fei Li, Long-Qing Chen, and Thomas R. Shrout*
11:45AM – 12:00PM	**Electrical Properties of Epitaxially Grown and Preferentially oriented CSD-derived $Pb(Mg_{1/3}, Nb_{2/3})O_3$-$PbTiO_3$ Thin films on Si substrate** *Hisao Suzuki, T. Arai, T. Ohno, N. Sakamoto and N. Wakiya*		**Structural Differences in Doped HfO_2: Root Causes for Varying Ferroelectric Properties Across Different Dopants** *T. Schenk, M.H. Park, C. Richter, E.D. Grimley, J.M. LeBeau, C. Zhou, J.L. Jones, T. Mikolajick, and Uwe Schroeder*	**Probing the Switching Behaviour of PMN-PT Below Room Temperature** *Philippa M. Shepley, L.A. Stoica, and A.J. Bell*
12:00 PM – 1:30 PM	**Lunch Break**			

1:30 PM – 4:00 PM	**SESSION X**			
	Nanoscale Ferroelectrics and Modeling Room: 1456	**Lead-free, Phase Boundaries** Room: 1443	**Electrocaloric** Room: 2456	**Single Crystals II** Room: 2443
	Session Chair: Inna Ponomareva	**Session Chair: Satoshi Wada**	**Session Chair: Roger Whatmore**	**Session Chair: Shujun Zhang**
1:30PM	**INVITED** – (1:30PM – 2:00PM) **Nanoscale Polarization in Molecular Ferroelectrics** *Stephen Ducharme*	**INVITED** – (1:30PM – 2:00PM) **Processing of Lead-free Piezoelectrics** *Mari-Ann Einarsrud*	**INVITED** – (1:30PM – 2:00PM) **Exotic Caloric Effects Predicted from First-principles Simulations** *Inna Ponomareva and S. Lisenkov*	**Development of PMN-PT Based Single Crystals** *Jian Tian, H. Pan, H. Marshall, and H. Ganegoda*
1:45PM – 2:00PM				**Current Status and Future Prospects of High Performance Piezoelectric Single Crystals: "Lead-based" and "Lead-free"** *J.Y. Lee, D.H. Kim, H.T. Oh, and Ho-Yong Lee*
2:00PM – 2:15PM	**Polarization Switching Kinetics in Bulk Ferroelectric Ceramics: Correlations due to Depolarization Fields** *R. Khachaturyan, J. Wehner, and Yuri A. Genenko*	**The MPB of BNT-xBT from the Titanium NMR Point of View** *Pedro B. Groszewicz, H. Breitzke, W. Jo, Jürgen Rödel, and Gerd Buntkowsky*	**Looking for Improved Caloric Responses with Ferroelectrics** *Brahim Dkhil*	**An Update of Large Size Relaxor-PT Crystal Development at TRS** *Jun Luo, S. Taylor and W. Hackenberger*
2:15PM – 2:30PM	**Quantification of Defect-Defect Interactions in Ferroelectric Materials** *S.J. Brewer, S.C. Williams, H. Zhou, R.Q. Rudy, M. Rivas, R.G. Polcawich, C D. Cress, E.R. Glaser, J.L. Jones, and N. Bassiri-Gharb*	**Electromechanical Hardening in Lead-Free Relaxor Composites** *Lalitha Kodumudi Venkataraman, L. Riemer, J. Koruza and J. Rödel*	**Efficient Electrocaloric Cooling Through Polymer Nanocomposites with High Dielectric Strength** *Florian Le Goupil, J. Martin, M. Valant, G. Hadziioannou, and N. Stingelin*	**Single Crystal Growth and Solidification Characteristics of PIN-PMN-PT Ferroelectrics** *Linghang Wang, F. Li, B. Wang, and Z. Xu*
2:30PM – 2:45PM	**Quantitative Modeling of High-Response Piezoelectricity Near a Phase Boundary** *Dennis M. Newns, M. Kuroda, F. Cipcigan, J. Crane, and G.J. Martyna*	**Quenching Effects for Electrical Properties on Lead-free $(Bi_{1/2}Na_{1/2})TiO_3$ and Related Solid Solution Ceramics** *Hajime Nagata, H. Muramatsu, T. Miura, and T. Takenaka*	**Direct Electrocaloric Effect Measurements in $BaTiO_3$-based Ferroelectric Ceramics** *M. Sanlialp, V.V. Shvartsman, and D.C. Lupascu*	**Domain Structure, Phase Transitions and Electric Properties of Novel $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$-$Bi(Zn_{2/3}Nb_{1/3})O_3$ Piezo-/Ferroelectric Single Crystals** *Zuo-Guang Ye, Zenghui Liu, Alisa Paterson, Hua Wu, and Wei Ren*
2:45PM – 3:00PM	**Switching Dynamics & Mechanisms in Morphotropic $PbZr_xTi_{1-x}O_3$ from Atomistic Modeling** *Jacob Chapman, O.T. Gindele, A.V. Kimmel, and D.M. Duffy*	**Influence of Additives on Ferroelectric Properties Of NBT-Based Ceramics** *Ekaterina D. Politova, N.V. Golubko, D.A. Belkova, A.V. Mosunov, N.V. Sadovskaya, G.M. Kaleva, and S. Yu. Stefanovich*	**Solid State Cooling Device Based on Electrocaloric Ceramic Multilayers** *Tian Zhang, Xiaoshi Qian, Haiming Gu, and Q. M. Zhang*	***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*

3:00PM – 3:15PM	**High Dielectric Constant due to the Strain-Induced Phase Transition of $BaTiO_3$ Nanocubes in an Ordered Assembly** *Kyuichi Yasui, Ken-ichi Mimura, and Kazumi Kato*	**Influence of Sintering Temperature on Structural, Dielectric and Electrical Properties of NBT-BCT Lead-free Piezoelectric Ceramics** *Raj Verr Singh, Meenakshi Gautam, and, R.P. Tandon*	**How Does Cyclic Electrical Loading Influence the Electrocaloric Effect in PMN-xPT?** *Andraz Bradeško, M. Vrabelj, L. Fulanović, M. Otoničar, Z. Kutnjak, B. Malič, and T. Rojac*	**Performance Comparison of Piezoceramic and Piezocrystal for Low-frequency Power Ultrasonics Application in Surgical Needles** Tingyi Jiang, Zhihong Huang, and Sandy Cochran
3:15PM – 3:30PM	**INVITED** **Ferroelectrics and Negative Capacitance** *Asif Khan*	**Improved Resistivity in Bismuth Deficient Morphotropic Phase Boundary 0.88BNT-0.08BKT-0.04BT Ceramics** *Gregory Yesner and A. Safari*	**Electrocaloric Ceramic Multilayer Modules – A Critical Step In Realizing High Performance Electrocaloric Cooling Devices** *Jinglei Li, Ying Hou, Xiaobo Zhao, Tian Zhang, and Q. M. Zhang*	**$(K, Na)NbO_3$-based Lead Free Single Crystals: Full Tensor Properties and Anisotropic Behavior** *Limei Zheng and Wenwu Cao*
3:30PM – 3:45PM		**Domain Investigation in Lead-free $Bi_{0.5}Na_{0.5}TiO_3$-$xBaTiO_3$ Ceramics by Piezoresponse Force Microscope** *Jinyan Zhao, Wei Ren, Nan Zhang, Gang Niu, Lingyan Wang, Ming Liu, Peng Shi, and Zuo-Guang Ye*	**Coupling Caloric Effects in $(x)0.67PNN-0.33PT – (1-x)La_{0.85}Ag_{0.15}MnO_3$ Ceramic Composites** *Abdulkarim A. Amirov, V.V. Rodionova, K. A. Chichay, and V.V. Sokolovskiy*	**Enhanced Piezoelectric and Ferroelectric Properties of $(K,Na,Li)(Nb,Ta,Sb)O_3$ Single Crystals by Defect Control** *Jurij Koruza, H. Liu, P. Veber, D. Rytz, M. Maglione, E.A. Patterson, T. Frömling, and J. Rödel*
3:45PM – 4:00PM				**The Charge Release and Its Mechanism for $Pb(In_{1/2}Nb_{1/2})O_3$-$Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Ferroelectric Crystals Under One-Dimensional Shock Wave Compression** *Hao Zhang, Junjie Gao, and Long Xie*
4:00 PM – 4:30 PM	**Refreshment Break**			
4:30 PM – 5:30 PM	**Plenary Session VI** Wenn Student Center Ballroom **Session Chair:** Nazanin Bassiri-Gharb **Pushing the Performance of Electro-Mechanical Thin Films**, *Prof. Paul Muralt*			
5:30 PM – 6:00 PM	**Conference Closing**			

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Adersah	Daw	Session I	Oral	Finite Element Simulation of Switchable and Tunable Resonators
Afifi	Mohamed	Poster I	Poster	Structure, Ferroelectric and Mechanical Performance of Polycrystalline Gadolinium Doped Lead Lanthanum Zirconate Titanate Ceramics
Akkopru-Akgun	Betul	Session VII	Oral	Improving Reliability in Piezoelectric Films
Alateeq	Abdulaziz	Session II	Oral	Step-up DC to DC Converter Based on Polarization Switching in Ferroelectric Capacitors
Alrwuili	Hamad	Session II	Oral	A Novel Compact Tunable Dual-Band Bandstop Filter (DBBSF) with Spurline and Stepped-Impedance Resonator Loaded with BST Capacitors
Amirov	Abdulkarim	Session X	Oral	Coupling Caloric Effects in (x)0.67PNN-0.33PT – (1-x)$La_{0.85}Ag_{0.15}MnO_3$ Ceramic Composites
Anis-ur-Rehman	Muhammad	Poster II	Poster	Structural and Dielectric Properties in Nd^{3+} Doped Bi-Cobaltite Nanoparticles
Asadi	Kamal	Session III	Oral	Graphene Ferroelectric Field-effect Transistors: Up-scaling and Practicality
Balke	Nina	Session III	Oral	Functional Material Properties of Oxide Thin Films Probed by Atomic Force Microscopy on the Nanoscale
Banys	Jūras	Poster II	Poster	Dielectric Properties of Multiferroic Ceramics of the $Bi_{1-x}La_xFe_{0.50}Sc_{0.50}O_3$ Metastable Solid Solutions System
Banys	Jūras	Poster I	Poster	Investigation of Noise Characteristics of Phosphorous Chalcogenide Crystal in the Vicinity of Phase Transition
Banys	Jūras	Poster II	Poster	Dielectric Properties of $BaTiO_3$-$KNbO_3$ Composites
Barrett	Nicholas	Session VI	Oral	Domain and Domain Wall Imaging with Low Energy Electrons
Basov	Sergey	Session VII	Oral	New Route to Design Vertically Aligned Multiferroic Nanocomposites
Bastola	Narayan	Session IV	Oral	Anomalous Enhancement in Photocatalytic Rate by Stabilizing a Metastable Phase in a $BiFeO_3$-Based Photocatalyst
Bell	Andrew	Session IV	Oral	Cross-Fertilization: Electrostriction, Devonshire and High Temperature Transducers
Bencan	Andreja	Session IX	Invited	Atomic-Scale Structural and Chemical Analysis of Domain Walls In Bismuth Ferrite
Bhalla	Amar S.	Poster II	Poster	Design, Simulation and Experimental Evaluation of Tri-Phasic Piezoelectric Composite Transducers
Bradesko	Andraz	Session X	Oral	How Does Cyclic Electrical Loading Influence the Electrocaloric Effect in PMN-xPT?
Brewer	Steven	Session X	Oral	Quantification of Defect-Defect Interactions in Ferroelectric Materials
Browne	Niall	Session IX	Oral	Deterministic Control Over Conducting States in Morphotropic $BiFeO_3$ using Electrical Bias and Uniaxial Stress: Towards Piezoresistive Applications
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Burns	Stuart	Poster II	Poster	Focused Ion Beam Methodologies Pave the way for "Ferroelectronics"
Bussmann-Holder	Annette	Session IV	Oral	$EuTiO_3$: a Magneto-optical Device for Light Modulation
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Butler	Alexander	Session VIII	Oral	End-Fire Ring Driven Flextensional Transducer
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Cai	XiuKai	Poster II	Poster	Interface Diffusion of Silver Electrode into Bismuth-based Ceramics and its Effects on the Dielectric Properties
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Chang	Wei-Yi	Session IX	Oral	Periodic Nano-domain Patterns in Relaxor Single Crystals
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Chapman	Jacob	Poster I	Poster	Atomistic Modelling of Ageing in Ferroelectrics
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Cheng	Christopher	Poster II	Poster	Lead Zirconate Titanate Thin Films for a 2D Ultrasound Array
Cheng	Jinrong	Session VII	Invited	Ferroelectric and Ferromagnetic MPBs of Modified $BiFeO_3$-$PbTiO_3$ Solid Solutions
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Chin	Evelyn	Session VII	Oral	Functional Response of Monolithic and Hetero-Layered Ferroelectric Thin Films
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Chung	Ching-Chang	Session VI	Oral	Temperature Dependence of Field-responsive Mechanisms in Lead Zirconate Titanate Investigated Using Laboratory X-ray Diffraction
Cochard	Charlotte	Session III	Oral	Dielectric Properties of Lithium Niobate from mHz to Optical Frequencies
Cochran	Sandy	Session X	Oral	Performance Comparison of Piezoceramic and Piezocrystal for Low-frequency Power Ultrasonics Application in Surgical Needles
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Cordero Edwards	Kumara	Session III	Oral	Mechanical Reading of Ferroelectric Polarization
Cui	Anyang	Session IX	Oral	In-situ Exploration of the Correlation Between Domain Evolution and First-order Phase Transition in $(K,Na)NbO_3$ Based Single Crystal
Damjanovic	Dragan	Session V	Oral	Recent Advances in Materials for Piezoelectric Transducers
Daniels	John	Session V	Invited	Compositional Dependence of Disorder in $Na_{½}Bi_{½}TiO_3$-x%$BaTiO_3$
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Denis	Lyndsey	Session VI	Oral	Domain Reorientation and Extrinsic Scaling Effects in Polycrystalline, {001} Textured $PbZr_{0.3}Ti_{0.7}O_3$ Thin Films
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Dolgos	Michelle	Session I	Oral	Piezoelectrics: Putting the "Squeeze" on New Materials
Domingo	Neus	Session III	Oral	Converse Flexoelectric Effects in PFM
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Du	Juan	Poster II	Poster	Nd doped $(K_{0.44}Na_{0.52}Li_{0.04})(Nb_{0.86}Ta_{0.1}Sb_{0.04})O_3$ Multifunctional Ceramics
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Dursun	Sinan	Poster I	Poster	Hard-Piezoelectric Ceramics for Low Temperature Co-fired Multilayer Piezoelectric Transformers
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Gregg	Marty	Plenary Session III	Plenary	Seeking Simple Truth in Complex Materials: Wrestling with Ferroelectrics
Griffin	Lee	Session V	Oral	Mesoscale Correlative Electro-Chemo-Mechanical Response in Ferroelectric Solid Solutions
Groen	Pim	Session IV	Oral	Flexible Lead-free Piezoelectric Composites for Energy Harvesting Applications
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Hanrahan	Brendan	Poster II	Poster	Pyroelectric Energy Conversion Cycles Tailored for Antiferroelectrics
Hanrahan	Brendan	Session VI	Invited	Linking Pyroelectric Energy Conversion Theory to Practice
Hashemi Zadeh	Sina	Session III	Oral	Symmetry Breaking and Direct Evidence of Polar Regions in Paraelectric Phase of $BaTiO_3$-based Ferroelectrics
Haugen	Astri Bjørnetun	Poster I	Poster	Textured Lead-free Piezoelectrics for High-frequency Ultrasound Imaging
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Hojo	Hajime	Session VIII	Oral	Ferromagnetism in $BiFe_{1-x}Co_xO_3$ Thin Films and the Correlation Between Ferroelectric and Ferromagnetic Domains
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Janssen	Arjen	Session II	Oral	Deposition of Epitaxial PMN-PT on Silicon Wafers for Piezoelectronic Transduction Memory Devices
Jaschin	Prem	Poster I	Poster	Synthesis of Single-crystalline Lithium Tantalate Nanorods – Piezoelectric and Non-linear Optic Properties
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Jia	Kun	Session VII	Oral	Principle and Performance of a Novel Soft Material Loudspeaker
Jian	Jie	Session I	Oral	Enhanced Dielectric and Piezoelectric Properties of the $BiFeO_3$-$PbTiO_3$-$BaZrO_3$ Ternary High Curie Temperature Ceramics
Jiang	Bo	Session V	Oral	Structural Disorder of $Bi_{0.5}K_{0.5}TiO_3$ Studied by Total Scattering and DFT
Johnson	Masami	Session VII	Oral	Investigation of (non) polar Crystallographic Structures of (un)doped HfO_2 Bulk Ceramics and Nanoparticles
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Jones	Jacob	Session V	Oral	Use of Bayesian Inference in Characterization of Ceramic Materials: An Introduction and Applications in Ferroelectrics
Kaiser	Alena	Session IX	Oral	Micromachining of PIN-PMN-PT Crystals Using Ultra-short Pulse Laser Ablation
Kalinin	Sergei	Session VIII	Oral	Ferroionic States: Coupling Between Surface Electrochemical and Bulk Ferroelectric Functionalities on the Nanoscale
Karuppanan	Avarinth	Poster I	Poster	Synthesis, Dielectric and Ferroelectric Behavior of Lead Free KBT-BT Ceramics
Kawahara	Masami	Poster I	Poster	High Performance PZT Chemical Coating Solution and Films for Piezoelectric MEMS Devices
Khanbareh	Hamideh	Session IV	Oral	Microstructural Tuning of Piezoelectric Particulate-Polymer-Foam Composites
Kholkin	Andrei	Session IV	Oral	Self-assembled Diphenylalanine Microtubes: Emerging Properties and Applications
Kim	Seung-Hyun	Session VI	Oral	Bio-compatible Lead-free Piezoelectric Thin Films for Small-scale Flexible Energy Harvesting and Storage Devices

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Kondekar	Pravin	Poster II	Poster	Effect of Parameter Variation in UTBB FDSOI-NCFET
Kornienko	Tatiana	Poster I	Poster	Photoelectromotive Force Under Transverse-moving Pulsed Illumination in the $Bi_{12}SiO_{20}$ and $Bi_{12}TiO_{20}$ Single Crystals
Koruza	Jurij	Session IX	Oral	Enhanced Piezoelectric and Ferroelectric Properties of $(K,Na,Li)(Nb,Ta,Sb)O_3$ Single Crystals by Defect Control
Kulkarni	Ajit	Poster I	Poster	Investigation of Electrical Properties in a New Lead-free (100-X)$(Li_{0.12}Na_{0.88})NbO_3$-X$BaTiO_3$ ($0 \leq X \leq 40$) Piezoelectric System
Kumar	Amit	Session VI	Oral	Observation, Injection and Controlled Motion of Conducting Domain Walls in Improper Ferroelectric Cu-Cl Boracite
Kumar	Amit	Poster II	Poster	Magnetodielectric Properties of CuO and MnO_2 Modified $BiFeO_3$-$BaTiO_3$ Solid Solution
Lardat	Raphael	Session VIII	Oral	Temperature and Stress-dependent Single Crystal Properties for High Power Sonar Applications
Le Goupil	Florian	Session X	Oral	Efficient Electrocaloric Cooling Through Polymer Nanocomposites with High Dielectric Strength
Lee	Ho-Yong	Session IX	Oral	Current Status and Future Prospects of High Performance Piezoelectric Single Crystals: "Lead-based" and "Lead-free"
Lemee	Nathalie	Session IX	Invited	Domain Engineering in Ferroelectric Tricolor Superlattices Probed by X-ray Diffraction
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Li	Jinglei	Session X	Oral	Electrocaloric Ceramic Multilayer Modules – A Critical Step In Realizing High Performance Electrocaloric Cooling Devices
Li	Chunchun	Poster I	Poster	Dielectric Relaxation in $Ca_5Nb_4TiO_{17}$
Li	Hongfang	Poster II	Poster	Preparation and Characterization of Ferroelectric Polymer Nanocomposites
Li	Kai	Poster II	Poster	Research on the Fluid Dynamic Characteristics of Piezoelectric Micro-jet
Li	Tao	Session IV	Oral	Optically-induced Polarization Switching in MoS_2/$BaTiO_3$ Heterostructures
Li	Liangxi	Session IV	Oral	PVDF-PPY Nanofibric Membranes for Peripheral Nerve Lesion Treatments
Li	Tao	Poster I	Poster	Ferroelasticity in Organolead Halide Perovskite $MAPbI_3$
Li	Fei	Session IX	Invited	The Contribution of Polar Nanoregions to Electromechanical Properties in Ferroelectric Crystals and Ceramics
Lichtensteiger	Celine	Session IV	Invited	Tuning of the Depolarization Field, Built-in Voltage and Nanodomain Structure in Ferroelectric Thin Films and Superlattices
Lin	Dabin	Poster II	Poster	Investigation of Morphotropic Phase Boundaries in the PIN-PSN-PT Ferroelectric Systems With High T_{rt} and T_c Phase Transition Temperatures
Liu	Lisha	Session I	Oral	*In situ* Poling and the Strong Post-poling Relaxation of non-180° Domain Texture in Bismuth Ferrite Ceramics
Liu	Yun	Session III	Oral	Susceptible Ferroelectric/Antiferroelectric Phase Transition Near the Surface of Typical Antiferroelectric Materials
Liu	Tianning	Session V	Oral	Release and Transfer of Thin-Film PZT onto Thin Polyimide Substrate
Liu	Fanmao	Session VIII	Oral	Tuning Light-induced Polarization Screening of Ferroelectric Materials by Water
Liu	Rui	Session II	Oral	Implications of Ferroelectricity During the Growth of Ferroelectric Superlattices
Liu	Wenjuan	Session II	Oral	RF Reactive Sputtering AlN Thin Film at Room Temperature for CMOS-compatible MEMS Application
Lu	Xu	Poster I	Poster	Effects of SiO_2 Coating on the Dielectric and Ferroelectric Properties of $BaTiO_3$-SiO_2 Composites
Lubomirsky	Igor	Session III	Oral	Non-classical Electrostriction in Fluorites and Perovskites: Current Understanding and Future Prospects
Luo	Haosu	Plenary Session V	Plenary	Investigation of Relaxor-PT Single Crystals for Device Applications
Luo	Jun	Session IX	Oral	An Update of Large Size Relaxor-PT Crystal Development at TRS
Lupascu	Doru C.	Session X	Oral	Direct Electrocaloric Effect Measurements in $BaTiO_3$-based Ferroelectric Ceramics
Lynch	Chris	Session III	Oral	Controlling Magnetization using Patterned Electrodes on a Piezoelectric Film
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Majzoubi	Maryam	Poster II	Poster	Comprehensive Analysis for Calculating Extensive Elastic Compliance and Mechanical Loss from a Non-electrode Sample
Maksymovych	Petro	Session V	Oral	Size-effects in Layered Ferrielectric $CuInP_2S_6$
Mangeot	Charles	Poster II	Poster	Reduced Hysteresis Model and Temperature Dependency of Multilayer Piezo Actuators
Mantri	Sukriti	Session I	Oral	Ferroelectric Domain Continuity over Grain Boundaries
Martin	Lane	Session V	Invited	Controlling Emergent Structures and Properties in Epitaxial Ferroelectric Films
Marton	Pavel	Session VIII	Invited	Domain-enhanced Electromechanical Properties of Ferroelectrics using Numerical Simulations
Marton	Pavel	Poster II	Poster	Zero-temperature Landau-Devonshire Potential for $BiFeO_3$ from the First Principles
Marton	Pavel	Session VIII	Oral	Tunable Elastic Metamaterial Based on Piezoelectric Transducer
Martyna	Glenn	Session III	Oral	The Piezoelectronic Family of Devices, from RF Switches to Fast Low Power Transistors
Matavž	Aleksander	Session V	Oral	Inkjet Printing of $LaNiO_3$ Electrodes for Ferroelectric Applications
Matsuo	Shogo	Poster I	Poster	Nonlinear Electric Field Dependence of Electrocaloric Effect in (001)-Epitaxial (Ba,Sr)TiO_3 Thin Films
McConville	James	Session VI	Oral	Local Writing and Characterization of Individual Charged Conducting Domain Walls in y-cut $LiNbO_3$ (MgO 5% mol) Single Crystals
Meurisse	Thibaut	Session III	Oral	Modeling Losses of a Piezoelectric Resonator: Analytical vs Finite Elements Analysis
Meyer	Richard	Session II	Oral	Textured PMNT Research and Development at PSU
Meyers	Cedric	Session IX	Oral	Tunable Interdigital Capacitors and Phase Shift Unit Cell Fabricated on $Ba_{0.29}Sr_{0.71}TiO_3$ Grown by Hybrid MBE
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Mishuk	Eran	Session II	Oral	Fabrication and Testing of Electromechanical Actuation Devices Based on Gd-Doped Ceria Thin Films
Mokry	Pavel	Session VII	Invited	Digital Holographic Tomography of Periodically Poled Lithium Niobate: A Challenge for Artificial Neural Networks
Mokry	Pavel	Session I	Oral	Role of Domain Patterns in Ferroelectrics: From Basic Ideas to Phase-Field Simulations
Morandi	Carl	Session I	Oral	Exploring Next Generation High Temperature Ferroelectrics: 35Bi($Mg_{1/2}Ti_{1/2}$)O_3-65$PbTiO_3$ Thin Films
Morgan	Timothy	Session II	Oral	Self-limiting Growth of Barium Titanate via Molecular Beam Epitaxy
Mosbah	Pascal	Poster II	Poster	Finite Element Modeling of Transducers Using the Atila++ Code
Murakami	Shunsuke	Poster I	Poster	Bi($Mg_{2/3}Nb_{1/3}$)O_3-$BaTiO_3$-$BiFeO_3$ PbO-free Piezoelectric Ceramics
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Neubert	Holger	Session III	Oral	Manufacturing Technologies for Ultrasonic Transducers in a Broad Frequency Range
Neumayer	Sabine	Session IV	Invited	Interface Dependent Domain Growth and Charge Transport Control in Lithium Niobate
Neumayer	Sabine	Session V	Oral	Structural Phase and Polarization Pattering of Strained BFO Thin Films
Newns	Dennis	Session X	Oral	Quantitative Modeling of High-response Piezoelectricity near a Phase Boundary
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Park	Byung Eun	Poster II	Poster	Paper Transistors with Organic Ferroelectric P(VDF-TrFE) Films
Parry	Samuel	Poster I	Poster	Room Temperature Crystallographic Phase Analysis of (1-x)$KNbO_3$-x$CaZrO_3$ Lead-free Piezoelectric Materials
Pereira de Sá	Pedro	Session VII	Oral	Fabrication and Characterization of Nanoimprinted Organic-Inorganic Multiferroic Nanocomposites
Pérez-Moyet	Richard	Poster I	Poster	Mechanical Strength and Material Property Evaluation of Textured PMN-PZT Polycrystalline Ceramic
Phan	Tue Trong	Session I	Oral	Evaluation on Operation of a Lead-Zirconium-Titanate (PZT) Actuator Array for Highly Integrated Biochip Application
Picht	Gunnar	Session III	Invited	Advanced Mechanical Characterization for Piezoelectric Automotive Sensor Applications
Pojprapai	Soodkhet	Session V	Oral	Electrical Fatigue Behavior of Li,Sb and Ta doped KNN Ceramics
Politova	Ekaterina	Session X	Oral	Influence of Additives on Ferroelectric Properties of NBT-based Ceramics
Ponomareva	Inna	Session X	Invited	Exotic Caloric Effects Predicted from First-principles Simulations
Popov	Sergey	Poster I	Poster	Targets Modification During NBT Thin Films Deposition
Potrepka	Daniel	Poster II	Poster	Characterization of PiezoMEMS $PbZr_{0.52}Ti_{0.48}O_3$ with IrO_2/Pt, IrO_2, and Pt Bottom Electrodes
Pradhan	Dhiren	Session IV	Oral	Effect of Temperature, Humidity and Thickness on Tip Induced Polarization Switching of Single Phase Multiferroic Thin Films
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Randall	Clive	Plenary Session I	Plenary	Cold Sintering--Rethinking What we Thought we Knew in Electroceramics
Rappe	Andrew	Session IV	Invited	The Bulk Photovoltaic Effect in Polar Oxides for Robust and Efficient Solar Energy Harvesting
Ren	Shenqiang	Poster I	Poster	Multifunctional Molecular Ferroelectic Thin Films
Ren	Wei	Session IX	Oral	Bismuth Based Pyrochlore Dielectric Thin Films Deposited at Low Temperature for Thin Film Multilayer Capacitor Applications
Richman	Michael	Poster II	Poster	Ferroelectric Film Dynamics Simulated by a Second-order Time-dependent Landau Model
Rivas	Manuel	Poster II	Poster	Determination of Elastic Modulus of IrO_2 Thin Films for PiezoMEMS Applications
Robinson	Harold	Poster II	Poster	ONR's Research Program on Acoustic Transduction Materials and Devices
Rodriguez	Brian	Session II	Oral	Biocompatible Lithium Niobate for Sensing and Microfluidics Applications
Rodriguez	Brian	Poster I	Poster	Non-destructive Determination of Collagen Fibril Width in Extruded Collagen Fibers by Piezoresponse Force Microscopy
Roscow	James	Session III	Oral	Modelling the Effect of Porous Structure on Poling Behavior of Ferroelectric Ceramics
Rossetti	George	Session III	Invited	Phenomenology of Transducer Materials
Rudy	Ryan	Session I	Oral	What is Needed for the PiezoMEMS Applications of the Future?
Ruesing	Michael	Session I	Oral	Optical Properties of Domain Walls in Periodically Poled $LiNbO_3$ and $LiTaO_3$ Studied by First-principle Calculation and Raman Spectroscopy
Ruyter	Antoine	Session VIII	Oral	$La_{1-y}Sr_yMnO_3$ / $Ba_{1-x}Sr_xTiO_3$ Junction Band Structure Tuning through Combinatorial Interface Chemical Modulation
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Salje	Ekhard	Session IV	Invited	Ultrafast Switching in Avalanche–driven Ferroelectrics by Supersonic Kink Movements
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Schultheiss	Jan	Session I	Oral	Simultaneous Time-resolved Measurements of Polarization and Strain Dynamics to Explore Switching in Ferroelectric/Ferroelastic Materials
Seidel	Jan	Session II	Invited	Topological Structures in Ferroic Materials as Nanoscale Functional Elements
Selbach	Sverre Magnus	Session I	Oral	Interactions Between Point Defects and Ferroelectric Domain Walls
Setter	Nava	Session V	Invited	What is so Interesting About Antiferroelectrics: A Walk in Lesser-known Footsteps of Prof. Eric Cross
Shen	Shujin	Poster I	Poster	Fabrication and Characterization of La, Ga Co-modified $BiFeO_3$-$PbTiO_3$ Multiferroic Ceramics with High Magnetic Field Assisted Sintering
Shepley	Philippa	Session IX	Oral	Probing the Switching Behaviour of PMN-PT Below Room Temperature
Shieh	Bernard	Poster II	Poster	A Hybrid Boundary Element Method for the Simulation of Acoustic Cross-talk in Large Piezoelectric Micromachined Ultrasonic Transducer Arrays in Immersion
Shimizu	Keisuke	Session IX	Oral	Enhanced Piezoelectric Response due to Polarization Rotation in Co-substituted $BiFeO_3$ Epitaxial Thin Films
Shimura	Reijiro	Session IX	Oral	Analyzing Pressure Dependence of a Low-temperature Solution-processed PZT Actuator
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Sidak	Vasyl	Poster II	Poster	Effect of Heat Treatment on Impedance Spectra of $Na_{0.5}Bi_{0.5}TiO_3$ Single Crystal
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Smith	Scott	Plenary Session IV	Plenary	Medical Ultrasound Transducers – Piezoelectrics at Work
Sodano	Henry	Session VI	Oral	Direct Writing of $BaTiO_3$ Nanocomposites with Tailored Microstructure for Energy Harvesting
Soergel	Elisabeth	Session VI	Oral	Manipulating the DWC in Bulk $LiNbO_3$
Somnath	Suhas	Session II	Oral	Full Information Acquisition in Piezoresponse Force Microscopy for Ultrafast Imaging of Polarization Switching
Song	Tae Kwon	Session I	Invited	Piezoelectric Properties of $BiFeO_3$-$BaTiO_3$ Ceramics and Thin Films
Spirito	David	Session VI	Oral	Large-scale and Flexible Energy Harvester Based on ZnO Conical Nanostructures by Nano-imprint Lithography and Atomic Layer Deposition
Staruch	Margo	Session IX	Oral	Large Strain Control of Magnetization in Magnetostrictive Films on Single Crystal Pin-PMN-PT
Suzuki	Hisao	Session IX	Oral	Electrical Properties of Epitaxially Grown and Preferentially Oriented CSD-derived $Pb(Mg_{1/3}, Nb_{2/3})O_3$-$PbTiO_3$ Thin films on Si Substrate
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Taghaddos	Elaheh	Session VII	Oral	Fabrication and Acoustic Characterization of BNT-Based Ultrasonic Therapeutic Transducer
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Tong	Yang	Poster II	Poster	Process and Microstructure to Achieve High Dielectric Constant in Ceramic-Glass Composites for Energy Storage Applications
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Tuncdemir	Safakcan	Session VI	Oral	High Temperature Energy Harvesting Systems
Uchiyama	Kiyoshi	Session V	Oral	A Proposal of New Buffer Layer for Depositing (110)-oriented Perovskite Thin Films on (111)Pt/SiO_2/Si Substrates
Valanoor	Nagarajan	Session IX	Oral	Nanoscale Origins of Ferroelastic Domain Wall Mobility in Ferroelectric Multilayers
Valanoor	Nagarajan	Session IX	Oral	Nanoscale Bubble Domains in Ultrathin Ferroelectric Films
van der Veen	Monique	Session IV	Invited	A Nanoporous Piezoelectric Material: Metal-Organic Framework ZIF-8
Vasudevan	Rama	Session III	Invited	"Strange Ferroelectrics": Why so many Materials Appear to Show Piezo/Ferroelectric Behaviors during Nanoscale Measurements
Verdaguer	Albert	Session IV	Oral	Adsorbates and Surface Screening at the Ferroelectric Oxide Surfaces: A Synchrotron Ambient Pressure X-Ray Photoelectron Spectroscopy (XPS) Study
Viehland	Dwight	Session V	Invited	Journey of a Life-time Down Ferroelectrics-Road with Professor Cross
Volkova	Halyna	Poster II	Poster	Characterization of Photoferroelectric $BaTiO_3$-based Solid Solutions
Wada	Satoshi	Session II	Invited	Piezoelectric Enhancement of Bismuth-based Piezoelectric Materials with Pseudo-cubic Symmetry based on Nano/Macro Complex Domain Configurations
Walker	Julian	Session I	Oral	Piezoelectric Microelectromechanical Systems (PiezoMEMS) for Adjustable X-ray Optics
Walker	Julian	Session I	Oral	Rare-earth Modified Bismuth Ferrite Ceramics: Composition, Structure and Properties from Local to Macroscopic Scales
Wang	Yaojin	Session II	Oral	Equivalent Magnetic Noise of Heterostructural Magnetoelectric Sensors
Wang	Aochen	Session II	Oral	Electrospun PVDF-TrFE Piezoelectric Nanofiber Membrane for Tissue Engineering Applications
Wang	Dawei	Poster I	Poster	Ceramic/Polymer Microwave Composites via the Cold Sintering Process
Wang	Jinbin	Poster II	Poster	Electrocaloric Effect in Ferroelectric Thin Film
Wang	Hong	Poster II	Poster	Significantly Enhanced Electric Polarization and Energy Density of All Polymer Based Sandwich Structured Composites for Energy Storage Applications
Wang	Lei	Poster II	Poster	Embedded Nanotransducer for Ultrahigh-frequency SAW Utilizing AlN/Diamond Layered Structure
Wang	Hongtao	Poster II	Poster	A New Interface Technique for Vibration-based Energy Harvesting Using Synchronous Switch and Intermediate Capacitor
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Wang	Guan	Session IX	Oral	Controlled Functionalization of Poly(4-Methyl-1-Pentene) Films for High Energy Storage
Wang	Dixiong	Session II	Oral	The Cold Sintering of Lead Zirconate Titanate (PZT-5A) Powder
Wang	Linghang	Session IX	Oral	Single Crystal Growth and Solidification Characteristics of PIN-PMN-PT Ferroelectrics
Wang	Ke	Session V	Oral	Nanoscale Piezoelectric Response and Domain Relaxation of $(K,Na)NbO_3$-Based Lead-free Perovskite with Abnormal Grain Growth
Watson	Beecher	Poster I	Poster	$[001]_c$ Textured Ternary Ceramics with Enhanced Piezoelectric Properties by Templated Grain Growth
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Weymann	Christian	Session IX	Oral	Controlling the Intrinsic Polarization State in RF Sputtering Grown Ferroelectric Ultrathin Films
Whatmore	Roger	Session IV	Invited	Lead Scandium Tantalate: From B-Sites through Thermal Sights to Cool Nights
Whatmore	Roger	Session VII	Oral	Magnetic Ion Partitioning in Multiferroic Aurivillius Bismuth Iron Manganese Titanate
Wolfman	Jerome	Session VI	Oral	Dielectric and Piezoelectric Properties of $Ba_{1-x}Ca_xTi_{1-y}Zr_yO_3$ Thin Films
Xia	Lu	Session VIII	Oral	Point Defects in (001)-Strained $BiFeO_3$
Xu	Ruijuan	Session III	Oral	Tunable, Multi-State Switching in Ferroelectric Thin Films
Yamada	Tomoaki	Session I	Oral	Manipulation of Domain Structure in {100} Tetragonal $Pb(Zr,Ti)O_3$ Nanorods by Charge Screening
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Yasui	Kyuichi	Session X	Oral	High Dielectric Constant due to the Strain-Induced Phase Transition of $BaTiO_3$ Nanocubes in an Ordered Assembly
Ye	Zuo-Guang	Session IX	Oral	Domain Structure, Phase Transitions and Electric Properties of Novel $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$-$Bi(Zn_{2/3}Nb_{1/3})O_3$ Piezo-/Ferroelectric Single Crystals
Yeo	Hong Goo	Poster I	Poster	Strongly {001} Oriented Bimorph Thick PZT Films Grown by High Temperature RF- Magnetron Sputtering for a Non-resonant Piezoelectric Energy Harvester
Yesner	Gregory	Session VI	Oral	Optimization of a Novel Transducer Design for a Pavement Embedded Energy Harvesting Application
Yesner	Gregory	Session X	Oral	Improved Resistivity in Bismuth Deficient Morphotropic Phase Boundary 0.88BNT-0.08BKT-0.04BT Ceramics
Yokota	Yuui	Session II	Oral	Phase Formation, Crystal Growth, Crystal Structure and Piezoelectric Properties of $Ca_3TaAl_3Si_2O_{14}$ Single Crystal
Yoshimura	Takeshi	Session III	Oral	Observation of Ferroelectric Domain Structure by Direct Piezoelectric Effect
Yu	Tai-Ho	Poster II	Poster	Modeling of Lamb Waves Excited by Inter-digital Transducers Deposited on Piezoelectric Plates
Yuan	Jing	Session I	Oral	Dielectric, Electrical Conduction, Piezoelectric and Impendence Analysis of Bi_3TiNbO_9 Piezoceramics with Ce-Modifications
Yurtseven	Hamit	Poster II	Poster	Pressure Dependence of the Soft Mode Close to the Ferroelectric-Paraelectric Transition in $PbTiO_3$
Zeng	Yi	Session X	Oral	High Energy Density of Polymer Nanocomposites Induced by Modulation of their Topological-Structure
Zhang	Tian	Session X	Oral	Solid State Cooling Device Based on Electrocaloric Ceramic Multilayers
Zhang	Chenlan	Poster I	Poster	Remarkably Enhanced Photocatalytic Activity in $Bi_{1-x}Ba_xFeO_3$ Prepared by Sol-Gel Method
Zhang	Yan	Poster II	Poster	Porous PZT with Aligned Porosity and Improved Pyroelectric and Piezoelectric Properties for Energy Harvesting Applications
Zhang	Shujun	Session IX	Oral	The Impact of Local Structure on Macroscopic Properties of ABO_3 Perovskite Relaxor
Zhang	Hao	Session IX	Oral	The Charge Release and Its Mechanism for $Pb(In_{1/2}Nb_{1/2})O_3$-$Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Ferroelectric Crystals Under One-dimensional Shock Wave Compression
Zhang	Nan	Session I	Invited	Lattice Strain and Domain Contributions in Piezoelectric PZT
Zhang	Haifeng	Session VII	Oral	A Performance Study of Various Piezoelectric Crystals based through Wall Data Communication Systems at Elevated Temperature
Zhao	Jianwei	Poster I	Poster	Probing Cracks Induced by Inhomogeneous Stresses in MLCAs
Zhao	Jinyan	Session X	Oral	Domain Investigation in Lead-free $Bi_{0.5}Na_{0.5}TiO_3$-$xBaTiO_3$ Ceramics by Piezoresponse Force Microscope
Zhao	Changhao	Poster I	Poster	Electric-Field-Induced Polarization Rotation in $PbZr_{0.5}Ti_{0.5}O_3$ Revealed by In-Situ Pair Distribution Function Study
Zheng	Shijie	Session I	Oral	Finite Element Modeling of Piezoelectric Nanobeams with Surface and Flexoelectricity Effects
Zheng	Rui	Poster II	Poster	Improved Tunability of $(Ba,Sr)TiO_3$-$Ba_4Ti_{13}O_{30}$ Composite Ceramics by Infiltrate $BaTiO_3$
Zheng	Limei	Session IX	Oral	(K, Na)NbO_3-Based Lead-free Single Crystals: Full Tensor Properties and Anisotropic Behavior
Zhou	Hanhan	Poster II	Poster	In-situ X-ray Diffraction Study of Gamma Irradiation Effects on Ferroelectric Thin Films
Zhu	Wanlin	Session VII	Oral	Dielectric Failure in Nb-doped {001} Textured Lead Zirconate Titanate Films
Zhu	Jianguo	Poster I	Poster	Properties and Structures of Nonstoichiometric (K,Na)NbO_3-Based Lead-free Ceramics

Attendee List

Adenwalla, Shireen
University of Nebraska-Lincoln
sadenwalla1@unl.edu

Akkopru-Akgun, Betul
Penn State University
betulakkopru@gmail.com

Alateeq, Abdulaziz
University of Colorado at Colorado Springs
ajateeq@gmail.com

Alghamdi, Talal
Florida Institute of technology
Talal.eee@gmail.com

Alrwuili, Hamad
University of Colorado at Colorado Springs
hamadalrwuili@yahoo.com

Amirov, Abdulkarim
Institute of Physics of Dagestan Scientific Center of Russian Academy of Sciencies
amiroff_a@mail.ru

Ando, Akira
Murata Mfg. Co., Ltd.
a_ando@murata.com

Antoine, Ruyter
Lab. GREMAN, UMR7347 CNRS
ruyter@univ-tours.fr

Anyang, Cui
East China Normal University
anyangcui@foxmail.com

Asadi, Kamal
Max-Planck Institute for Polymer Research
asadi@mpip-mainz.mpg.de

Asderah, Daw
University of Colorado at Colorado Springs
dasderah@uccs.edu

Baird, David
Progeny Systems
david.baird@progeny.net

Banys, Juras
Vilnius University
Juras.Banys@ff.vu.lt

Barrett, Nicholas
CEA Saclay
nick.barrett@cea.fr

Basov, Sergey
BSMA-IMCN Université Catholique de Louvain
sergey.basov@uclouvain.be

Bassiri-Gharb, Nazanin
Georgia Institute of Technology
nazanin.bassirigharb@me.gatech.edu

Bastola, Narayan
Indian Institute of Science
bastola.san@gmail.com

Bedwell, Ian
Thales Australia
ian.bedwell@thalesgroup.com.au

Bell, Andrew
University of Leeds
a.j.bell@leeds.ac.uk

Bencan, Andreja
JSI
andreja.bencan@ijs.si

Bhalla, Amar
University of Texas at San Antonio
amar.bhalla@utsa.edu

Blottman, John
Naval Undersea Warfare Center
john.blottman@NAVY.MIL

Bradesko, Andraz
Jozef Stefan Institute
andraz.bradesko@ijs.si

Braga Groszewicz, Pedro
Technische Universität Darmstadt
groszewicz@chemie.tu-darmstadt.de

Brewer, Steven
Georgia Institute of Technology
sbrewer@gatech.edu

Browne, Niall
Queen's University Belfast
nbrowne07@qub.ac.uk

Buixaderas, Elena
Institute of Physics,
Czech Academy of Sciences
buixader@fzu.cz

Burns, Stuart
University of New South Wales
s.r.burns@student.unsw.edu.au

Bussmann-Holder, Annette
Max-Planck-Institute for Solid State Research
a.bussmann-holder@fkf.mpg.de

Butler, Stephen
Naval Undersea Warfare Center
stephen.c.butler1@NAVY.MIL

Butler, Alexander
Image Acoustics, Inc.
abutler@imageacoustics.com

Cai, Xiukai
Shandong Jianzhu University
xkcai@sdjzu.edu.cn

Cao, Wenwu
Penn State University
dzk@psu.edu

Cardoletti, Juliette
Penn State University
jzc462@psu.edu

Chang, Yunfei
Penn State University
yuc15@PSU.EDU

Chapman, Jacob
University College London
jacob.chapman.13@ucl.ac.uk

Attendee List

Chen, Wei Ting
Penn State University –
Visiting Researcher
weitingchen2011@gmail.com

Cheng, Christopher
Penn State University
cyc5@psu.edu

Chin, Evelyn
Georgia Institute of Technology
eschin@gatech.edu

Cho, Yasuo
Tohoku University
yasuocho@riec.tohoku.ac.jp

Choi, Minkyu
Penn State University
mchoi@psu.edu

Chung, Ching-Chang
North Carolina State University
cchung4@ncsu.edu

Cochard, Charlotte
Luxembourg Institute of
Science and Technology
Charlotte.Cochard@list.lu

Cochran, Sandy
University of Glasgo
sandy.cochran@glasgow.ac.uk

Cohen, Ronald
Carnegie Institution and LMU
rcohen@carnegiescience.edu

Coleman, Kathleen
Penn State University
kpc8@psu.edu

Collins, Stephen
University of Leeds
MTLSC@LEEDS.AC.UK

Cordero, Francesco
CNR-ISC
francesco.cordero@cnr.it

Cordero Edwards, Rohini Kumara
Institut Català de Nanociencia i
Nanotecnologia (ICN2)
kumara.cordero@icn2.cat

Curtis, Victoria
Image Acoustics, Inc.
vcurtis@IMAGEACOUSTICS.COM

Damjanovic, Dragan
École Polytechnique Fédérale de Lausanne
dragan.damjanovic@EPFL.CH

Daniels, John
University of New South Wales, Australia
j.daniels@unsw.edu.au

Daue, Thomas
Smart Material Corp.
t.daue@smart-material.com

Dawber, Matthew
Stony Brook University
Matthew.Dawber@STONYBROOK.EDU

Denis, Lyndsey
Penn State University
lmd342@psu.edu

Di, Xiao
École Polytechnique Fédérale de Lausanne
xiao.di@epfl.ch

Dickey, Elizabeth
North Carolina State University
bguhlir@ncsu.edu

Dolgos, Michelle
Oregon State University
michelle.dolgos@oregonstate.edu

Domingo, Neus
ICN2 -Catalan Institute of Nanoscience and
Nanotechnology
neus.domingo@icn2.cat

Dong, Wen
Sandia National Laboratories
wdong@sandia.gov

Dr. Neubert, Holger
Fraunhofer-Institut für Keramische
Technologien und Systeme-IKTS
holger.neubert@ikts.fraunhofer.de

Drouin, Alexis
SOITEC
alexis.drouin@soitec.com

Ducharme, Stephen
University of Nebraska
sducharme1@unl.edu

Dursun, Sinan
Center of Dielectrics and Piezoelectrics
sxd448@psu.edu

Edwards, David
Queen's University Belfast
dedwards06@qub.ac.uk

Einarsrud, Mari-Ann
NTNU: Norwegian University of
Science and Technology
mari-ann.einarsrud@ntnu.no

Erturk, Alper
Georgia Institute of Technology
alper.erturk@me.gatech.edu

Esteves, Giovanni
North Carolina State University
gesteve@ncsu.edu

Eydam, Agnes
Technische Universität Dresden
agnes.eydam@tu-dresden.de

Attendee List

Fan, Zhongming
Iowa State University
zfanad@iastate.edu

Fang, Peng
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences
peng.fang@siat.ac.cn

Fanton, Mark
Penn State University
maf146@arl.psu.edu

Fengler, Franz
NaMLab gGmbH
Franz.Fengler@namlab.com

Finkel, Peter
Naval Research Laboratory
peter.finkel@nrl.navy.mil

Foley, Brian
Georgia Institute of Technology
brian.m.foley@gmail.com

Foster, Richard
University of Leeds
r.j.foster@leeds.ac.uk

Fox, Glen
Fox Materials Consulting, LLC
glen_fox_pa@msn.com

Fratello, Vincent
Quest Integrated
v.fratello@qi2.com

Fujii, Elji
Panasonic
fujii.e710@jp.panasonic.com

Fuoco, Lindsay
Harris Corporation
lindsay.fuoco@harris.com

Ganegoda, Hasitha
CTS Corporation
hasitha.ganegoda@ctscorp.com

Gao, Lisheng
Penn State University
lig5167@psu.edu

Gaponenko, Iaroslav
University of Geneva
iaroslav.gaponenko@unige.ch

Garcia, Vincent
Unité Mixte de Physique CNRS/Thales
vincent.garcia@cnrs-thales.fr

Garten, Lauren
National Renewable Energy Lab
lauren.garten@nrel.gov

Gautier, Brice
Institute of Nanotechnology of Lyon
brice.gautier@insa-lyon.fr

Genenko, Yuri
Darmstadt University of Technology
genenko@mm.tu-darmstadt.de

Giles, Alan
Smart Material Corp.
a.giles@smart-material.com

Glaum, Julia
NTNU: Norwegian University of Science and Technology
julia.glaum@ntnu.no

Glinsek, Sebastjan
Luxembourg Institute of Science and Technology
sebastjan.glinsek@list.lu

Godard, Nicolas
Luxembourg Institute of Science and Technology
nicolas.godard@list.lu

Gorfman, Semën
University of Siegen
gorfman@physik.uni-siegen.de

Gorostiaga, Mikel
IMTEK-University of Freiburg
mikel.gorostiaga@imtek.uni-freiburg.de

Granzow, Torsten
Luxembourg Institute of Science and Technology
torsten.granzow@list.lu

Gregg, Marty
Queens University Belfast
m.gregg@QUB.AC.UK

Grise, Kathy
IEEE - Institute of Electrical and Electronics Engineers
k-l-grise@ieee.org

Groen, Pim
Holst Centre /TNO
an.beyns@tno.nl

Groen, Pim
Holst Centre /TNO
pim.groen@tno.nl

Guo, Ruyan
University of Texas at San Antonio
ruyan.guo@utsa.edu

Gurdal, Ahmet Erkan
Solid State Ceramics, Inc.
egurdal@solidstateceramics.com

Han, Myung-Geun
Condensed Matter Physics & Materials Science/Brookhaven National Laboratory
mghan@bnl.gov

Hashemi Zadeh, Sina
École Polytechnique Fédérale de Lausanne
sina.hashemizadeh@epfl.ch

Haugen, Astri Bjørnetun
Technical University of Denmark
ahua@dtu.dk

Heitmann, Adam
Naval Undersea Warfare Center
adam.heitmann@navy.mil

Helgeland, Jon
Bifrost Engineering
jhelgeland@bifrostengineering.com

Attendee List

Haugen, Astri Bjørnetun
Technical University of Denmark
ahua@dtu.dk

Heitmann, Adam
Naval Undersea Warfare Center
adam.heitmann@navy.mil

Helgeland, Jon
Bifrost Engineering
jhelgeland@bifrostengineering.com

Hennig, Eberhard
PI Ceramic GmbH
e.hennig@piceramic.de

Hiranaga, Yoshiomi
Tohoku University
hiranaga@riec.tohoku.ac.jp

Hladky, Anne-Christine
The Institute of Electronics, Microelectronics and Nanotechnology
anne-christine.hladky@isen.fr

Hojo, Hajime
Kyushu University
hojo.hajime.100@m.kyushu-u.ac.jp

Hooper, Thomas
University of Leeds
py11teh@leeds.ac.uk

Hoshina, Takuya
Tokyo Institute of Technology
thoshina@ceram.titech.ac.jp

Hou, Dong
North Carolina State University
dhou3@ncsu.edu

Hsing, Greg Hsiang Chun
Stony Brook University
greghsing@gmail.com

Hulick, Scott
CTS Corporation
scott.hulick@ctscorp.com

Ihlefeld, Jon
Sandia National Laboratories
jihlefe@sandia.gov

Ikram, Salma
Government College University Faisalabad
salma.irfan@yahoo.com

Inoue, Kenji
Piezo Studio Inc.
k-inoue@piezostudio.co.jp

Isla, Julio
Imperial College London
j.isla13@imperial.ac.uk

Janssens, Arjen
Solmates B.V.
arjen.janssens@SOLMATES.NL

Jaschin, Prem
Indian Institute of Science
milla.jazzin@gmail.com

Jesse, Stephen
Oak Ridge National Laboratory
sjesse@ornl.gov

Jiang, Bo
Norwegian University of Science and Technology
bo.jiang@ntnu.no

Johnson, Brienne
North Carolina State University
bsjohns5@ncsu.edu

Jones, Beth
Penn State University
baj2@psu.edu

Jones, Jacob
North Carolina State University
jacobjones@ncsu.edu

Kai, Jiang
East China Normal University
jiangkaixxfk@126.com

Kaiser, Alena
InfraTec GmbH
A.Kaiser@infratec.de

Karuppanan, Aravinth
SSN College of ENgineering
aravinthk@ssn.edu.in

Khanbareh, Hamideh
University of Bath
h.khanbareh@bath.ac.uk

Kholkin, Andrei
University of Aveiro
kholkin@ua.pt

Kim, Seung-Hyun
Brown University
seunghyun_kim@brown.edu

Kim, Yunseok
Sungkyunkwan University (SKKU)
yunseokkim@skku.edu

Klymko, Victor
Sonion
vkl@sonion.com

Ko, Song Won
Xaar
songwon.ko@xaar.com

Kodumudi Venkataraman, Lalitha
Technische Universität Darmstadt
kvlalitha87@gmail.com

Kondekar, Pravin
Indian Institute of Technology, Design and Manufacturing, Jabalpur
pnkondekar@iiitdmj.ac.in

Kornienko, Tatiana
Belarusian State University
tatianakornienko3@gmail.com

Koruza, Jurij
Technische Universität Darmstadt
koruza@ceramics.tu-darmstadt.de

Attendee List

Kumar, Amit
Queen's University Belfast
a.kumar@qub.ac.uk

Lardat, Raphael
Thales Underwater Systems
Raphael.Lardat@FR.THALESGROUP.COM

Le Goupil, Florian
Université de Bordeaux
florian.le-goupil@u-bordeaux.fr

Lee, Wayne
Harris Corporation
wayne.s.lee@harris.com

Lee, Ho-Yong
Ceracomp Co., Ltd.
hlee.ceracomp@gmail.com

Lee, Jong-Yeoub
Ceracomp Co., Ltd.
lsadd@CERACOMP.COM

Lemee, Nathalie
University of Picardie Jules Verne
nathalie.lemee@u-picardie.fr

Lengel, George
SPECS Surface Nano Analysis, Inc.
lengel@nanonis.com

Li, Jinglei
Penn State university
424342804@qq.com

Li, Fei
Penn State University
lifei1216@gmail.com

Li, Jiefang
Virginia Tech University
Jiefang@vt.edu

Li, Linglong
Oak Ridge National Lab
linglong86.li@gmail.com

Li, Liangxi
Auburn University
lzl0039@gmail.com

Li, Tao
University of Nebraska-Lincoln
peachfishb@gmail.com

Lim, Leong Chew
Microfine Materials Technologies Pte Ltd
lclim@microfine-piezo.com

Lin, Dian-Hua
Microfine Materials Technologies Pte Ltd
dhlin@microfine-piezo.com

Liu, Tianning
Penn State University
TWL5075@PSU.EDU

Liu, Fanmao
Institut de Ciència de Materials
de Barcelona (ICMAB-CSIC)
fliu@icmab.es

Liu, Lisha
University of New South Wales
lisha.liu@student.unsw.edu.au

Liu, Rui
Stony Brook University,
Department of Physics and Astronomy
rui.liu@stonybrook.edu

Lubomirsky, Igor
Weizmann Institute of Science
Igor.Lubomirsky@weizmann.ac.il

Luo, Jun
TRS Technologies, Inc.
jun@trstechnologies.com

Luo, Haosu
Shanghai Institute of Ceramics
hsluo@mail.sic.ac.cn

Lupascu, Doru C.
University of Duisburg-Essen
doru.lupascu@uni-due.de

Lynch, Chris
The University of California, Los Angeles
cslynch@seas.ucla.edu

Mackertich, Galestan
Penn State University
g.mackertich@gmail.com

Mackwitz, Peter
University of Paderborn /
Department Physik
peterm@mail.upb.de

Mahmoud, Mohamed
University of Nebraska–Lincoln
m.afifi@unl.edu

Malic, Barbara
Jožef Stefan Institute
barbara.malic@IJS.SI

Mangeot, Charles
Noliac A/S
cm@noliac.com

Martin, Lane
University of California, Berkeley
lwmartin@berkeley.edu

Marton, Pavel
Institute of Physics,
Czech Academy of Sciences
marton@fzu.cz

Martyna, Glenn
IBM TJ Watson Research Center
martyna@us.ibm.com

Masami, Kawahara
Kojundo Chemical Lab.
kawahara.masami@kojundo.co.jp

Matavž, Aleksander
Jozef Stefan Institute
aleksander.matavz@ijs.si

Matloub, Ramin
PIEMACS
ramin.matloub@piemacs.ch

Attendee List

Matsuo, Shogo
Nagoya University
matsuo.syougo@c.mbox.nagoya-u.ac.jp

McConville, James
Queen's University Belfast
jmcconville22@qub.ac.uk

McHenry, Dean
Sound Technology Inc.
demchenry@comcast.net

Meurisse, Thibaut
École Polytechnique Fédérale de Lausanne
meurisse.thibaut@gmail.com

Meyers, Cedric
University of California, Santa Barbara
cmeyers@umail.ucsb.edu

Mimura, Takanori
Tokyo Institute of Technology
mimura.t.ac@m.titech.ac.jp

Mishuk, Eran
Weizmann Institute of Science
Eran.Mishuk@weizmann.ac.il

Mokry, Pavel
Institute of Plasma Physics CAS
mokry@ipp.cas.cz

Morandi, Carl
Penn State University
csm204@psu.edu

Morgan, Tim
University of Arkansas
tamorga@uark.edu

MOSBAH, Pascal
ISEN-Lille
pascal.mosbah@isen.fr

Moura, Adriane
Georgia Institute of Technology
agmoura@gatech.edu

Mudarri, Timothy
MSI Transducers Corp.
tmudarri@msitransdcuers.com

Murakami, Shunsuke
The University of Sheffield
smurakami1@sheffield.ac.uk

Muralt, Paul
École Polytechnique Fédérale de Lausanne
Paul.Muralt@epfl.ch

Naden, Aaron
Queen's University Belfast
a.naden@qub.ac.uk

Nagata, Hajime
Tokyo University of Science
h-nagata@rs.noda.tus.ac.jp

Neumayer, Sabine
University College Dublin
sabine.neumayer@ucd.ie

Newns, Dennis
IBM Research
Dennisn@us.ibm.com

Nguyen, Clark
University of California at Berkeley
ctnguyen@berkeley.edu

Nie, Rui
Sichuan University
nierui129@163.com

Odagawa, Hiroyuki
National Institute of Technology, Kumamoto College
odagawa@kumamoto-nct.ac.jp

Otonicar, Mojca
JSI
mojca.otonicar@ijs.si

Park, Byung Eun
University of Seoul
pbe@uos.ac.kr

Parry, Samuel
University of Leeds
sm11sjp@leeds.ac.uk

Paruch, Patrycja
University of Geneva
patrycja.paruch@unige.ch

Pereira de Sá, Pedro
University College London
pedro.pereira@uclouvain.be

Phan, Tue
Japan Advanced Instititue of Science and Technology
phan-tt@jaist.ac.jp

Picht, Gunnar
Robert Bosch GmbH
gunnar.picht@de.bosch.com

Pojprapai, Soodkhet
Suranaree University of Technology
soodkhet@g.sut.ac.th

Politova, Ekaterina
L.Ya.Karpov Institute of Physical Chemistry
politova@cc.nifhi.ac.ru

Randall, Clive
Penn State University
car4@psu.edu

Rappe, Andrew
University of Pennsylvania
rappe@SAS.UPENN.EDU

Razumnaya, Anna
University of Picardie
razumnaya2@yandex.ru

Ren, Shenqiang
Temple University
shenqiang.ren@temple.edu

Ren, Junyan
Fudan University
jyren@fudan.edu.cn

Attendee List

Ren, Wei
Xi'an Jiaotong University
wren@mail.xjtu.edu.cn

Richman, Michael
University of Missouri-Kansas City
msrxt4@mail.umkc.edu

Rigby, Stewart
Thales UK
sdr29@PSU.EDU

Robinson, Harold
Naval Undersea Warfare Center
harold.c.robinson@NAVY.MIL

Rodriguez, Brian
University College Dublin
brian.rodriguez@ucd.ie

Roscow, James
University of Bath
j.i.roscow@bath.ac.uk

Rossetti, George
University of Connecticut
george.rossetti_jr@uconn.edu

Rüsing, Michael
University of Paderborn
mruesing@mail.upb.de

Ryu, Minoru
Taiyo Yuden CO., LTD.
/Pennsylvania State University
mur348@psu.edu

Safar, Martin
University of Birmingham
mxs1053@bham.ac.uk

Saini, Deepika
North Carolina State University
dsaini@ncsu.edu

Salazar Kuri, Ulises
Benemerita Universidad Autonoma
de Puebla
usalazar@ifuap.buap.mx

Salje, Ekhard
University of Cambridge
ekhard@esc.cam.ac.uk

Sando, Daniel
University of New South Wales
daniel.sando@unsw.edu.au

Saya, Daisuke
LAAS-CNRS
dsaya@laas.fr

Schroeder, Uwe
Namlab
Uwe.Schroeder@namlab.com

Schultheiss, Jan
Technische Universität Darmstadt
schultheiss@ceramics.tu-darmstadt.de

Sehirlioglu, Alp
Case Western Reserve University
alp.sehirlioglu@case.edu

Seidel, Jan
University of New South Wales
jan.seidel@unsw.edu.au

Selbach, Sverre M.
NTNU: Norwegian University of
Science and Technology
selbach@ntnu.no

Setter, Nava
EPFL Swiss Federal Institute of Technology
nava.setter@epfl.ch

Shepley, Philippa
University of Leeds
p.m.shepley@leeds.ac.uk

Sherman, Daniel
Naval Undersea Warfare Center
daniel.p.sherman@navy.mil

Shieh, Bernard
Georgia Institute of Technology
bshieh@gatech.edu

Shimizu, Keisuke
Tokyo Institute of technology
shimizu.k.ak@m.titech.ac.jp

Shimura, Reijiro
Japan Advanced Institute of Science and
Technology
s1540007@jaist.ac.jp

Smith, Scott
GE Global Research
smithls@GE.COM

Soergel, Elisabeth
University of Bonn
soergel@uni-bonn.de

Somnath, Suhas
Oak Ridge National Laboratory
somnaths@ornl.gov

Spirito, David
Luxembourg Institute of Science and
Technology
david.spirito@list.lu

Staruch, Margo
U.S. Naval Research Laboratory
margo.staruch@nrl.navy.mil

Suzuki, Hisao
Shizuoka University
suzuki.hisao@shizuoka.ac.jp

Svirskas, Sarunas
Vilnius University
sarunas.svirskas@ff.vu.lt

Tagantsev, Alexander
Ioffe Institute of RAS
alexander.tagantsev@epfl.ch

Taghaddos, Elaheh
Rutgers University
elaheh.taghaddos@RUTGERS.EDU

Tai, Alan
GE Healthcare
alantai@ieee.org

Attendee List

Takahashi, Mitsue
National Institute of Advanced Industrial Science and Technology
mitsue-takahashi@aist.go.jp

Talebinezhad, Hossein
Auburn university
h.talebinezhad@auburn.edu

Tong, Yang
Auburn University
yzt0019@auburn.edu

Trolier-McKinstry, Susan
Penn State University
set1@psu.edu

Tsurumi, Takaaki
Tokyo Institute of Technology
ttsurumi@ceram.titech.ac.jp

Tückmantel, Philippe
University of Geneva / DQMP
philippe.tueckmantel@unige.ch

Tuncdemir, Safakcan
Solid State Ceramics, Inc.
stuncdemir@SolidStateCeramics.com

Uchiyama, Kiyoshi
Natinal Institute of Technology, Tsuruoka College
uchiyama@tsuruoka-nct.ac.jp

Valanoor, Nagarajan
University of New South Wales
nagarajan@unsw.edu.au

van der Veen, Monique
Delft University of Technology
m.a.vanderveen@tudelft.nl

Vasudevan, Rama
Oak Ridge National Laboratory
rvv@ornl.gov

Verdaguer, Albert
ICN2/ICMAB: Universitat Autònoma de Barcelona
averdaguer@icn2.cat

Viehland, Dwight
Virginia Tech University
dviehlan@vt.edu

Volkova, Halyna
CentraleSupelec
halyna.volkova@centralesupelec.fr

Voss, Rasmus
Sonion
rvo@sonion.com

Walker, Julian
Penn State University
jxw512@psu.edu

Wallnoefer, Wolfgang
TDK Corporation
wallnoef@jp.tdk.com

Wang, Dixiong
Penn State University
dow5263@psu.edu

Wang, Lei
National University of Defense Technology
charlesweng@126.com

Wang, Yaojin
Nanjing University of Science and Technology
yjwang@njust.edu.cn

Wang, Dawei
University of Sheffield
dawei.wang@sheffield.ac.uk

Wang, Linghang
Xi'an Jiaotong University
uswlhcn@yahoo.com

Wang, Aochen
Tianjin University
wangaochen@binn.cas.cn

Wang, Ke
Tsinghua University
wang-ke@tsinghua.edu.cn

Watson, Beecher
Penn State University
bhwatson14@gmail.com

Webber, Kyle
Friedrich-Alexander Universität Erlangen-Nürnberg
kyle.g.webber@gmail.com

Weigner, James
Lockheed Martin
james.d.weigner@LMCO.COM

Wen, Xiaonan
Apple Inc.
xwen@apple.com

Wenjuan, Liu
State Key Lab of ASIC and System, Fudan University
liuwj14@fudan.edu.cn

Weymann, Christian
DQMP University of Geneva
christian.weymann@unige.ch

Whatmore, Roger
Imperial College London
r.whatmore@imperial.ac.uk

Wolfman, Jerome
Lab. GREMAN Univ. Tours CNRS
wolfman@univ-tours.fr

Woodruff, Danielle
University of Leeds
pm15dcw@leeds.ac.uk

Attendee List

Wu, Carl
Office of Naval Research
wul99@aol.com

Xia, Lu
Norwegian University of Science and Technology
lux@ntnu.no

Xu, Ruijuan
University of California, Berkeley
ruijuan.xu@berkeley.edu

Yamada, Tomoaki
Nagoya University
t-yamada@nucl.nagoya-u.ac.jp

Yamashita, Yohachi (John)
Toyama Prefectural University
sxjwg220@ybb.ne.jp

Yao, Yulian
Gerogia Institute of Technology
yulianyao@gatech.edu

Yao, Kui
Institute of Materials Research and Engineering, A*STAR
k-yao@imre.a-star.edu.sg

Yasui, Kyuichi
National Institute of Advanced Industrial Science and Technology (AIST)
k.yasui@aist.go.jp

Ye, Zuo-Guang
Simon Fraser University
zye@sfu.ca

Yegingil, Hakki
CTS Corporation
hakki.yegingil@ctscorp.com

Yeo, Hong Goo
Penn State University
hxy162@PSU.EDU

Yesner, Gregory
Rutgers University
gyesner@gmail.com

Yokota, Yuui
Tohoku University
yokota@imr.tohoku.ac.jp

Yoshimura, Takeshi
Osaka Prefecture University
tyoshi@pe.osakafu-u.ac.jp

Yu, Tai-Ho
National United University
yth@nuu.edu.tw

Yuan, Jing
Sichuan University
yuanjingscu@163.com

Yurtseven, Hamit
Middle East Technical University
hamit@metu.edu.tr

Zamani Alavijeh, Mohammad
University of Arkansas
mzamania@uark.edu

Zarnetske, Michael
Naval Undersea Warfare Center
michael.zarnetske@NAVY.MIL

Zeng, Yi
Tsinghua University
3115966576@qq.com

Zhang, Yan
University of Bath
y.zhang2@bath.ac.uk

Zhang, Tian
Penn State University
txz908@psu.edu

Zhang, Shujun
University of Wollongong
shujun@uow.edu.au

Zhang, Nan
Xi'an Jiaotong University
nzhang1@xjtu.edu.cn

Zhao, Jinyan
Xi'an Jiaotong University
zhaojy_7@163.com

Zhao, Jianwei
North Carolina State University
jzhao25@ncsu.edu

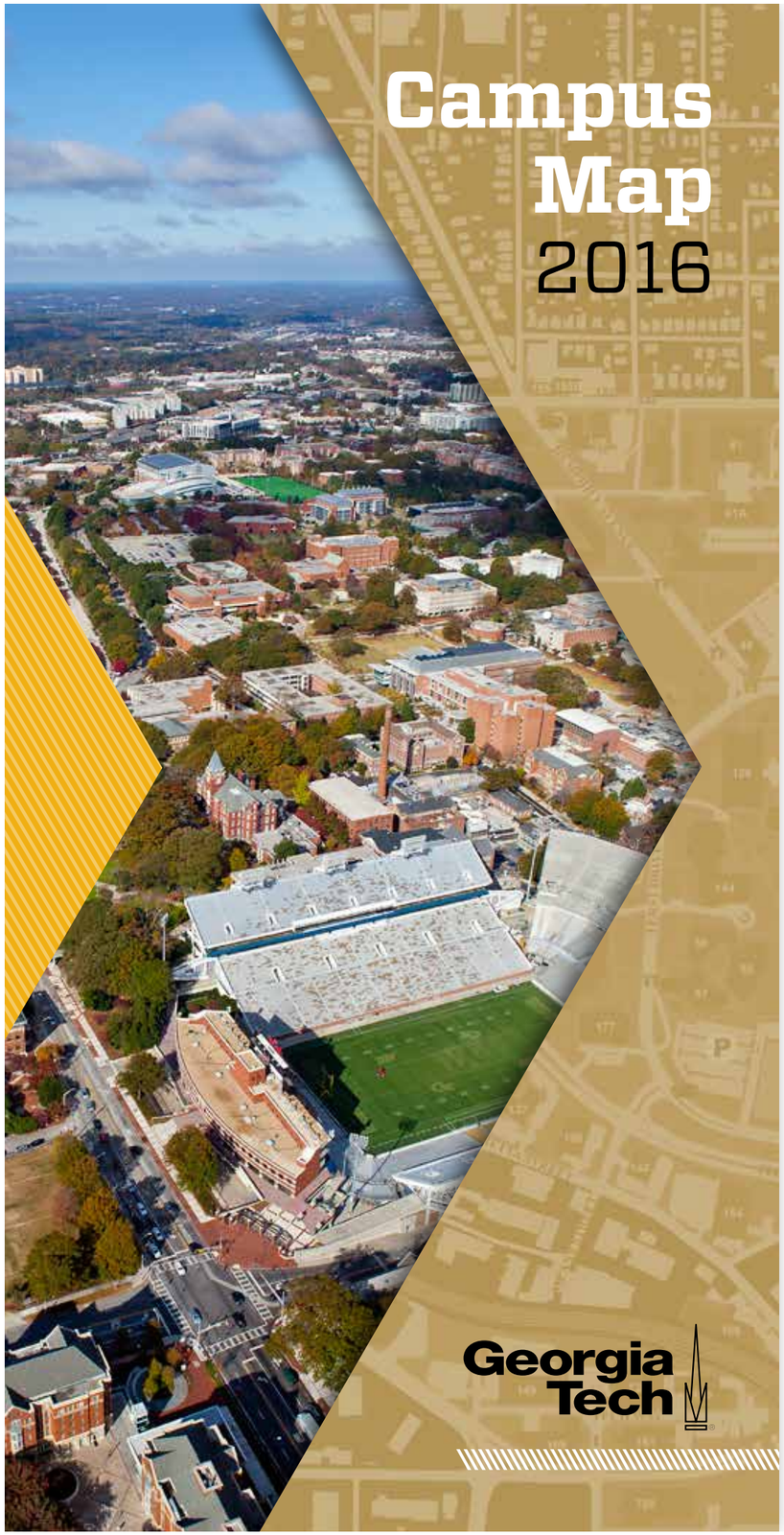
Zhao, Changhao
North Carolina State University
czhao9@ncsu.edu

Zhigao, Hu
East China Normal University
zghu@ee.ecnu.edu.cn

Zhu, Wanlin
Penn State University
wuz14@psu.edu

Zhu, Jianguo
Sichuan University
nic0400@scu.edu.cn

Zipparo, Michael
Sylvan Acoustics, Inc.
michael.zipparo@gmail.com



Campus Map 2016

Georgia Tech

TRANSPORTATION

Stingerette Service

- Available daily from 6 p.m. to 7 a.m. when the Institute is in session. Service requests are taken until 6:30 a.m.
- To request a ride, go to **www.stingerette.com** or call 404.385.RIDE (404.385.7433).
- Transportation for mobility-impaired and temporarily disabled students can be established by calling 404.894.2563.

Emory Shuttle

The Emory Shuttle provides convenient transportation from Georgia Tech to Emory University's Health Sciences Research Bldg. The shuttle, which runs from 7:15 a.m. until 7:15 p.m. during fall and spring semesters and 8:15 a.m. to 4:50 p.m. in the summer, includes stops at the intersection of Ferst Drive and Atlantic Drive, the Midtown MARTA station, and the Atlanta Botanical Garden.

Safe Ride Home

For students living in Home Park, Centennial Place, 100 Midtown, and University House, the Safe Ride Home Punch Card provides Stingerette rides from campus to their homes. Cards for 10 rides are available for $20 at the Parking & Transportation Services office.

The Grocery Shuttle

The free shuttle to Atlantic Station is available Saturdays and Sundays, 10:10 a.m. to 5:30 p.m., with one trip per hour.

MARTA Rapid Rail System

Monthly MARTA passes are offered at a discount to students, faculty, and staff. For more information, visit the Alternative Transportation page at **www.pts.gatech.edu**.

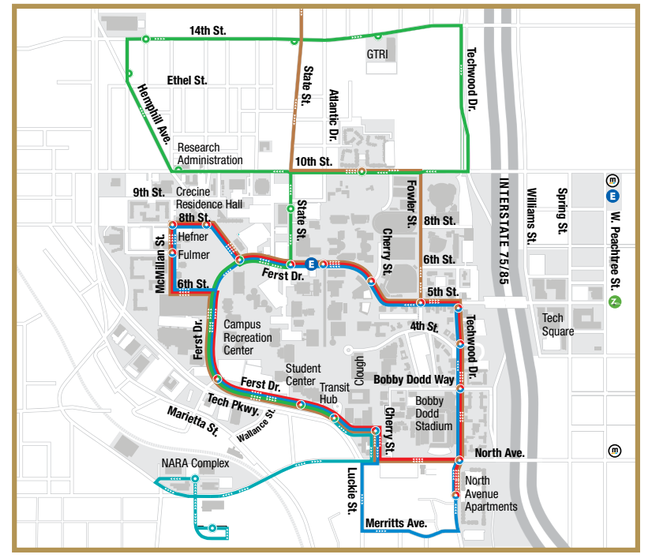
The **North Avenue** and **Midtown** MARTA Stations are convenient to the Georgia Tech campus. The Tech Trolley provides direct service to Midtown Station.

Stinger Bus Service

- Offers convenient travel for students, faculty, and staff Monday – Friday.
- Blue Route, 7 a.m. – 10 p.m. Red Route, 7 a.m. – 9:50 p.m. Six minute wait time per stop during peak hours.
- Green Route: Runs Monday – Friday, 6:45 a.m. to 9 p.m.
- All Stinger buses have wheelchair lifts for disabled access. Schedules are available at **www.pts.gatech.edu**. Visit **www.nextbus.com** for transit maps and estimated arrival times.

STINGER SHUTTLE

LEGEND
- Red Route
- Blue Route
- Green Route
- NARA/TEP Shuttle
- Weekend Grocery Shuttle
- MARTA Station
- Zipcar
- Emory Shuttle
- Stingerette Service Area



Tech Trolley

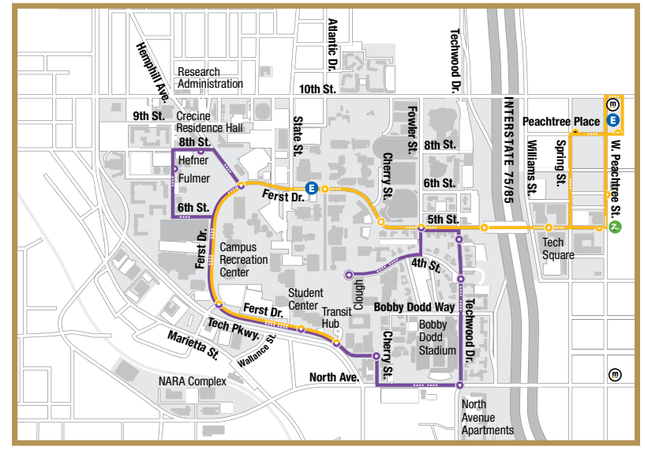
- Operates Monday – Friday from 5:45 a.m. to 10:15 p.m., Saturdays from 10 a.m. to 6:30 p.m., and Sundays from 3 p.m. to 9:45 p.m.
- All trolleys have wheelchair lifts for disabled access. Schedules are available at **www.pts.gatech.edu**. Visit **www.nextbus.com** for transit maps and estimated arrival times.

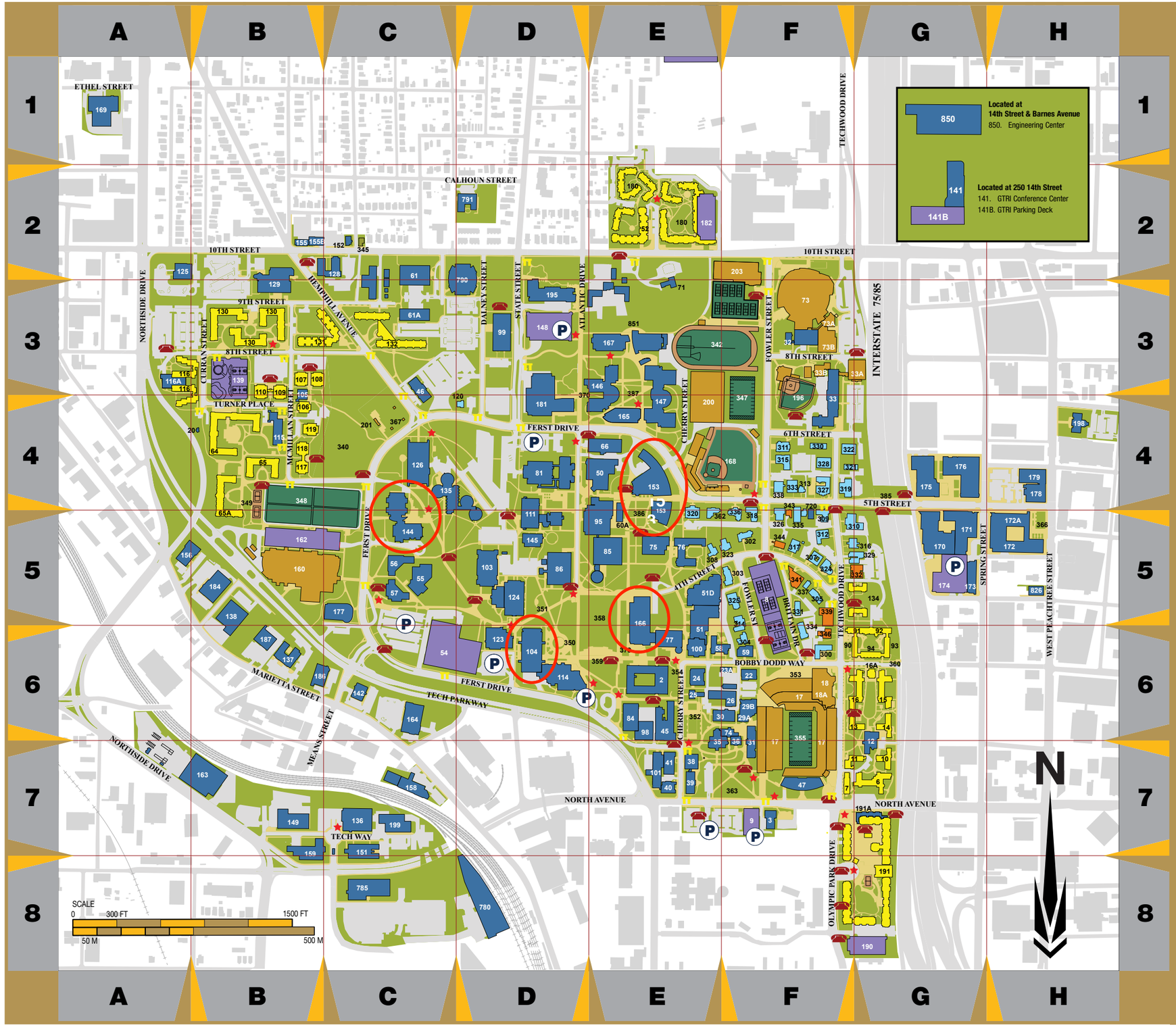
Midnight Rambler

Operates daily from 9 p.m. to 3 a.m. during fall and spring semesters only, stopping at Clough Undergraduate Learning Commons, North Avenue, the Student Center, the Campus Recreation Center, and West Campus housing.

Tech Trolley

LEGEND
- Trolley Stops
- Midnight Rambler Stops
- MARTA Station
- Zipcar
- Emory Shuttle
- Stingerette Service Area
- Stop served only after 5 p.m. and on weekends





Located at 14th Street & Barnes Avenue
850. Engineering Center

Located at 250 14th Street
141. GTRI Conference Center
141B. GTRI Parking Deck

CAMPUS SAFETY

Your safety on campus begins with your own awareness and commitment.

- Save the Georgia Tech Police Dept. (GTPD) phone number, 404.894.2500, in your phone.
- If you notice any suspicious activity, immediately notify GTPD.
- If you are a victim of a crime, immediately report the incident to GTPD.
- Walk or jog in groups.
- Be aware of your surroundings; walk confidently and briskly; and avoid other activities while walking, such as talking on your cell phone or listening to headphones.
- Call GTPD to arrange for a safety escort.
- Use campus transportation.

Campus Directory Map

Visitor Parking

Under Construction

Pi Mile

Emergency Telephones

Emergency telephones providing a direct line to Georgia Tech police are located throughout campus. They may be used for any incident, accident, emergency, or fire. After dark, many of these phones are identified by a blue light.

ACADEMIC/ADMINISTRATION

RESIDENCE HALLS

GREEK HOUSING

ATHLETICS FACILITIES

RELIGIOUS ORGANIZATIONS

GREEN SPACE

PARKING DECKS

Georgia Tech

NUMERICAL LISTING

Numbers may be missing due to campus construction or if the facility is solely used for internal support.

2. Skiles Classroom Bldg., **E6**
3. Robert Alumni/Faculty House, **F7**
6. Smith Residence Hall, **G7**
7. Brown Residence Hall, **F7**
8. Peters Parking Deck, **F5**
9. Burge Parking Deck, **F7**
10. Howell Residence Hall, **G7**
11. Harris Residence Hall, **F7**
12. Brittain Dining Hall, **G7**
13. Cloudman Residence Hall, **F6**
14. Harrison Residence Hall, **G6**
15. Towers Residence Hall, **G6**
16. Glenn Residence Hall, **F6**
16A. Glenn-Towers Connector, **G6**
17. Bobby Dodd Stadium, **F6**
18. Edge Intercollegiate Athletic Center, **F6**
18A. Rice Center for Sports Performance, **F6**
22. Daniel Lab, **F6**
23A. OIT Engineering, **F6**
24. Smith Bldg. (Social Sciences), **E6**
25. OMED (Chapin Bldg.), **E6**
26. Holland Bldg. (Whistle), **F6**
29A. Lyman Hall, **F6**
29B. Emerson Bldg., **F6**
30. French Bldg., **E6**
31. Bill Moore Student Success Center (Admissions), **F7**
32. Facilities Bldg., **F3**
33. O'Keefe Main Bldg., **F4**
33A. O'Keefe Gym; Women's Softball Locker Rooms, **F3**
33B. O'Keefe Custodial Services Bldg., **F3**
35. Evans Administration Bldg. (Tech Tower), **E7**
36. Carnegie Bldg., **F7**
38. Savant Bldg., **E7**
39. Swann Bldg., **E7**
40. Guggenheim Aerospace Bldg., **E7**
41. Engineering Science & Mechanics Bldg., **E7**
45. Coon Bldg. (Psychology), **E6**
46. Beringause Bldg. (Georgia Tech Police Dept.), **C3**
47. Wardlaw Center, **F7**
50. College of Computing, **E4**
51. Hinman Bldg. (Design), **E6**
51D. Rich Computer Center, **E5**
52. Graduate Living Center, The Children's Campus @ Georgia Tech, **E2**
54. Student Center Parking Deck, **C6**
55. Instructional Center, **C5**
56. Groseclose Bldg. (Industrial & Systems Engineering), **C5**
57. ISyE Annex, **C5**
58. Old Civil Engineering Bldg., **E6**
59. Hall Bldg., **F6**
60A. Caddell Bldg. (Building Construction), **E5**
61. GTRI Research Bldg. (North), **C2**
61A. GTRI Research Bldg. (South), **C3**
64. Nelson Residence Hall, Shell Residence Hall, **B4**
65. Zbar Residence Hall, **B4**
65A. Maulding Residence Hall, **B5**
66. Cherry Emerson Bldg., **E4**
71. President's Residence, **E3**
73. McCamish Pavilion, **F3**
73A. Luck Bldg., **F3**
73B. Zelnak Basketball Practice Facility, **F3**
74. Bradley Bldg., **F6**
75. College of Design (West), **E5**
76. College of Design (East), **E5**
77. Price Gilbert Memorial Library, **E6**
81. Howey Physics Bldg., **D4**
84. Weber Space Science & Technology Bldg. I, **E6**
85. Van Leer Bldg. (Electrical & Computer Engineering), **E5**
86. Bunger-Henry Bldg., **D5**
90. Field Residence Hall, **F6**
91. Matheson Residence Hall, **G6**
92. Perry Residence Hall, **G6**
93. Hanson Residence Hall, **G6**
94. Hopkins Residence Hall, **G6**
95. Pettit Bldg. (Microelectronics Research Center), **E5**
98. Weber Space Science & Technology Bldg. II, **E6**
99. Baker Bldg. (GTRI), **D3**
100. Crosland Tower (Library), **E6**
101. Knight Bldg. (Aerospace Engineering), **E7**
103. Boggs Bldg., **D5**
104. Wenn Student Center / Post Office, **D6**
105. Commander Bldg., **B3**
106. Fulmer Residence Hall, **B4**
107. Hefner Residence Hall, **B3**
108. Armstrong Residence Hall, **B3**
109. Caldwell Residence Hall, **B3**
110. Folk Residence Hall, **B3**
111. Mason Bldg. (Civil & Environmental Engineering), **D5**
114. Stamps Student Center Commons, **D6**
115. Couch Bldg. (Music), **B4**
116. Woodruff Residence Hall, **A3**
116A. Woodruff Dining Hall, **A3**
117. Freeman Residence Hall (GTCN), **B4**
118. Montag Residence Hall, **B4**
119. Fitten Residence Hall, **B4**
123. Smithgall Student Services Bldg., **D6**
124. Ferst Center for the Arts; DramaTech, **D5**
125. Southern Regional Education Board, **A2**
126. Callaway Manufacturing Research Bldg., **C4**
128. Center for Assistive Technology & Environmental Access (CATEA); Construction Research Center; Equal Opportunity Programs, **C2**
129. Paper Tricentennial Bldg. (Renewable Bioproducts Institute), **B3**
130. Eighth Street Apts., **B3**
131. Crecine Residence Hall, **B3**
132. Center Street Apts., **C3**
134. Fourth Street Apts., Goldin House, Gray House, Hayes House, Stein House, **G5**
135. Manufacturing Related Disciplines Complex, **C4**
136. Tech Way Bldg., **C7**
137. Ivan Allen College of Liberal Arts (781 Marietta St.), **B6**
138. Printing & Copying Services, **B5**
139. Curran Street Parking Deck, **B3**
141. GTRI Conference Center (250 14th St.), **G2**
141B. GTRI Parking Deck (250 14th St.), **G2**
142. Human Resources, **C6**
144. Love Manufacturing Bldg. (MRDC II), **C5**
145. Allen Sustainable Education Bldg., **D5**
146. Petit Biotechnology Bldg., **E3**
147. Ford Environmental Science & Technology Bldg. (Chemical & Biomolecular Engineering; Chemistry & Biochemistry; Earth & Atmospheric Sciences), **E4**
148. North Campus Parking Deck, **D3**
149. Structural Engineering & Materials Research Lab (625 Lambert St.), **B7**
151. Zinn Combustion Laboratory (635 Strong St.), **C7**
152. Broadband Institute Residential Lab, Aware Home (479 10th St.), **C2**
153. Klaus Advanced Computing Bldg., **E4**
155. Research Administration Bldg. (GTRC; Office of Sponsored Programs), **B2**
155B. Research Administration Bldg. (Grants & Contracts), **B2**
156. Office of Information Technology (OIT), Planning & Programming, **A5**
158. Digital Fabrication Lab; GTRI Machine Shop (676 Marietta St.), **C7**
159. Food Processing Technology Bldg., **B7**
160. Campus Recreation Center, **B5**
162. Campus Recreation Center Parking Deck, **B5**
163. Grinnell Bldg. (645 Northside Dr.), **B7**
164. Business Services Bldg., **C6**
165. Whitaker Bldg. (Biomedical Engineering), **E4**
166. Clough Undergraduate Learning Commons, **E5**
167. Molecular Science & Engineering Bldg., **E3**
168. Chandler Baseball Stadium, **F4**
169. Warehouse (650 Ethel St.), **A1**
170. Global Learning Center (Professional Education; Distance Learning), **G5**
171. Georgia Tech Hotel & Conference Center, **G5**
172. Scheller College of Business, **H5**
172A. Barnes & Noble@Georgia Tech (Bookstore); BuzzCard Office, **H5**
173. Economic Development Bldg. (Georgia Tech Foundation; Center for Quality Growth & Regional Development), **G5**
174. Technology Square Parking Deck, **G5**
175. Technology Square Research Bldg., **G4**
176. Centergy One, **G4**
177. Whitehead Bldg. (Stamps Health Services), **C5**
178. Parking Office (828 West Peachtree St.), **H4**
179. 830 West Peachtree St., **H4**
180. Tenth & Home, **E2**
181. Marcus Nanotechnology Bldg., **D4**
182. Family Housing Parking Deck, **E2**
184. Center for Advanced Brain Imaging (831 Marietta St.), **B5**
186. Capital Assets Accounting Staging (755 Marietta St.), **B6**
187. Environmental Health & Safety, **B6**
190. North Avenue Apts. South Parking Deck, **G8**
191. North Avenue Apts., **G8**
191A. North Avenue Dining Hall, **G7**
195. Engineered Biosystems Bldg., **D3**
196. Women's Softball Stadium (Mewborn Field), **F4**
198. Academy of Medicine, **H4**
199. Carbon Neutral Energy Solutions Lab, **C7**
200. Brock Football Practice Facility, **E4**
201. Challenge Course Pavilion, **C4**
203. Byers Tennis Complex, **F2**
300. Alpha Epsilon Pi, **F6**
302. Alpha Tau Omega, **F5**
303. Beta Theta Pi, **F5**
304. Chi Phi, **F6**
305. Chi Psi, **F5**
307. Delta Sigma Phi, **F5**
308. Delta Tau Delta, **E5**
309. Delta Upsilon, **F5**
310. Kappa Alpha, **F5**
311. Kappa Sigma, **F4**
312. Lambda Chi Alpha, **F5**
313. Alpha Sigma Phi, **F4**
314. Phi Delta Theta, **F5**
315. Phi Gamma Delta, **F4**
316. Phi Kappa Sigma, **G5**
317. Alpha Phi, **F5**
318. Phi Kappa Theta, **F5**
319. Phi Sigma Kappa, **F4**
320. Pi Kappa Alpha, **E5**
321. Psi Upsilon, **F4**
322. Alpha Xi Delta (Mewborn & Dull House), **F4**
323. Sigma Alpha Epsilon, **F5**
324. Sigma Chi, **F5**
325. Sigma Nu, **F5**
326. Sigma Phi Epsilon, **F5**
327. Tau Kappa Epsilon, **F4**
328. Theta Chi, **F4**
329. Theta Xi, **G5**
330. Zeta Beta Tau, **F4**
331. Alpha Chi Omega, **F5**
332. Christian Campus Fellowship, **F5**
333. Alpha Gamma Delta, **F4**
334. Alpha Delta Pi, **F6**
335. Delta Chi, **F5**
336. Pi Kappa Phi, **F5**
337. Alpha Delta Chi, **F5**
338. Zeta Tau Alpha, **F4**
339. Baptist Collegiate Ministry, **F5**
340. Couch Park (Burger Bowl Field), **C4**
341. Catholic Center, **F5**
342. Griffin Track, **E3**
343. Lutheran Campus Ministry, **F4**
344. Methodist Center (Wesley Foundation), **F5**
345. Rohr Chabad House, **C2**
346. Presbyterian Center, **F6**
347. Alexander Rose Bowl Field, **F4**
348. Stamps Field, **B4**
349. Alumni Park, **B4**
350. Kessler Campanile, **D6**
351. Amphitheater, **D5**
352. Harrison Square, **E6**
353. Callaway Plaza, **F6**
354. Mayer Memorial Garden, **E6**
355. Grant Field, **F6**
358. Tech Green, **E5**
359. Tech Walkway, **E6**
362. Phi Mu, **E5**
363. Tech Tower Lawn, **F7**
366. Acuity Brands Plaza, **H5**
367. Challenge Course & Pavilion, **C4**
370. Suddath Courtyard, **D3**
379. LeCraw Plaza, **E6**
386. Noonan Courtyard, **E5**
387. Biotech Quad/Courtyard, **E3**
720. Heffernan House (Architecture Archives), **F4**
780. GTRI at Technology Enterprise Park, **D8**
785. Technology Enterprise Park, **C8**
790. Centennial Research Bldg. (GTRI), **D2**
791. Landon Learning Center (Childcare), **D2**
826. 756 W. Peachtree St., **H5**
850. Engineering Center (14th St. & Barnes Ave.), **G1**
851. Eco-Commons Glade Overlook, **E3**

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ACADEMIC/ADMINISTRATION

	ID#	GRID
Academy of Medicine	198	H4
Admissions (Bill Moore Student Success Center)	31	F7
Allen Sustainable Education Bldg.	145	D5
Alumni/Faculty House (L.W. “Chip” Robert Jr.)	3	F7
Baker Bldg. (GTRI)	99	D3
Barnes & Noble@Georgia Tech (Bookstore)	172A	H5
Bill Moore Student Success Center (Admissions)	31	F7
Boggs Bldg.	103	D5
Bradley Bldg.	74	F6
Brittain Dining Hall	12	G7
Broadband Institute Residential Lab, Aware Home (479 10th St.)	152	C2
Bunger-Henry Bldg.	86	D5
Bursar’s Office (Lyman Hall)	29A	F6
Business Services Bldg.	164	C6
BuzzCard Office	172A	H5
Caddell Bldg. (Building Construction)	60A	E5
Callaway Manufacturing Research Bldg. (Manufacturing Institute)	126	C4
Capital Assets Accounting Staging (755 Marietta St.)	186	B6
Carbon Neutral Energy Solutions Lab	199	C7
Career Services (Center for Career Discovery & Development)	31	F7
Carnegie Bldg.	36	F7
Centennial Research Bldg. (GTRI)	790	D2
Center for Advanced Brain Imaging (831 Marietta St.)	184	B5
Center for Assistive Technology & Environmental Access	128	C2
Center for the Enhancement of Teaching & Learning (CETL)	166	E5
Centergy One	176	G4
Central Receiving	164	C6
Chapin Bldg.	25	E6
Cherry Emerson Bldg.	66	E4
Childcare (The Children’s Campus @ Georgia Tech)	52	E2
Childcare (Landon Learning Center)	791	D2
Clough Undergraduate Learning Commons	166	E5
College of Business (Scheller)	172	H5
College of Computing	50	E4
College of Design (East)	76	E5
College of Design (West)	75	E5
College of Liberal Arts (Ivan Allen)	137	B6
Commander Bldg.	105	B3
Co-op Program (Center for Career Discovery & Development)	38	E7
Coon Bldg. (Psychology)	45	E6
Couch Bldg. (Music)	115	B4
Crosland Tower (Library)	100	E6
Daniel Lab	22	F6
Dean of Students (Smithgall)	123	D6
Digital Fabrication Lab; GTRI Machine Shop	158	C7
DramaTech (James E. Dull Theater)	124	D5
Economic Development Bldg.	173	G5
Emerson Bldg.	29B	F6
Engineered Biosystems Bldg.	195	D3
Engineering Center	850	G1
Engineering Science & Mechanics Bldg.	41	E7
Environmental Science, Health & Safety	187	B6
Evans Administration Bldg. (Tech Tower)	35	E7
Facilities Bldg.	32	F3
FASET Orientation Office (ISyE Annex)	57	C5
Ferst Center for the Arts (349 Ferst Dr.)	124	D5
Financial Aid (Bill Moore Student Success Center)	31	F7
Food Processing Technology Bldg.	159	B7
Ford Environmental Science & Technology Bldg.	147	E4
French Bldg.	30	E6
Georgia Tech Hotel & Conference Center	171	G5
Global Learning Center	170	G5
Grinnell Bldg. (645 Northside Dr.)	163	B7
GTRI Conference Center (250 14th St.)	141	G2
GTRI Research Bldg. (North)	61	C2
GTRI Research Bldg. (South)	61A	C3
Guggenheim Aerospace Bldg.	40	E7
Hall Bldg.	59	F6
Health Services (Whitehead Bldg.)	177	C5
Heffernan House (Architecture Archives)	720	F4
Hinman Bldg. (Design)	51	E6
Holland Bldg. (Whistle)	26	F6
Housing Office	123	D6
Howey Physics Bldg.	81	D4
Human Resources	142	C6
Industrial & Systems Engineering (ISyE) (Groseclose Bldg.)	56	C5
Instructional Center	55	C5
International Education	38	E7
ISyE Annex	57	C5
Ivan Allen College of Liberal Arts (781 Marietta St.)	137	B6
Klaus Advanced Computing Bldg.	153	E4
Knight Bldg. (Aerospace Engineering)	101	E7
Landon Learning Center (Childcare)	791	D2
Language Institute (O’Keefe)	33	F4
Library & Information Center (Price Gilbert Memorial)	77	E6
Love Manufacturing Bldg. (MRDC II)	144	C5
Lyman Hall (Bursar’s Office)	29A	F6
Manufacturing Related Disciplines Complex (MRDC)	135	C4
Marcus Nanotechnology Bldg.	181	D4
Mason Bldg. (Civil & Environmental Engineering)	111	D5
Molecular Science & Engineering Bldg.	167	E3
North Avenue Dining Hall	191A	G7
O’Keefe Custodial Services Bldg.	33B	F3
O’Keefe Gym	33A	F3
O’Keefe Main Bldg.	33	F4
OIT Engineering	23A	F6
OIT Planning & Programming	156	A5
Old Civil Engineering Bldg.	58	E6
OMED (Minority Educational Development) (Chapin Bldg.)	25	E6
Paper Tricentennial Bldg. (Renewable Bioproducts Institute)	129	B3
Parking Office (828 W. Peachtree St.)	178	H4
Petit Biotechnology Bldg.	146	E3
Pettit Bldg. (Microelectronics Research Center)	95	E5
Police (Georgia Tech Police Dept.) (Beringause Bldg.)	46	C3
Post Office / Wenn Student Center	104	D6
President’s Office (Carnegie)	36	F7
President’s Residence	71	E3
Price Gilbert Memorial Library	77	E6
Printing & Copying Services	138	B5
Registrar (Tech Tower)	35	E7
Research Administration Bldg. (GTRC)	155	B2
Research Administration Bldg. (Grants & Contracts)	155B	B2
Rich Computer Center	51D	E5
Rohr Chabad House	345	C2
Savant Bldg.	38	E7
Scheller College of Business	172	H5
Skiles Classroom Bldg.	2	E6
Smith Bldg. (Social Sciences)	24	E6
Smithgall Student Services Bldg.	123	D6
Southern Regional Education Board	125	A2
Stamps Student Center Commons	114	D6
Structural Engineering & Materials Research Lab (625 Lambert St.)	149	B7
Student Center (Wenn)	104	D6
Swann Bldg.	39	E7
Tech Tower (Evans Administration Bldg.)	35	E7
Tech Way Bldg.	136	C7
Technology Enterprise Park	780	D8
Technology Square Research Bldg.	175	G4
Van Leer Bldg. (Electrical & Computer Engineering)	85	E5
Wardlaw Center	47	F7
Warehouse (650 Ethel St.)	169	A1
Weber Space Science & Technology Bldg. I	84	E6
Weber Space Science & Technology Bldg. II	98	E6
Wenn Student Center / Post Office	104	D6
Whitaker Bldg. (Biomedical Engineering)	165	E4
Whitehead Bldg. (Stamps Health Services)	177	C5
Woodruff Dining Hall	116A	A3
Zinn Combustion Laboratory (635 Strong St.)	151	C7
756 W. Peachtree St.	826	H5

RESIDENCE HALLS

	ID#	GRID
Armstrong Residence Hall	108	B3
Brown Residence Hall	7	F7
Caldwell Residence Hall	109	B3
Center Street Apts.	132	C3
Cloudman Residence Hall	13	F6
Crecine Residence Hall	131	B3
Eighth Street Apts.	130	B3
Field Residence Hall	90	F6
Fitten Residence Hall	119	B4
Folk Residence Hall	110	B3
Fourth Street Apts., Goldin House, Gray House, Hayes House, Stein House	134	G5
Freeman Residence Hall (GTCN)	117	B4
Fulmer Residence Hall	106	B4
Glenn Residence Hall	16	F6
Glenn-Towers Connector	16A	G6
Graduate Living Center	52	E2
Hanson Residence Hall	93	G6
Harris Residence Hall	11	F7
Harrison Residence Hall	14	G6
Hefner Residence Hall	107	B3
Hopkins Residence Hall	94	G6
Howell Residence Hall	10	G7
Matheson Residence Hall	91	G6
Maulding Residence Hall	65A	B5
Montag Residence Hall	118	B4
Nelson Residence Hall	64	B4
North Avenue Apts.	191	G8
Perry Residence Hall	92	G6
Shell Residence Hall	64	B4
Smith Residence Hall	6	G7
Tenth & Home	180	E2
Towers Residence Hall	15	G6
Woodruff Residence Hall	116	A3
Zbar Residence Hall	65	B4

GREEK HOUSING

	ID#	GRID
Alpha Chi Omega	331	F5
Alpha Delta Chi	337	F5
Alpha Delta Pi	334	F6
Alpha Epsilon Pi	300	F6
Alpha Gamma Delta	333	F4
Alpha Phi	317	F5
Alpha Sigma Phi	313	F4
Alpha Tau Omega	302	F5
Alpha Xi Delta (Mewborn & Dull House)	322	F4
Beta Theta Pi	303	F5
Chi Phi	304	F6
Chi Psi	305	F5
Delta Chi	335	F5
Delta Sigma Phi	307	F5
Delta Tau Delta	308	E5
Delta Upsilon	309	F5
Kappa Alpha	310	F5
Kappa Sigma	311	F4
Lambda Chi Alpha	312	F5
Phi Delta Theta	314	F5
Phi Gamma Delta	315	F4
Phi Kappa Sigma	316	G5
Phi Kappa Theta	318	F5
Phi Mu	362	E5
Phi Sigma Kappa	319	F4
Pi Kappa Alpha	320	E5
Pi Kappa Phi	336	F5
Psi Upsilon	321	F4
Sigma Alpha Epsilon	323	F5
Sigma Chi	324	F5
Sigma Nu	325	F5
Sigma Phi Epsilon	326	F5
Tau Kappa Epsilon	327	F4
Theta Chi	328	F4
Theta Xi	329	G5
Zeta Beta Tau	330	F4
Zeta Tau Alpha	338	F4

ATHLETICS FACILITIES

	ID#	GRID
Alexander Rose Bowl Field	347	F4
Bobby Dodd Stadium at Grant Field	17	F6
Brock Football Practice Facility	200	E4
Byers Tennis Complex	203	F2
Campus Recreation Center	160	B5
Challenge Course	367	C4
Challenge Course Pavillion	201	C4
Chandler Baseball Stadium	168	F4
Edge Intercollegiate Athletic Center	18	F6
Grant Field	355	F6
Griffin Track	342	E3
Luck Bldg.	73A	F3
McCamish Pavilion	73	F3
Mewborn Field	196	F4
O’Keefe Gym; Women’s Softball Locker Rooms	33A	F3
Rice Center for Sports Performance	18A	F6
Stamps Field	348	B4
Women’s Softball Stadium (Mewborn Field)	196	F4
Zelnak Basketball Practice Facility	73B	F3

RELIGIOUS ORGANIZATIONS

	ID#	GRID
Baptist Collegiate Ministry	339	F5
Catholic Center	341	F5
Christian Campus Fellowship	332	F5
Lutheran Campus Ministry	343	F4
Methodist Center (Wesley Foundation)	344	F5
Presbyterian Center	346	F6

GREEN SPACE

	ID#	GRID
Acuity Brands Plaza	366	H5
Alumni Park	349	B4
Amphitheater	351	D5
Biotech Quad/Courtyard	387	E3
Callaway Plaza	353	F6
Couch Park (Burger Bowl Field)	340	C4
Eco-Commons Glade Overlook	851	E3
Harrison Square	352	E6
Kessler Campanile	350	D6
LeCraw Plaza	379	E6
Mayer Memorial Garden	354	E6
Noonan Courtyard	386	E5
Suddath Courtyard	370	D3
Tech Green	358	E5
Tech Tower Lawn	363	F7
Tech Walkway	359	E6

PARKING DECKS

	ID#	GRID
Burge Parking Deck Ⓟ	9	F7
Campus Recreation Center Parking Deck	162	B5
Curran Street Parking Deck	139	B3
Family Housing Parking Deck	182	E2
GTRI Parking Deck (250 14th St.)	141B	G2
North Avenue Apts. South Parking Deck	190	G8
North Campus Parking Deck Ⓟ	148	D3
Peters Parking Deck	8	F5
Student Center Parking Deck Ⓟ	54	C6
Technology Square Parking Deck Ⓟ	174	G5

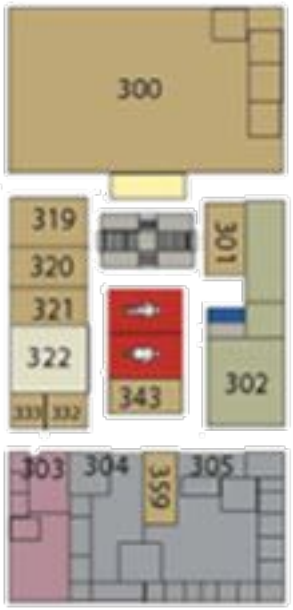
Ⓟ=Visitor Parking

Committed to the Environment: Georgia Tech is committed to environmental sustainability and has been named to The Princeton Review’s “Green Honor Roll.” The paper used for this publication exceeds the EPA standards for recycled fiber content, has been Green Seal certified, and was manufactured using nonpolluting wind-generated electricity.

Plenary Talks, Dinner Banquet: Wenn Student Center Ballroom
Tutorials: Wenn Student Center, third floor

Level 3: Student Center

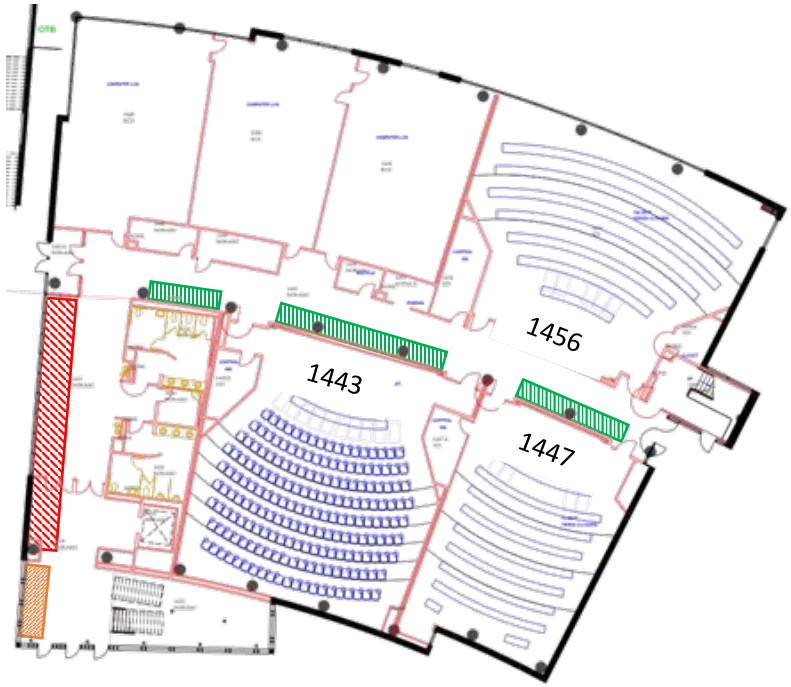
300: Ballroom
319-321: Tutorials



2017 IEEE ISAF-IWATMD-PFM

Technical Break-out Sessions: Klaus Building, academic Wing

Ground/First Level



Second Level

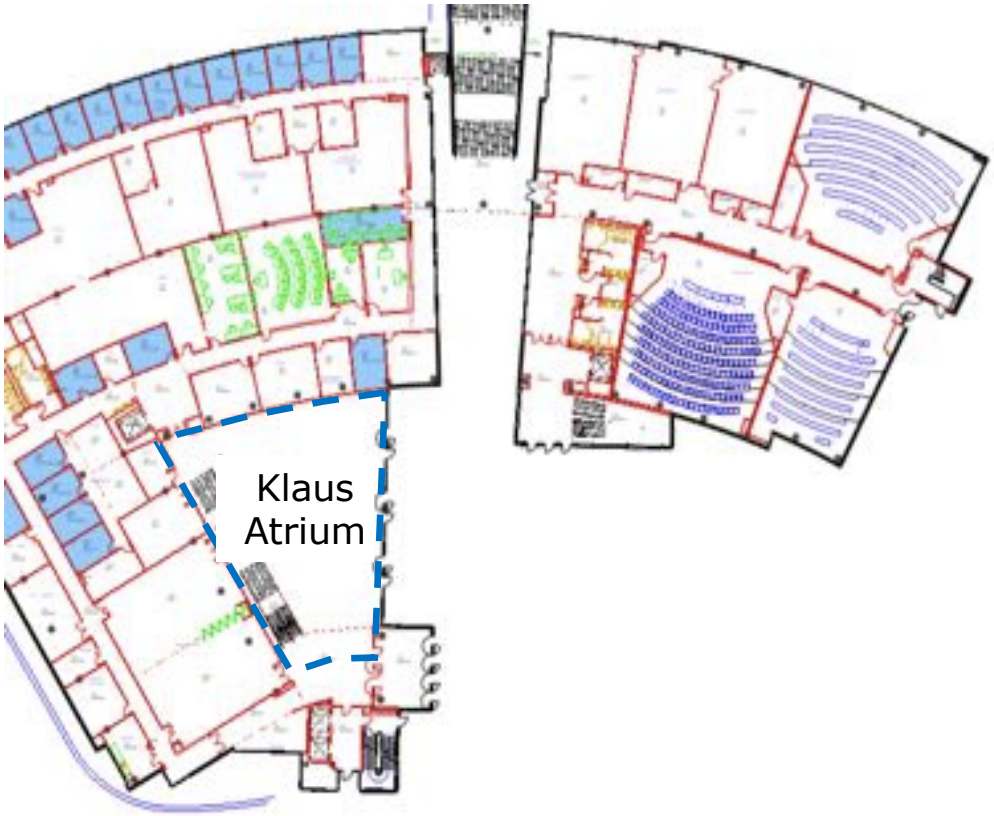
Registration/information desk

Platinum/Diamond exhibitors + Coffee/Tea stations

Silver/Gold exhibitors

Poster Sessions: Klaus Building Atrium
Welcome Reception: Clough Undergraduate Learning Commons roof garden

Klaus Building
Ground floor



Clough Undergraduate Learning Commons
Fifth floor

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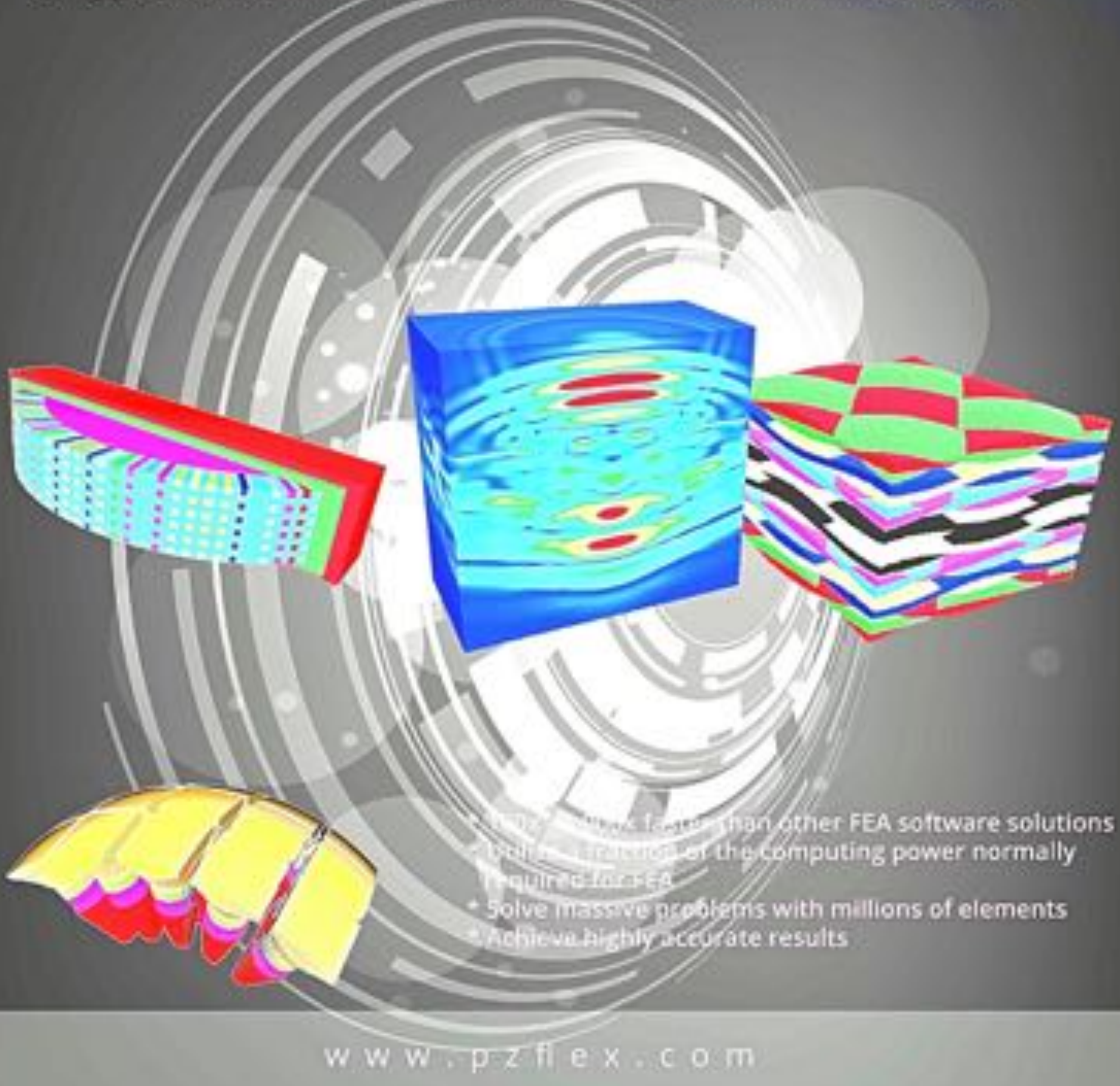

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NOTES

NOTES

	Sunday, May 7	Monday, May 8	Tuesday, May 9	Wednesday, May 10	Thursday, May 11
08:00		Conference opening		Plenary III	
08:30	Tutorials I	Plenary I	Plenary II		Plenary V
09:00				Plenary IV	
09:30		Coffee Break	Coffee Break		Coffee Break
10:00	Coffee Break	Session I	Session III	Coffee Break	Session IX
10:30	Tutorials II			Session VI	
11:00					
11:30					
12:00	Lunch Break	Poster Lunch	Poster Lunch	Lunch Break / WIE lunch	Lunch Break
12:30					
13:00	Tutorials III				Session X
13:30					
14:00		Session II	Session IV	Session VII	
14:30	Coffee Break				
15:00	Tutorials IV				
15:30			Coffee Break	Coffee Break	
16:00			Session V	Session VIII	Coffee Break
16:30					Plenary VI
17:00					
17:30		Craft Beer Tasting			Conference closing
18:00	Welcome Reception				
18:30			President's Reception *(by invitation only)*	Banquet	
19:00					
19:30					
20:00					
20:30					
21:00					
21:30					