IEEE

ISAF 2025

ISAF-ICE-ISIF-PFM

GRAZ, AUSTRIA | JULY 13 - 18, 2025

2025 IEEE INTERNATIONAL SYMPOSIUM ON APPLICATIONS OF FERROELECTRICS

SYMPOSIUM PROGRAM

SPONSORS AND ORGANIZERS

IEEE UFFC

Please visit our website for more information!

2025.ieee-isaf.org

Table of Contents

Welcome Message from the General Chairs

Dear Colleagues and Friends,

It is with great pleasure that we welcome you to the IEEE International Symposium on Applications of Ferroelectrics (ISAF), which is joined by the International Conference on Electroceramics (ICE), International Symposium of Integrated Functionalities (ISIF), and Piezoresponse Force Microscopy (PFM) Workshop.

The symposium will take place July 13–18, 2025, in the vibrant city of Graz, Austria.

This year's symposium will continue our tradition of bringing together researchers, engineers, and innovators from around the world to explore the latest developments in ferroelectric materials, devices, and applications. With a rich technical program, engaging plenary sessions, and opportunities for collaboration across disciplines, ISAF 2025 promises to be a memorable experience.

Graz, a UNESCO World Heritage city known for its blend of historic charm and modern innovation, offers a beautiful backdrop for scientific exchange and networking. Attendees can also look forward to local excursions, cultural events, and a taste of Austrian hospitality throughout the week.

We look forward to seeing you to Graz!

General Co-Chair
Marco Deluca
Silicon Austria Labs GmbH

General Co-Chair
Hana Uršič
Jožef Stefan Institute

ISAF-ICE-ISIF-PFM 2025 Organizing Committee

Conference Chairs
Marco Deluca, Silicon Austria Labs GmbH, Austria
Hana Uršič, Jožef Stefan Institute, Slovenia

Local Committee Chair
Klaus Reichmann, TU Graz, Austria

Technical Program Chairs
Andreja Benčan, Jožef Stefan Institute, Slovenia
Jurij Koruza, TU Graz, Austria

Financial Chairs
Giovanna Canu, National Research Council of Italy - ICMATE, Italy
Jesús Ricote, Instituto de Ciencia de Materiales de Madrid, CSIC, Spain

Social Activities Chair
Mojca Otoničar, Jožef Stefan Institute, Slovenia

Tutorials Chairs
Julia Glaum, Norwegian University of Science and Technology, Norway
Nagy Valanoor, University of New South Wales, Australia

Diversity and Inclusion Chairs
Barbara Malič, Jožef Stefan Institute, Slovenia
Geoff Brennecka, Colorado School of Mines, United States
Hiroko Yokota, Institute of Science Tokyo, Japan

Exhibition Chairs
Erling Ringgaard, CTS Corporation, Denmark
Laura Stoica, Thales, United Kingdom

Poster Session/Competition Chairs
Kei Yazawa, Colorado School of Mines, United States
Neamul Khansur, Case Western Reserve University, United States

Publications Chair
Pavel Mokry, Technical University of Liberec, Czech Republic

WIE (Women in Engineering) Chairs
Betul Akkopru-Akgun, The Pennsylvania State University, United States
Julian Walker, Norwegian University of Science and Technology, Norway

Student Events Chairs
Ipek Efe, ETH Zurich, Switzerland
Thomas Buttiens, Laboratoire Albert Fert, CNRS, France

ISAF Technical Program Chairs
Soonil Lee, Changwon National University, South Korea
Julia Glaum, Norwegian University of Science and Technology, Norway
Qifa Zhou, University of Southern California, United States
Nagy Valanoor, University of New South Wales, Australia

ICE Chairs

Harry L. Tuller, MIT, United States
Martin Wilkening, TU Graz, Austria
Thomas Defferriere, MIT, United States
Matthaeus Siebenhofer, TU Wien, Austria

ISIF Chairs

Orlando Auciello, The University of Texas at Dallas, United States
Susan Trolier-McKinstry, The Pennsylvania State University, United States
Sandwip Dey, Arizona State University, United States

PFM Chairs

Seungbum Hong, KAIST, South Korea
Neus Domingo, ORNL, United States

General Information

Venue
University of Graz

- Plenaries: Lecture room HS 12.01 and HS 12.11, Universitätsstraße 2-4
- Oral/Lecture Sessions: Resowi-Center, Universitätsstraße 15
- Poster Sessions, Receptions: Aula, Universitätsplatz 3

Registration Hours
Please visit the registration desk on Floor 1 in the foyer of Resowi-Center (Universitätsstraße 15)

- **Sunday, July 13**
  - 8:00 -Tutorial Attendee Badge Pick-Up Only
  - 9:00 to 19:00 – Attendee Badge Pick-Up
- **Monday, July 14:** 8:00 to 18:30
- **Tuesday, July 15:** 8:30 to 18:30
- **Wednesday, July 16:** 8:30 to 14:00
- **Thursday, July 17:** 8:30 to 17:00
- **Friday, July 18:** 8:30 to 11:00

CONFlux Virtual Platform
Login credentials will be sent out to all registrants a few days before the conference. Sessions will not be live-streamed.

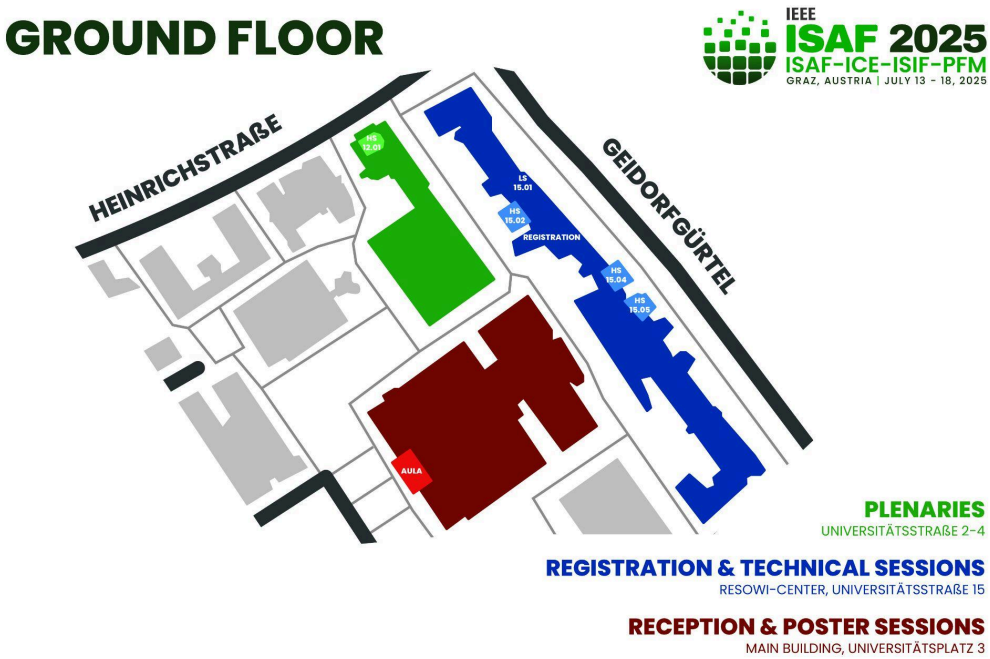
Poster Sessions
The poster sessions will be held in the Aula Exhibit Hall, located at Universitätsplatz 3. A layout map will be posted on the conference application to help you find the posters you are interested in.

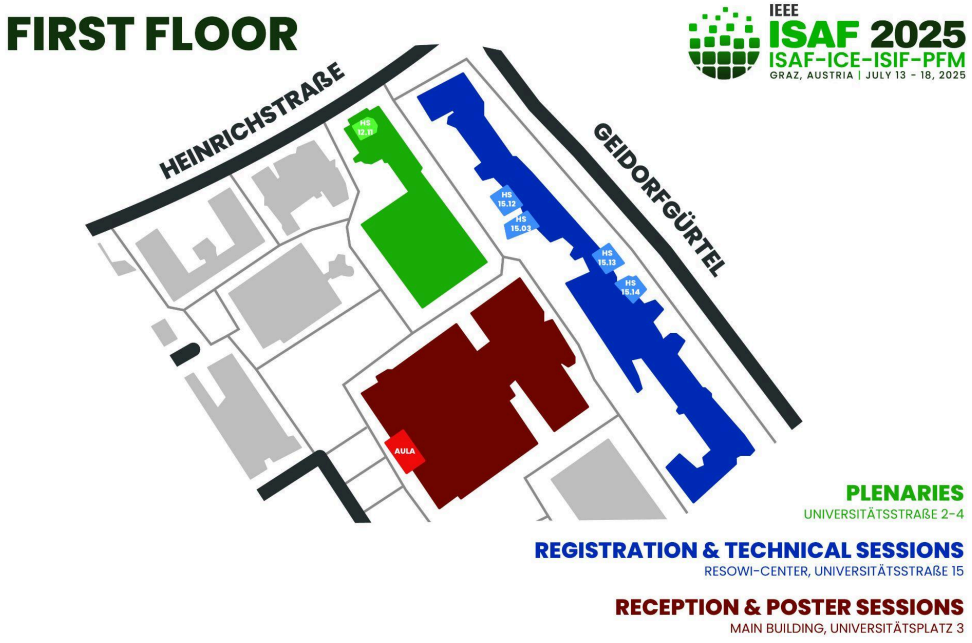
Proceedings
The final Proceedings will be sent to attendees post-conference.

Speaker-Ready Room
ALL speakers with an oral presentation **MUST** bring their presentation slides (on a USB drive) to the speaker ready room the day before their session. Directions to this room will be provided at the registration desk. The room assistant will load these on the computer for the session that day.

It will NOT be possible to use presentations from personal laptops.

Campus Map


GROUND FLOOR
IEEE ISAF 2025 ISAF-ICE-ISIF-PFM
GRAZ, AUSTRIA | JULY 13 - 18, 2025
HEINRICHSTRAßE
GEIDORFGÜRTEL
HS 12.01
LS 15.01
HS 15.02
REGISTRATION
HS 15.04
HS 15.05
AULA
PLENARIES
UNIVERSITÄTSSTRAßE 2-4
REGISTRATION & TECHNICAL SESSIONS
RESOWI-CENTER, UNIVERSITÄTSSTRAßE 15
RECEPTION & POSTER SESSIONS
MAIN BUILDING, UNIVERSITÄTSPLATZ 3


FIRST FLOOR
IEEE ISAF 2025 ISAF-ICE-ISIF-PFM
GRAZ, AUSTRIA | JULY 13 - 18, 2025
HEINRICHSTRAßE
GEIDORFGÜRTEL
HS 12.11
HS 15.12
HS 15.03
HS 15.13
HS 15.14
AULA
PLENARIES
UNIVERSITÄTSSTRAßE 2-4
REGISTRATION & TECHNICAL SESSIONS
RESOWI-CENTER, UNIVERSITÄTSSTRAßE 15
RECEPTION & POSTER SESSIONS
MAIN BUILDING, UNIVERSITÄTSPLATZ 3

Sponsors and Exhibitors

Conference

IEEE

UFFC
IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society

---

Tutorial Day Sponsor

Zurich Instruments

Platinum Sponsor

aixACCT systems

Gold Sponsor

evatec process systems

helbling

Silver Sponsor

PI

Bronze Sponsor

TDK

Excursion Sponsors

AuCERS

KEKO

Other Sponsors

REGION GRAZ www.regiongraz.at

GRAZ

Supporters

Jožef Stefan Institute, Ljubljana, Slovenia

SAL SILICON AUSTRIA LABS

TU Graz

MCL

Platinum Sponsor

Gold Sponsors

helbling	Innovation, together we do it. Helbling is an independent engineering service provider and innovation partner with 450 engineers and scientists across many disciplines, eager to engineer the best solutions for our clients. We offer development of actuator based systems, from idea to test and industrialization, incl. project, quality and requirements management. Contact us today to discuss your innovation project: helbling.ch

Student Travel Grant Winners

Adam Wynne
Rutgers University, United States

Ajay Kumar Sao
UNIVERSITY OF DELHI, India

Aleksandra Koroleva
University Grenoble Alpes, France

Amiya Ranjan Sahoo
Visvesvaraya National Institute of Technology Nagpur, India

Anirudh K R
Institute of Physics of the Czech Academy of Sciences, Czech Republic

Anthony Diaz-Huemme
Penn State, United States

Anwesha Panda
ETH Zurich, Switzerland

Astha Sharma
Visvesvaraya National Institute of Technology, Nagpur, India

Babita Sharma
Department of Physics & Astrophysics, University of Delhi, India

Baichen Lin
Institute of Materials Research and Engineering (IMRE), ASTAR, Singapore

Barbara Repic
Jožef Stefan Institute, Slovenia

Benjamin Aronson
University of Virginia, United States

Blaz Velkavrh
Jožef Stefan Institute, Slovenia

Bozo Vareskic
Cornell University, United States

Brooke Downing
Colorado School of Mines, United States

Caitlin Guzzo
Norwegian University of Science and Technology (NTNU), Norway

Cenling Huang
Shanghai Jiao Tong University, China

Chaewon Gong
KAIST, Korea

Daniel Villarreal
University of Texas at Dallas, United States

Deborah Kern
Helmholtz Zentrum Berlin GmbH, Germany

Emanuele Palladino
Queen Mary University of London, United Kingdom

Filip Grajkowski
Massachusetts Institute of Technology, United States

Gudeta Jafo Muleta
Indian Institute of Science, India

Han Yu
Tsinghua University, China

Hao Luo
UNSW Sydney, Australia

Haochen Lyu
Rutgers, United States

Hareem Zubairi
The University of Manchester, United Kingdom

Ipek Efe
ETH Zurich, Switzerland

Ivana Gorican
Jožef Stefan Institute, Slovenia

Jaehyeon Yun
Kyunghee University, Korea

Jalaja M A
Indian Institute of Science (IISC), India

Janina Roknic
Jožef Stefan Institute, Slovenia

Jannatul Robaiat Mou
University of Manchester, United Kingdom

Jatinder Pal Singh
University of Delhi, India

Jian Wen
The University of Manchester, United Kingdom

Kamila Makarova
Bauman Moscow State Technical University, Russia

Kei Nishimura
Osaka Metropolitan University, Japan

Kota Moriguchi
Nagoya Institute of Technology, Japan

Krishna Teja Valeti
Colorado School of Mines, United States

Laura Cangini
Technical university of darmstadt, Germany

Luis Hurtado
Carnegie Mellon University, United States

Manisha Bansal
Indian Institute of Science Education and Research, Vithura, Thiruvananthapuram (IISER TVM), India

Maximillian Urban
The Pennsylvania State University, United States

Meenal Dhanetwal
UGC-DAE Consortium For Scientific Research, Indore Centre, India

Megan Lenox
University of Virginia, United States

Mehrdad Ghiasabadi Farahani
Instituto de Ciencia de Materiales de Barcelona (ICMAB-CSIC) Campus UAB, Spain

Student Travel Grant Winners (continued)

Meryem Lachhab
Electronic Ceramics Department, Jožef Stefan Institute, Slovenia

Michael Gunawan
UNSW Sydney, Australia

Muhammet Boz
Gebze Technical University, Turkey

Mukul Kumar
Punjab Engineering College, India

Nejc Suban
Jožef Stefan Institute, Slovenia

Pramoda Vishnumurthy
NaMLab hGmbH, Germany

Prosun Mondal
IIT (BHU) Varanasi, India

Rahul Kumar Sahu
Visvesvaraya National Institute of Technology, India

Rajni Baranwal
Indian Institute of Technology (BHU), India

Rhea Fe Sinajon
Ming Chi University of Technology, Taiwan

Roberto Guido
NaMLab gGmbH, Germany

Ronghao Yang
University of Leeds, United Kingdom

Sabrina Kahse
Technical University Darmstadt, Germany

Salma Shahni
Amity University, Noida, Uttar Pradesh, India

Shivakumar Chedurupalli
University of Hyderabad, India

Shuaib Bolaji Issa
Norwegian University of Science and Technology, Norway

Shubham Kumar Parate
IISc Bangalore, India

Shubham Modgil
Punjab Engineering College, India

Shuxin Lin
Sun Yat-sen University, China

Uichang Jeong
KAIST, Korea

Victor Regis de Moraes
Jozef Stefan Institute, Slovenia

Wayne Yeo
Colorado School of Mines, United States

Xueqing Fang
UNSW, Australia

Yongyi Wu
Xi'an Jiaotong University, China

Yuna Kato
Institute of Science Tokyo, Japan

Zhang Zhengduan
Zhejiang University, China

Zibo Jiang
Xi'an Jiaotong University, China

Ziga Bertalanic
Jožef Stefan Institute, Slovenia

Student Poster Finalists

ISAF: Fundamentals of Ferroelectrics, Multiferroics & Related Materials
Tuesday, July 15 | 18:00 - 19:30
Old University Aula 1/5

Anirudh K R, Institute of Physics of the Czech Academy of Sciences, Czech Republic
3125: Spectroscopic Insights on Doped lead-Free antiferroelectric Niobates

Suzuka Udagawa, Gakushuin University, Japan
3109: Composition Dependence of the Structure and Dielectric Properties in the non-Centrosymmetric ZrxTa1-xO2.5-δ

ISAF: Processing of Ceramics, Composites, Polymers, Glassceramics & MLCCs
Monday, July 14 | 18:00 - 19:30
Old University Aula 1/5

Anna Paulik, Graz University of Technology, Austria
3374: Fe-acceptor-Doping of lead-Free (Ba,Ca)(Zr,Ti)O3 piezoceramics

Kamila Makarova, Bauman Moscow State Technical University, Russia
3315: Comparative Study of Different Polarization Methods on the Structure and electrophysical Properties of Polymer Ferroelectric Films

Yubo Zhu, University of Sheffield, United Kingdom
3196: Sodium Niobate (NN) Based High Energy Density Ceramic Capacitors

---

ISAF: Processing of Crystals, Thick & Thin Films
Monday, July 14 | 18:00 - 19:30
Old University Aula 1/5

Alexander Kobald, Materials Center Leoben Forschung GmbH, Austria
3269: Enhanced Energy Storage Properties in $NaNbO_3$-Based Thin Films Through Process-Optimized Chemical Solution Deposition

---

ISAF: Characterization & Properties of Ferroelectrics & Related Materials
Monday, July 14 | 18:00 - 19:30
Old University Aula 1/5

Anna Paulik, Graz University of Technology, Austria
3373: Enhancing the Electromechanical Properties of lead-Free (Ba,Ca)(Zr,Ti)O3 piezoceramics Using stoichiometry, Processing and Dopants

Chinmay Chandan Parhi, Graz University of Technology, Graz, Austria
3438: Influence of Stoichiometry and Na/Bi Ratio on Electronic Structure and Properties of relaxor 0.94(NaxBiy)TiO3- 0.06BaTiO3 Ceramics

Ivana Goričan, Jozef Stefan Institute, Slovenia
3448: Functional Properties of 0.5BaZr0.2Ti0.8O3–0.5Ba0.7Ca0.3TiO3 Thick Films Prepared by Aerosol Deposition

Kota Moriguchi, Nagoya Institute of Technology, Japan
3377: The Effect of Europium Doping on Structural Phase Transitions in KNbO3

Maximillian Urban, The Pennsylvania State University, United States
3007: Polarization Stability and Effects in B-Site Substituted Perovskite High Entropy Oxide Films

Nejc Suban, Jozef Stefan Institute - JSI, Slovenia
3098: Investigating the Piezoelectric Performance of Ceramic Powders Using piezo-Response Force Microscopy

Sobhan M. Fathabad, University Duisburg-Essen, Germany
3289: Impact of Electric Field Cycling Protocols on Electrocaloric Response and Efficiency in (Na0.5Bi0.5)TiO3 - BaTiO3 Perovskite Ceramics

Yusuf Kilic, University of Sheffield, United Kingdom
3285: The Effect of Raw Material Purity on Structure Property Relations in 0.7BiFeO3-0.3BaTiO3 Piezoelectric

---

ISAF: Applications of Ferroelectrics & Related Materials
Tuesday, July 15 | 18:00 - 19:30
Old University Aula 1/5

Amiya Ranjan Sahoo, VNIT, India
3258: Advanced Energy Solutions via bi-Directional electrocaloric Effect and Enhanced Storage in Ba0.5Sr0.5TiO3 Based relaxor Ferroelectrics

Gumin Kang, KAIST, South Korea
3288: Mechanism Analysis and Performance Enhancement Through Ferroelectric Coating of Cathode Materials in Lithium-Ion Batteries

Ilgın Uslu, Gebze Technical University, Türkiye
3326: Influence of Ceramic Volume Fraction on the Electroacoustic Performance of 1-3 Piezocomposites

Michael Gunawan, University of New South Wales, Australia
3361: Switchable Surface Chemistry of BiFeO3: a New Approach for photoelectrochemical Water Splitting

Nisa Hacıoğlu, Gebze Technical University, Türkiye
3322: Investigation of the Effect of Pillar Geometry on the Crosstalk and Electroacoustic Performance of 1-3 Piezocomposites

---

ICE - International Conference on Electroceramics
Tuesday, July 15 | 18:00 - 19:30
Old University Aula 1/5

Žiga Bertalanič, Jožef Stefan Institute, Slovenia
3382: Solid Oxide Fuel Cell Fabrication Using tape-Casting and screen-Printing Methods

---

ICE: Electroceramics: Preparation, Characterization and Devices
Tuesday, July 15 | 18:00 - 19:30
Old University Aula 1/5

Gero Pickel, Technical University Darmstadt, Germany
3276: Towards Disentangling the site-Specific Charge Transition Levels of Manganese in Spinels

Lisa Winkler, Technical University of Munich, Germany
3115: Proton Conducting Ceramic Single Chamber Glucose Fuel Cells for Human Implants

Lucie Quincke, Technische Universität München, Germany
3099: Understanding Low-Temperature Direct Liquid-to-Solid Synthesis and Chemistry of Li-Garnet Electrolytes for Hybrid and Solid-State Batteries

---

ISIF: Wearable and implantable devices
Tuesday, July 15 | 18:00 - 19:30
Old University Aula 1/5

M. Lourdes Calzada, Consejo Superior de Investigaciones Científicas (CSIC), Instituto de Ciencia de Materiales de Madrid, Spain
3185: Toward Solution Deposition of BiFeO3-Based Perovskite Films on Flexible Bio-Based Polymer Substrates

---

ISIF: Characterization, Design, Theory, and Simulation
Tuesday, July 15 | 18:00 - 19:30
Old University Aula 1/5

Janina Roknić, Jozef Stefan Institute / Young Researcher, Slovenia
3368: Exploring Polarization Direction in Potassium Sodium Niobate by 4D STEM, First-Principles Calculations and Machine-Learning Algorithms

---

PFM: 1D & 2D Nanostructured Materials via PFM
Tuesday, July 15 | 18:00 - 19:30
Old University Aula 1/5

Julia Hernandez-Ruiz, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC), Spain
3450: Local-Scale Characterization of MoS2/BTO heterostructures via Scanning Probe Microscopy

---

PFM: Ferroelectric Data Storage & Polarization Lithography
Tuesday, July 15 | 18:00 - 19:30
Old University Aula 1/5

Waseem Ahmad Wani, University College Dublin, Ireland
3267: Role of Mechanical and Electrical Stimuli on Domain Stability in Hafnia Thin Films

PFM: Interface Engineering via PFM
Thursday, July 17 | 14:00 - 15:30
Old University Aula 1/5

Lima Zhou, University College Dublin, Ireland
3136: Morphotropic Phase Boundary Tuning in Ferroelectrics Using Liquid PFM

Plenary Speakers

PLEN-01
Monday, July 14 | 9:00 – 9:45
Heizhaus

Salia Cherifi-Hertel, French National Center for Scientific Research (CNRS)
"Shedding Light on Ferroelectric Solitons: A Review of Past, Present, and Future"

Salia Cherifi-Hertel, French National Center for Scientific Research (CNRS)

Abstract: The ferroic community has seen a rise in interest regarding topological polarization textures, which have considerable potential for enhancing solitonic information technologies and driving new innovations in ferroelectrics. Recent key findings include the observation of non-Ising and chiral domain walls, as well as various patterns such as bubble domains and skyrmions. Current research emphasizes exotic topological structures that may reveal novel physical and functional properties. Concurrently, experimental techniques are being developed and refined to allow the detection of local symmetry violations and establish structure-property correlations down to the nanoscale. In this context, second-harmonic generation has emerged as effective approache for non-invasively probing the internal structure, chirality, and complex polarization textures. In this lecture, I will provide a comprehensive review of advancements in our understanding of the internal structure of domain walls in ferroelectrics, with a particular emphasis on local symmetry and properties, facilitated by the integration of machine learning algorithms into nonlinear optical microscopy.

PLEN-02
Monday, July 14 | 9:45 – 10:30
Heizhaus

Roger Proksch, Oxford Instruments, Asylum Research
"Forces, Functionality and Friction - Accurate Nanoscale Electromechanics"

Abstract: Atomic Force Microscopes (AFMs) have become a standard tool for high resolution surface mapping of a wide variety of nanoscale samples. The vast majority of existing AFMs make use of an optical beam detector (OBD) that measures the bending of the flexible cantilever beam. Despite its popularity, accurate and reproducible mechanical measurements using this detection approach remains extremely challenging. Specific barriers to widespread accurate AFM include (i) highly inconsistent sensitivity calibrations, (ii) measurement noise floors significantly higher than thermal motion of the cantilever probes and (iii) uncontrolled mixing of vertical and in-plane forces acting on the tip. Component mixing inevitably complicates attempts at accurate mechanical measurements and can lead to enormous, and often unacknowledged uncertainties. In this work, we build on earlier previous interferometric results to develop and demonstrate new workflows that allow the full three-dimensional nanoscale mechanical response of samples – limited by the fundamental thermal (Brownian) fluctuations of the cantilever with an accurate sensitivity calibrated by the wavelength of light. These workflows are based around a new quadrature phase differential interferometer (QPDI) that routinely achieves a detection noise down to ≈5 fm/√Hz on standard commercial cantilevers. The QPDI measurement remains linear and accurate for large deflections (>1 µm) down to sub-picometer thermal fluctuations. This improved low noise floor and accurate calibration reveals details and features that have been hidden from view using conventional OBD measurements. We demonstrate new workflows for a variety of materials including functional ferroelectrics, including high frequency (5G) filter design and manufacturing, beyond Moore's law computing materials such as HfO and HZO and 2D van der Waals materials including twisted graphene and hBN and soft polymeric samples. We demonstrate significantly improved accurate force quantification of in-plane and vertical forces that are typically mixed in an uncontrolled manner with OBD.

Plenary Speakers (continued)

PLEN-03
Tuesday, July 15 | 9:00 – 9:45
Heizhaus

Bilge Yildiz, MIT
"Electrochemical Ionic Synapses for Energy-Efficient Brain-Inspired Computing"

Abstract: In this talk, I will share our work on the ionic electrochemical synapses, whose electronic conductivity we control deterministically by electrochemical insertion/extraction of dopant ions into/out of the channel layer. This work is motivated by the need to enable significant reductions in the energy consumption of computing, and is inspired by the ionic processes in the brain. Proton as the working ion in our research presents with very low energy consumption, on par with biological synapses in the brain. Our modeling results indicate the desirable material properties, such as ion conductivity and interface charge transfer kinetics, that we must achieve for fast (ns), low energy (< fJ) and low voltage (<1V) performance of these devices. Importantly, the target material is a mixed proton-electron conductor, whose electronic conductivity depends on the proton concentration through doping and phase change effects. The candidate materials are a spectrum of intercalation oxides as well as 2D van der Waals materials. We have assessed the electron polaron and proton mobilities in these systems, to understand the conductivity modulation mechanisms, and down-select most promising materials. In addition, the conductance change in these electrochemical devices depends non-linearly on the gate voltage, due to field-enhanced ion migration in the electrolyte, and charge transfer kinetics at the electrolyte-channel interface. We are leveraging these intrinsic nonlinearities to emulate bio-realistic learning rules deduced from neuroscience studies, such as spike timing dependence of plasticity and Hebbian learning rules. Our findings provide pathways towards brain-inspired hardware that has high yield and consistency and uses significantly lesser energy as compared to current computing architectures.

PLEN-04
Tuesday, July 15 | 9:45 – 10:30
Heizhaus

Franz Faupel, Kiel University
"Sustainability Crisis and our Responsibility as Scientific Community"

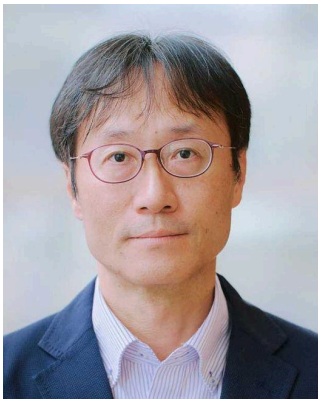
Abstract: The climate and sustainability crisis is currently the greatest challenge to the survival of humanity. Alarmingly, catastrophic droughts, wildfires, floods, and storms are becoming increasingly common, signaling that several planetary boundaries have been breached, with little time left before the first tipping points are reached. Despite clear evidence from scientific research and everyday experiences, greenhouse gas emissions continue to rise exponentially due to barriers to change at political, societal, and individual levels. Given its systemic nature, the sustainability crisis cannot be addressed through technological progress alone but requires a complete paradigm shift. As scientists, we bear a special responsibility to lead the communication of the urgent need for action to both the public and decision-makers [1]. Recently, as a group of concerned researchers, we founded the International Alliance of Societies for a Sustainable Future (https://sfs-alliance.org). Motivated by the fragility of existing political networks, our vision is to leverage the robust and stable international scientific network to alert the global public about the sustainability crisis and recommend measures for socio-ecological transformation. This alliance is not limited to natural sciences and technology but spans all disciplines across borders and cultures [2].

References
[1] J. Rödel, A. Frisch, and D. Damjanovic, J. Mater. Sci. 58, 15577, https://link.springer.com/article/10.1007/s10853-023-09031-z (2023).
[2] J. Rödel, F. Faupel, and S. Klein, Nature Materials, https://www.nature.com/articles/s41563-024-02063-z (2024).

Plenary Speakers (continued)

PLEN-05
Thursday, July 17 | 9:00 – 9:45
Heizhaus

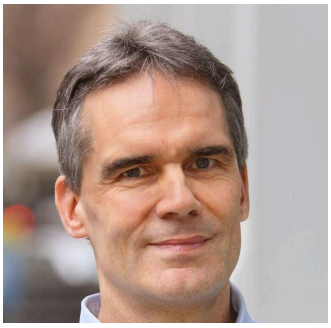
Yuji Noguchi, Kumamoto University
"Defect Control in Polar Perovskites "Ferroelectric and Ferrielectric oxides""



Abstract: This keynote presents the history, current status, and future prospects of the defect control in polar perovskites of BaTiO3 and Bi1/2Na1/2TiO3 and related polar perovskites. Polar materials include not only ferroelectrics but also ferrielectrics that were first discovered in high-quality Bi1/2Na1/2TiO3-based single crystals. This will also discuss the dielectric properties of ferrielectric ceramics which may surpass BaTiO3-based ceramics in terms of ultra-high permittivity under strong DC bias fields.

PLEN-06
Thursday, July 15 | 9:45 – 10:30
Heizhaus

Juergen Fleig, TU Wien
"Unifying Perspectives on Perovskite Oxides: From PZT and STO to LSF and LSM"



Abstract: Perovskite-type oxides are almost ubiquitous in the field of electroceramics. This is due to the broad range of properties that can result when choosing appropriate compositions: insulating behavior in dielectric SrTiO3 and ferroelectric Pb(Zr,Ti)O3 (PZT), high electronic conductivity in (La,Sr)MnO3 (LSM), high electrocatalytic activity in (La,Sr)CoO3 (LSC) or (La,Sr)FeO3 (LSF), etc. Not surprisingly, researchers often mainly focus on one class of perovskite oxides, with the aim of understanding and improving a specific property and its use in devices. However, despite their often strikingly different properties, all these perovskites share several strongly related phenomena, and on a fundamental level unifying descriptions are often possible. This is exemplified in the talk.

Plenary Speakers (continued)

PLEN-07
Friday, July 18 | 11:15 – 12:00
Heizhaus

Susan Trolier-McKinstry, The Pennsylvania State University, IEEE Women in Engineering Distinguished Lecturer
"Designing Reliability into Ferroelectric Films for MEMS and Memory"

Piezoelectric thin films based on Al1-xScxN, PbZr1-xTixO3 and K1-xNaxNbO3 are being commercialized in piezoelectric microelectromechanical systems (MEMS) for resonators, low drive actuators, and the facile approach to making transducer arrays. As these materials are incorporated into devices, it is critically important that they operate reliably over the lifetime of the system over a wide range of DC and AC excitation conditions. Increasingly, wurtzite structured ferroelectrics such as Al1-xScxN, Al1-xBxN, and Zn1-xMgxO are also being explored for ferroelectric memory applications. Here too, the current generation of materials is limited in terms of reliability in terms of cycling, as well as the propensity to high leakage currents in thickness-scaled devices. This paper discusses the links between defect chemistry and the lifetime-limiting behaviors. A combination of thermally stimulated depolarization current, deep level transient spectroscopy, impedance spectroscopy, highly accelerated lifetime testing, and transmission electron microscopy is typically needed to fully characterize the mechanism for failure. In some cases, once the key mechanisms for failure are understood, significant increases in the lifetime and performance can be achieved.

PLEN-08
Friday, July 18 | 12:00 – 12:45
Heizhaus

Long-Qing Chen, The Pennsylvania State University, 2024 IEEE Distinguished Lecturer Award
"Thermodynamics and Phase-field Method of Ferroelectric Phase Transitions, Domains, and Defect Reactions in the Presence of Strain and Electric Field"

Abstract: This presentation will outline a general thermodynamic formulation and the corresponding phase-field implementation to model, understand and predict the formation of domains and their responses to mechanical and electric stimuli in the possible presence of atomic, ionic, and electronic defects.

PROGRAM AT A GLANCE

Sunday, July 13

8:00 - 19:00	*Registration (RESOWI Foyer)*			
	HS 15.03	*HS 15.12*	*HS 15.04 *Updated Room*	*LS 15.02 (*updated Room)*
9:00 - 10:30	TUT-01: Ionic plastic crystal ferroelectrics (Julian Walker)	TUT-02: Electrical and mechanical characterization of piezo- & ferroelectric (Tom Kremers)	TUT-03: Engineering ferroelectric domains in oxide heterostructures and membranes (Ruijuan Xu)	ExCom meeting
10:30 - 11:00	Coffee Break (RESOWI Foyer)			
11:00 - 12:30	TUT- 04: Ferroelectric topologies (Sergei Prokhorenko)	TUT-05: Neutron diffraction: New opportunities in ferroelectrics and multiferroics (Daniel Sando)	TUT-06: Using ferroelectrics to enhance (photo)catalytic activity for clean fuel production: Experimental and computational approaches (Judy Hart)	
12:30 - 14:00	Lunch & Presentation for Tutorial Attendees Presented by Zurich Instruments (HS 15.03)			
14:00 - 15:30	TUT-07: Emerging Ferroelectricity in Fluorite-Structured (Hf,Zr)O2: From Fundamentals to Practical Semiconductor Applications (Min Hyuk Park)	TUT-08: Understanding the Role of Mechanics and Electromechanics of Atomic Force Microscopy Measurements of Ferroelectric Properties (Stephen Jesse)	TUT-09: Integration of thin-film ferroelectrics on non-conventional substrates (Sebastjan Glinsek)	ECAPD IAB Annual General Meeting (AGM)
15:30 - 16:00	Coffee Break (RESOWI Foyer)			
16:00 - 17:30	TUT-10: Fundamentals of Wurtzite Ferroelectrics (Kei Yazawa)	TUT-11: General AI approaches for large scale data handling in ferroelectric (Joshua Agar)	TUT-12: Ceramic Processing – Synthesis of Metal Oxides (Clement Nicollet)	Ferroelectrics Standing Committee (16:00 - 19:00)
17:30 - 19:00	Break			Student Social (Offsite: Bierbaron)
19:00 - 22:00	Welcome Reception (Aula)			

Tutorials

Julian Walker, Norwegian University of Science and Technology
TUT-01: Ionic plastic crystal ferroelectrics
Sunday, July 13 | 9:00 - 10:30

Abstract: While molecular ferroelectrics are embedded in the history of ferroelectricity, with its discovery in Rochelle Salt (sodium potassium tartrate) crystals in 1920, they have not seen anywhere near the development of metal oxide ferroelectrics. In the last decade and a half however, significant discoveries and developments have occur in a new class of molecular materials known as ionic plastic crystals, and there is growing interest in this new class of ferroelectric to see if they can bring about new applications and niece functionalities.

The tutorial will introduce plastic crystals as a material class and explain their history and defining characteristic, which is a mesophase occurring before the melting point in which molecules exhibit translational symmetry but orientational disorder. From here we will discuss the basic principles of piezoelectricity and ferroelectricity and how these properties manifest in ionic plastic crystals. Finally, the tutorial will conclude by using this fundamental knowledge as the basis for identifying some of the challenges and intriguing phenomena related to ionic plastic crystal ferroelectrics, most notably the role of molecular rotation in their functional properties. The tutorial should serve as an introduction to this class of molecular ferroelectrics and a recap of some fundamental ferroelectric related properties sand phenomena.

Tom Kremers, aixACCT Systems GmbH
TUT-2: Electrical and mechanical characterization of piezo- & ferroelectric
Sunday, July 13 | 9:00 - 10:30

Abstract: Piezoelectric materials are integral to numerous advanced technologies including sensors and actuators due to their unique electromechanical coupling properties. Understanding and characterizing these materials require precise measurement techniques that reliably determine key parameters, such as piezoelectric coefficients, dielectric constants, and polarization behavior. This tutorial offers an in-depth exploration of the theoretical principles underpinning piezoelectricity and the advanced measurement methodologies used to evaluate these properties.

The discussion begins with a concise review of the fundamental theory of piezoelectric materials, emphasizing the relationships between electrical and mechanical responses under applied stimuli. We then transition to advanced measurement techniques that enable accurate characterization. These include displacement measurements, dynamic piezoelectric coefficient evaluation, and dielectric spectroscopy. Methods for analyzing polarization hysteresis loops, small-signal impedance, and resonance characteristics are detailed, providing insights into material behavior under various operational conditions.

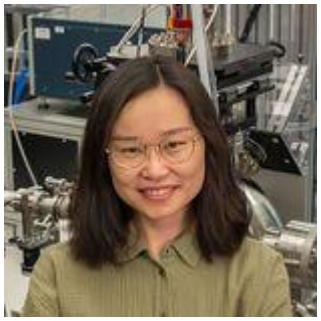
Special attention is given to precision measurement setups that integrate automated control and high-sensitivity detection, ensuring repeatability and accuracy. Techniques for determining material non-linearity, fatigue, and aging effects are also examined, alongside tools for highly accelerated lifetime testing (HALT) of piezoelectric materials and devices. In addition, techniques to detect material defects as the measurement of thermally stimulated depolarization currents (TSDC) are presented.

The tutorial emphasizes methodologies that combine hardware and software innovations, facilitating robust analysis of piezoelectric performance. Illustrative examples demonstrate how these techniques can be applied to research and development in fields such as microelectromechanical systems (MEMS) and advanced sensors.

By the end of the session, participants will have a comprehensive understanding of both the theoretical framework and the practical measurement tools necessary to characterize piezoelectric materials effectively. This knowledge will empower researchers and engineers to conduct precise evaluations, driving advancements in material design and application.

(Tutorials continued)

Ruijuan Xu, North Carolina State University
TUT-03: Engineering ferroelectric domains in oxide heterostructures and membranes
Sunday, July 13 | 9:00 - 10:30



Abstract: Ferroelectric materials exhibit electrically switchable polarization, with their nano- and mesoscale polarization arrangements giving rise to distinct ferroelectric domains. The functional properties of ferroelectrics, including their dielectric, piezoelectric, and ferroelectric responses, are intrinsically coupled to domain configurations. By strategically designing and controlling domain structures, these properties can be significantly enhanced. In this tutorial, I will focus on low-dimensional ferroelectrics, from epitaxial heterostructures to freestanding membranes, to introduce key strategies for domain engineering. Specifically, I will discuss how orientation control, electrostatic engineering, strain engineering, and size effects can be leveraged to tailor ferroelectric domain structures and induce emerging and competing ferroic orders in complex oxide heterostructures and membranes.

Sergei Prokhorenko, University of Arkansas
TUT-04: Polar topological defects and solitons
Sunday, July 13 | 11:00 - 12:30

Abstract: In recent years, ferroelectric (polar) topological structures have become a rapidly growing area of research. A steady stream of experimental and theoretical studies reporting novel swirling patterns of polarization continues to expand the field, raising new questions about the underlying physical phenomena and functional properties that remain to be fully understood.

In this tutorial, I will provide an introduction into the physics of ferroelectric topological defects and solitons. Starting from the fundamentals of homotopy theory required to navigate the rich landscape of ferroelectric topological defects and solitons, I will move on to the discussion of the physical mechanisms that drive the formation of polar topologies and the emergent functional phenomena associated with these structures. Particular attention will be devoted to placing polar topologies within the broader context of modulated phases and to bridging polar topologies with their counterparts in magnetic materials, liquid crystals and other physical systems. Finally, I will discuss the dynamical excitations associated with various topological states, along with the emergent functional phenomena that suggest new pathways for functionalizing polar topological structures.

(Tutorials continued)

Daniel Sando, University of Canterbury
TUT-05: Neutron diffraction: New opportunities in ferroelectrics and multiferroics
Sunday, July 13 | 11:00 - 12:30

Abstract: Neutron diffraction has become an essential technique for investigating the atomic and magnetic structure of ferroelectrics and multiferroics, offering distinct advantages over X-ray and electron-based methods. Since neutrons interact weakly with matter, they penetrate deeply into bulk materials, enabling non-destructive structural analysis as well as in-situ and in-operando studies. Additionally, their sensitivity to light elements such as oxygen can offer insight into lattice distortions and bonding environments. Crucially, neutrons directly interact with magnetic moments, making them well suited to studying magnetic order and magnetoelectric coupling.

In this tutorial, I will first introduce the fundamental principles of neutron scattering, including the formalism for neutron-matter interactions. I will then present several specific case studies to demonstrate how neutron diffraction has advanced our understanding of bulk ferroelectrics and thin film multiferroic systems. I will retain the focus on practical applications, for instance, demonstrating how neutron scattering techniques can provide insight into temperature- and field-dependent phase transitions, polarization mechanisms, and magnetoelectric coupling. Several specific experimental methods, such as powder and single-crystal neutron diffraction, inelastic neutron scattering, and polarized neutron reflectometry, will be introduced in the context of real-world materials research. By the end of the tutorial, participants will have a understanding of how neutron scattering can provide a unique understanding of ferroelectric and multiferroic materials, beyond x-ray or electron-based techniques.

(Tutorials continued)

Judy Hart, School of Materials Science and Engineering
TUT-06: Using ferroelectrics to enhance (photo)catalytic activity for clean fuel production: Experimental and computational approaches
Sunday, July 13 | 11:00 - 12:30

Abstract: Future clean energy systems require efficient means of storing and transporting energy obtained from intermittent renewable sources, such as solar and wind. One way of achieving this is through electrochemical conversion of clean electricity to chemical energy stored in fuels such as hydrogen produced through water splitting [1]. Such electrochemical processes can be driven either directly by sunlight (referred to as photo-electrocatalysis) or indirectly (i.e. by producing electricity from solar, wind or other clean energy sources, which is then fed into the electrochemical cell).

While such electrochemical and photoelectrochemical (PEC) processes for clean fuel production are well established, they are not yet commercially viable at a large scale, due to low efficiencies and high costs. Novel materials and approaches are needed.

Electrochemical clean fuel production processes are based on redox reactions, with oxidation occurring at the surface of an anode and reduction occurring at the surface of a cathode. In the case of PEC processes, at least one electrode must be a semiconductor that absorbs photons from incident sunlight to produce excited electron-hole pairs, with the charges then needing to be separated and transported to the electrode surfaces to undergo the reactions. It is these charge separation and transport steps that are often a limiting factor in PEC processes and a significant cause of inefficiencies and energy losses.

One novel approach to enhancing efficiency in (photo)electrochemistry is to use ferroelectric materials for the (photo)electrodes [2,3]. The polarization-induced internal electric field of the ferroelectric can facilitate charge separation and transport, while also potentially tuning the surface chemistry and electronic states to optimize the reaction processes at the surface.

This tutorial will cover the basic principles of PEC clean fuel generation and the application of ferroelectric materials. The ferroelectric polarization field can have a variety of effects on charge separation and transport, which are often in competition with each other and each need to be considered in order to understand and optimize PEC performance [4,5]. The array of experimental methods that can be used to help resolve these effects will be discussed.

Understanding the atomic-scale effects of ferroelectric polarization on electronic structures, surface chemistry and reaction processes is particularly challenging. Here, application of computational methods such as density functional theory (DFT) in parallel with experimental methods is a powerful approach. Relevant computational methods and the insights they can provide will be discussed.

[1] W. Yang, R. R. Prabhakar, J. Tan, S. D. Tilley, J. Moon, Chemical Society Reviews, 48, 4979-5015 (2019).
[2} D. Tiwari, S. Dunn, Journal of Materials Science, 44, 5063-5079 (2009).
[3} M. Gunawan, et al., J. Materials Chemistry A, 13, 1612-1640 (2025
[4] M. Gunawan, et al., Advanced Functional Materials, 2417651 (2025).
[5] W. Yang, et al., Nano Letters, 15, 7574-7580 (2015).

(Tutorials continued)

Min Hyuk Park, Department of Materials Science and Engineering of Seoul National University
TUT-07: Emerging Ferroelectricity in Fluorite-Structured (Hf,Zr)O2: From Fundamentals to Practical Semiconductor Applications
Sunday, July 13 | 14:00 - 15:30

Abstract: The ferroelectricity discovered in (Hf,Zr)O2 has garnered increasing interest from both academia and industry since its first report in 2011.[1] Even from the first report, the ferroelectricity could be demonstrated in sub-10-nm thickness, which is now confirmed within sub-1-nm thickness.[2,3] The origin of the unexpected ferroelectricity has been intensively studied and the formation of the metastable orthorhombic (space group: Pca21) or rhombohedral (space group: R3m or R3) phases is believed as the crystallographic origin. Owing to the robust ferroelectricity in sub-5-nm thickness regime which is beneficial to achieve low-power semiconductor devices as well as an endurable cycle number even beyond 1012 cycles of ferroelectric (Hf,Zr)O2, ferroelectric random-access memory is more promising for practical applications than ever.[4-6]

However, there are technical issues requiring urgent solutions, such as insufficient endurance and switching speed, which are strongly related to the intrinsically high coercive field and its wide distribution.[4-6] In this tutorial, therefore, the ferroelectricity in (Hf,Zr)O2 is reviewed from the fundamental theory behind the unexpected formation of the ferroelectric phase to the practical semiconductor applications. The strong quantitative correlation between the material properties and device performances are reviewed with considering various factors including interfacial redox chemistry [7], defect chemistry [8,9], polymorphism [10], stress/strain [11], and crystallographic texture.

[1] T. S. Boescke et al. Appl. Phys. Lett. 99, 102903 (2011).
[2] S. Cheema et al. Nature 580, 478-482 (2021).
[3] S. Cheema et al. Science 376, 648-652 (2022).
[4] M. H. Park et al. MRS Commun. 8, 795-808 (2018).
[5] U. Schroeder and M. H. Park et al. Nat. Rev. Mater. 7, 653-669 (2022).
[6] J. Y. Park, D.-H. Choe and D. H. Lee et al. Adv. Mater. 35, 2204904 (2022).
[7] K. Yang et al. Chem. Mater. 35 (6), 2219-2237 (2023).
[8] M. H. Park et al. J. Mater. Chem. C (31), 10526-10550 (2020).
[9] J. Lee, K. Yang and J. Y. Kwon et al. Nano Convergence 10, 55 (2024).
[10] M. H. Park et al. Adv. Electron. Mater. 5, 1800522 (2019).
[11] Y. Lee and H. W. Jeong et al. Mater. Sci. Semicond. Proc. 160, 107411 (2023).

(Tutorials continued)

Stephen Jesse, Oak Ridge National Laboratory
TUT-08: Understanding the Role of Mechanics and Electromechanics of Atomic Force Microscopy Measurements of Ferroelectric Properties
Sunday, July 13 | 14:00 - 15:30

Abstract: The atomic force microscope has emerged as a leading characterization platform for imaging and assessing the functional properties of ferroelectric materials at the nanoscale. Its usefulness derives from the combined ability to apply bias locally (10's nm) via a conductive scanning probe and sense displacements of the surface (10's of pm) to yield maps of ferroelectric domains and insights into the local switching behavior of ferroelectrics. However, one must exercise care when setting up an experiment and interpreting results since a range of phenomena, including electrostatic interactions between the scanning probe and the surface, can give responses that can appear as piezoelectric/ferroelectric behaviors. Properly navigating the landscape of nanoscale electromechanical phenomena demands cutting-edge expertise – both in the experimental part and high-level data analytics. This tutorial will start with an overview of how advanced Piezoresponse Force Microscopy (PFM) and related spectroscopic approaches developed over the last two decades have impacted the study of nanoferroics. This perspective will set the stage for then focusing on building a deeper understanding of the mechanics and electromechanics at play when DC and AC bias is applied to a scanning probe positioned at or near the sample surface and discussing strategies for mitigating spurious effects. The intent of this tutorial is to provide guidance for performing PFM and to raise awareness about what to look for when assessing the validity of results either while performing measurements or when examining the open literature.

Sebastjan Glinsek, Luxembourg Institute of Science and Technology
TUT-09: Integration of Thin-Film Ferroelectrics on Non-Conventional Substrates
Sunday, July 13 | 14:00 - 15:30

Abstract: Perovskite ferroelectric thin films have been extensively studied over the past several decades and have been successfully integrated into various devices, including inkjet printheads, inertial sensors, speakers, and microphones.

The breakthrough in their development was achieved with films grown directly on platinized silicon (polycrystalline films) or oxide single-crystal substrates (epitaxial films), which can withstand the high annealing or deposition temperatures (typically above 650 °C) required for their formation.

However, there is a growing demand for integrating these films onto temperature-sensitive, non-conventional substrates, such as transparent glass, flexible polymers, and metallic foils. This trend is driven by emerging applications, including wearables, invisible electronics, and artificial skin.

In this tutorial, I will discuss three key approaches for integrating oxide ferroelectrics onto temperature-sensitive substrates: 1) lowering the effective crystallization temperature; 2) light-based annealing; and 3) transfer processing, which is intriguing also from a fundamental perspective, as it enables the creation of artificial 2D heterostructures that lead to novel physical phenomena.

(Tutorials continued)

Kei Yazawa, Colorado School of Mines
TUT-10: Fundamentals of Wurtzite Ferroelectrics
Sunday, July 13 | 16:00 - 17:30

Abstract: Wurtzite (Al,Sc)N bas been utilized as microwave resonator and filter devices in telecommunications due to its large electromechanical coupling. The recent discovery of ferroelectricity in (Al,Sc)N films provides opportunities for new material discoveries and device applications such as tunable filters and non-volatile memories. In this tutorial, I will present unique features of the wurtzite ferroelectric materials. Those include: (1) crystal phases in AlN based materials, (2) on Landau-Devonshire model and global strain effects on ferroelectric responses, (3) local bonding effects on ferroelectric switching pathway, and (4) anomalously abrupt kinetics in ferroelectric switching dynamics, and (5) leakage current mechanisms. Those fundamental understandings on wurtzite ferroelectric materials provide insights on further material design and improvement on material properties and device performance.

Joshua Agar, Lehigh University
TUT-11: General AI Approaches for Large Scale Data Handling in Ferroelectric
Sunday, July 13 | 16:00 - 17:30

Abstract: In this tutorial, we introduce a modern AI-driven framework for large-scale data handling and analysis in the context of ferroelectric materials research. As experimental and computational workflows generate increasingly complex and voluminous datasets, effective data management and analysis strategies are essential for accelerating scientific discovery. We focus on the integration of DataFed, a federated scientific data management system designed to support distributed collaboration, metadata-rich data curation, and powerful search capabilities across institutions and platforms.

Participants will learn how to automate the ingestion, organization, and annotation of high-dimensional ferroelectric datasets using DataFed's APIs and tools. We demonstrate how automated curation pipelines can be established to maintain data provenance and reproducibility, enabling seamless access to diverse datasets.

Building on this foundation, the tutorial covers the training and deployment of deep autoencoders for unsupervised spectral unmixing and latent feature extraction. These AI models enable the discovery of hidden physical patterns and structure-property relationships that are not readily apparent through traditional analysis. Emphasis is placed on embedding these models within real-world scientific workflows, promoting AI-enabled science where model training, inference, and retraining occur in tandem with data acquisition.

This hands-on session is designed for materials scientists interested in scalable, intelligent workflows. By the end of the tutorial, participants will be equipped with the tools and knowledge to implement an end-to-end pipeline for federated data management and deep learning-driven discovery in ferroelectric systems and beyond.

(Tutorials continued)

Clement Nicollet, CNRS - University of Nantes
TUT-12: Ceramic Processing – Synthesis of Metal Oxides
Sunday, July 13 | 16:00 - 17:30

Abstract: Synthesis of metal oxides is typically the first step of any materials science research in a field or application involving oxides materials. However, the synthesis is rarely the prime focus in materials science, which usually describe properties and characterizations of said materials. Consequently, synthesis protocols are often given too little attention in the literature and hence poorly described. For scientists starting in the field, it becomes confusing to make the right choice of synthesis route and conditions to successfully prepare what will be the base of their research, which is a pure, single phase, complex oxide powder.

With this tutorial, we will provide basic knowledge on the underlying chemistry of oxide synthesis, and simple explanations on what motivates the need of various synthesis routes. Then, four main synthesis routes are described, namely the solid state reaction route, the Pechini route, the combustion route, and the precipitation route. For each routes, the approach is described, and the relevant parameters to be considered are developed. Finally, a step by step general protocol for each route is proposed, which can serve as a solid foundation for unexperienced researchers to become more confident when approaching metal oxide synthesis.

Invited Speakers

ISAF - International Symposium on Applications of Ferroelectrics

- Alenka Mertelj, Jožef Stefan Institute, Slovenia
  “Ferroelectric nematic liquid”
- Anna Grünebohm, Ruhr-Universität Bochum, Germany
  “Conventional and inverse electrocaloric effects in perovskites: insights from ab initio based modelling”
- Anna Razumnaya, University of Picardie, France
  “Topological States in Nanostructured Ferroelectrics of Different Dimensionalities”
- Brahim Dkhil, Centrale Supélec, France
  "Materials strategy for enhancing piezocatalytic activity"
- Chunming Wang, Shandong University, China
  “Park plasma sintering of high-Tc CaBi2Nb2O9 that exhibits superior piezoelectric performance”
- Elizabeth Dickey, Carnegie Mellon University, United States
  “Understanding Disorder and Domains in Wurtzite Ferroelectrics by Electron Microscopy and Spectroscopy”
- Emmanuel Defay, Luxembourg Institute of Science and Technology, Luxemburg
  “Pyroelectric energy harvesting – from Joules to Watts”
- Enzhu Li, University of Electronic Science and Technology of China, China
  “P-V-L Theory and First-Principles Density of States Calculation for Evaluating Chemical Bonds in Microwave Dielectric Ceramics”
- Geoff Brennecka, Colorado School of Mines, United States
  “Weeds or Flowers? Effects of heterovalent additions in AlN-based thin films”
- Goran Dražić, National Institute of Chemistry, Slovenia
  “Probing local structure and polarisation under static and dynamic conditions of lead free ferroelectrics using 4D STEM”
- Guillaume Nataf, University de Tours, France
  “Strategies to build ferroelectric thermal conductivity switches”
- Hamideh Khanbareh, University of Bath, United Kingdom
  “Functionally Graded Piezoelectric Composites for Biological Applications”
- Hiroko Yokota, Tokyo Institute of Technology, Japan
  “The emergence of polarity at the antiphase boundary in PbZrO3”
- Ilya Grinberg, Bar Ilan University, Israel
  “An analytical theory for predicting collective properties of ferroelectric solid solutions based on their composition and structure-property relationships”
- Jacob Jones, North Carolina State University, United States
  “New Insights into the Synthesis of (K,Na)NbO3 and BiFeO3 from In Situ, High-Temperature X-ray Diffraction”
- Jacob Santamaria, University of Madrid, Spain
  “Moiré polar topologies in twisted oxide membranes”
- Jorge Íñiguez-González, Luxembourg Institute of Science and Technology, Luxembourg
  “Towards structural softness and enhanced electromechanical responses in HfO2 ferroelectrics”
- Karsten Albe, TU Darmstadt, Germany
  “Towards defect engineering of perovskites by combining first-principles calculations and machine learning methods”
- Kyle Webber, Friedrich-Alexander-University Erlangen-Nürnberg, Germany
  “Powder-Based High-Throughput Solid-State Synthesis of BiFeO3-xBaTiO3”
- Ming Liu, Xi'an, Jiaotong University, China
  “Free-Standing Ferroelectric and Magnetoelectric Single Crystal Membranes with Super-Elasticity”
- Miryam Arredondo, Queen’s University, Belfast, United Kingdom
  “Size Effects in Ferroelastic Domains: A Study by In Situ Microscopy Techniques”
- Nan Zhang, Xi’an Jiaotong University, China
  “Decoding the short-range correlations in relaxor-ferroelectrics from diffuse scattering analysis”
- Pol Lloveras Muntane, Universitat Polit`ecnica de Catalunya, Spain
  “Multicaloric effects in lead scandium tantalate under simultaneous application of pressure and electric field”
- Sarah Guerin, University of Limerick, Ireland
  “Computation-Guided Development of Sustainable Biomolecular Piezoelectric Devices”

- Satoshi Wada, Yamanashi University, Japan
  "Piezoelectric Enhancement of Barium Titanate Ceramics by AC poling over Tc and their Domain Size Effects"
- Seungbum Hong, Korea Advanced Institute of Science and Technology (KAIST), South Korea
  "Dielectric gap between AFM tip and ferroelectric surface"
- Soonil Lee, Changwon National University, South Korea
  "Defect Engineering and Analysis in Perovskite-Structured High-Entropy Materials"
- Tadej Rojac, Jožef Stefan Institute, Ljubljana, Slovenia
  "Piezoelectric nonlinearity in disordered lead-based and lead-free relaxor ferroelectric ceramics"
- Takao Shimizu, National Institute for Materials Science, Tsukuba, Japan
  "Robust ferroelectricity in Y-doped HfO2 materials"
- Uros Prah, Luxembourg Institute of Science and Technology, Luxembourg
  "Polyvinylidene fluoride-based polymers – on the way to lead-free electrocalorics"
- Vid Bobnar, Jožef Stefan Institute, Slovenia
  "Designing polymer systems with enhanced dielectric response"
- Xiaoqing Pan, UC Irvine, United States
  "Phonon Modes and Dynamic Behaviors at Oxide Interfaces by Electron Microscopy and Spectroscopy"
- Yoshihiro Kawakami, Research Institute for Electromagnetic Materials, Japan
  "Evaluation of generation energy by vibration using Pb-free piezoelectric thick film formed on stainless steel substrate by aerosol deposition method"
- Yukio Sato, Kumamoto University, Japan
  "Response of ferroelectric nanodomain by applying external electric fields studied by transmission electron microscopy"
- Yun Liu, Australian National University, Australia
  "Multiscale Structural Characterization of Polar Functional Materials: Challenges and Potential"
- Zijian Hong, Zhejiang University, China
  "Dynamic Motion of Polar Skyrmions in Oxide Heterostructures"
- Zuo-Guang Ye, Simon Fraser University, Canada
  "Intriguing Phase Transitions and Effects of Domain Engineering in Relaxor-Based Piezocrystals"

ICE - International Conference on Electroceramics

- Albert Tarancon, ICREA Prof at IREC- Catalonia Institute for Energy Research, Spain
  "The Beginning of the Ion Age: Switchable Materials and Devices based on Iontronics"
- Andreas Klein, TU Darmstadt, Germany
  "Experimental benchmarking of ab-initio defect calculations"
- Dou Zhang, Central South University, China
  "Enhanced Piezoelectric Performance and Energy Storage Performance in lead-Free Ceramics Through Regulating Local Ferroelectric Distortion"
- Edith Bucher, MU Leoben, Austria
  "Materials for electrochemical energy conversion and storage in solid oxide cells"
- Jennifer L. M. Rupp, TU München, Germany
  "Lithium and Action"
- Jon-Paul Maria, Penn State University, United States
  "Discovery, synthesis, and properties of novel ferroelectric crystals"
- Judy Hart, UNSW Sydney, Australia
  "Ferroelectric polarization as a route to enhancing catalytic and photoelectrochemical performance for clean fuel generation"
- Julia Glaum, Norwegian University of Science and Technology - NTNU, Norway
  "Piezoelectric ceramics in aqueous media: a tale of stability and functionality"
- Nicola H. Perry, University of Illinois Urbana-Champaign, United States
  "Screening Proton Surface Exchange Kinetics of Thin-Film Triple Conductors for Efficient Protonic Ceramic Electrolysis Cells"
- Roger DeSouza, RWTH Aachen, Germany
  "Space-charge zones at surfaces, grain boundaries and domain walls in complex oxides: detection, description and consequences"

- Sophie Guillemet-Fritsch, University of Toulouse 3 - Paul Sabatier, France
  “Innovative processes and ceramics for high performance and compactness in Power Electronics substrates and capacitors”
- Thomas Defferriere, MIT, United States
  “Approaches and Opportunities for Grain Boundary Space Charge Engineering in Ceramic Ionic Conductors”

PFM - Piezoresponse Force Microscopy

- Celine Lichtensteiger, University of Geneva, Switzerland
  “Domains, superdomains and wrinkles in epitaxially strained and freestanding PbTiO3”
- Jiangyu Li, Southern University of Science and Technology, Shenzhen, China
  “Flexoelectric Engineering of Two-Dimensional Materials, Structures and Devices”
- Lukas Eng, TU Dresden, Germany
  “Engineering Conductive Domain Walls and Interfaces in LiNbO3”
- Martin Sarott, University of Groningen, Netherlands
  “Emergence of Polar Domains in Epitaxial Films of the Binary Oxide WO3”
- Peggy Qi Zhang, Commonwealth Scientific and Industrial Research Organisation - CSIRO, Australia
  “Stability and Dynamic Conductivity of Ferroelectric Nanoscale Bubbles”

ISIF - International Symposium of Integrated Functionalities

- Ahmad Islam, Air Force Research Lab, United States
  “Dielectric Integration for the newest melt-grown semiconductor: Ga2O3”
- Barbara Stadlober, Joanneum Research Materials, Austria
  “Sensing everywhere: Printed ferroelectric polymer sensors for human-machine interfaces, biosignal monitoring and large-area sensor networks”
- Yasuo Koide, National Institute for Materials Science Tsukuba, Japan
  “Applications of AlOx/TiOy nanolaminates to MOSFETs and capacitors”

Special Events

ISAF-ICE-ISIF-PFM 2025 Welcome Reception
Sunday, July 13 | 19:00 - 21:00
Aula

Unwind and Connect at the Welcome Reception!
Join us for a refreshing Welcome Reception designed to help you relax and recharge.

Savor Delicious Appetizers: Enjoy a delectable assortment of appetizers that perfectly complement a selection of refreshing beverages. From savory bites to sweet treats, our offerings are crafted to please every palate.

Network and Reconnect: This is your chance to unwind in a laid-back atmosphere, meet new people, and reconnect with colleagues. Engage in lively conversations about the day's sessions, exchange insights, and build valuable connections in a relaxed setting.

Foster New Connections: Whether you're catching up with old friends or making new acquaintances, this reception is the perfect opportunity to strengthen professional relationships and share experiences.

A Welcome Reception ticket is included with your conference registration. Guest tickets are available for purchase.

ISAF-ICE-ISIF-PFM 2025 Banquet Dinner
Thursday, July 17 | 19:30 – 22:30
Messe Graz (Messeplatz 1,8010 Graz, Austria)

Join us for an unforgettable evening with a Banquet Dinner that promises to be a highlight of the year.

Dine in Elegance: Indulge in a sumptuous multi-course dinner, carefully crafted to delight your taste buds. Our chefs have prepared a menu that celebrates both local and classic flavors, ensuring a dining experience that is as memorable as it is delicious.

Enjoy Live Entertainment: Be entertained by captivating performances that will add a special touch to the evening.

Connect and Celebrate: This is more than just a dinner—it's a chance to reconnect with old friends, network with colleagues, and build new connections.

Reserve your place now and be part of a celebration that honors our past, celebrates our present, and looks forward to a bright future.

Let’s make this a night to remember!

A ticket is not included in your registration but can be added for $90 (+VAT). Guest tickets are available for purchase. Limited tickets remain, so purchase your ticket in advance to reserve your spot. Tickets must be purchased by June 25 to guarantee space.

Student Events

Student Social
Sunday, July 13 | 17:30 - 19:00
Bierbaron Bierspezialitäten, Heinrichstrasse 56, 8010 Graz

The Student Social marks the start of the conference for student attendees, providing a platform for networking and reconnecting with peers from previous years. Through engaging icebreaker activities, students can build new connections while also fostering existing relationships. The event serves as the official kickoff for all student-focused activities throughout the conference, creating a welcoming and collaborative environment for participants.

Student Career Lunch
Tuesday, July 15 I 12:30 - 14:00
*Conference Lunch Hall *Pre-registration is required*

This informal networking lunch is designed to connect students with professionals from industry and academia through assigned small-group lunches. It's a unique opportunity for students to ask questions, gain career insights, and hear real-world perspectives; and professionals to share their journey, inspire future talent, and connect with the next generation of professionals in our field.

Student Pitch Competition
Wednesday, July 16 | 12:45 - 13:30
HS 15.14

The Student Pitch Competition will be an opportunity for students to present themselves to future employers and the research community. This is intended to help employers find new team members or postdocs and help students expand their professional network. Two individual juries of leading academic and industry representatives will select their winners. Bring a single slide and show everyone your most interesting results in 90 seconds!

Participants will be judged on their single presentation slide, their clarity of speech and time management, their clarity of results/research, and the overall impression will be provided as if this pitch was a job interview. There will be three prizes awarded and each winner will receive an IEEE UFFC-S certificate.

Joint WIE & DEI Events

Two-Day Joint WIE & DEI Engagement Event

Part 1 - Poster Session (Tuesday)
Tuesday, July 15 | 18:00 – 19:30
Aula

The event will begin during Tuesday's poster session, where key themes related to Women in Engineering (WIE) and Diversity & Inclusion (D&I) will be visually presented to engage attendees. Topics such as work-life balance, inclusive workplace practices, career advancement for underrepresented groups, and broadening participation in engineering will be highlighted across 3 to 5 posters, depending on space availability.

Part 2 - Roundtable Discussions (Thursday)
Thursday, July 17 I 12:30 - 14:00
LS 15.01 / 15.02

The conversation will continue during Thursday's lunch break with a series of facilitated roundtable discussions. Invited moderators will guide informal, yet focused, dialogues on the same core WIE and D&I topics introduced during the poster session. These discussions are intended to promote open exchange and encourage actionable ideas in a relaxed, inclusive setting. The posters from Tuesday will remain on display to provide context and continuity.

Monday, July 14							
8:00 - 18:30	***Registration (RESOWI Foyer)***						
8:30 - 10:30	**Monday Opening & Plenary (Heizhaus)**						
8:30 - 9:00	*Opening Ceremony*						
9:00 - 9:45	*Plenary 1 - Salia Cherifi-Hertel*						
9:45 - 10:30	*Plenary 2 - PFM: Roger Proksch*						
10:30 - 11:00	**Coffee Break (RESOWI Foyer)**						
	HS 15.14 *Updated	***HS 15.03***	***HS 15.12***	***HS 15.04***	***HS 15.05***	***HS 15.13***	
11:00 - 12:30	**ISAF/ICE: Advanced processing**	**ISAF: Lead-free bulk BiFeO3-based 1/2**	**ISAF/ISIF: Material design, transitions& defects 1/3**	**PFM: Instrumental & methods -1/2**	**ISAF/ISIF/PFM: Integrated ferroelectrics 1/2**	**ISAF: Advanced characterization 1/3**	
12:30 - 14:00	**Lunch on own or for purchase (RESOWI Foyer)**						**TPC III & PFM Workshop Board committee meeting (LS 15.02)**
14:00 - 15:30	**ISAF/ICE: Advanced sintering**	**ISAF: Lead-free bulk BiFeO3- & Bi-based 2/2**	**ISAF/PFM: Material design, transitions& defects 2/3**	**PFM: Instrumental & methods -2/2**	**ISAF/ISIF/PFM: Integrated ferroelectrics 2/2**	**ISAF/PFM: Advanced characterization 2/3**	
15:30 - 16:00	**Coffee Break (RESOWI Foyer)**						
16:00 - 18:00	**ISAF/ISIF: Energy harvesting**	**ISAF/ICE: Lead-free bulk KNN 1/2**	**ISAF/PFM Relaxors**	**PFM/ISIF/ISAF: 2D materials, membranes, flexoelectricity**	**ISIF: MEMS & NEMS**	**ISAF: Advanced characterization 3/3**	
18:00 - 19:30	**Poster Session 1 (Aula)**						

Tuesday, July 15							
8:30 - 18:30	*Registration (RESOWI Foyer)*						
9:00 - 10:30	Tuesday Plenary (Heizhaus)						
9:00 - 9:45	*Plenary 3 - ISAF: Susan Trolier McKinstry, WiE DL*						
9:45 - 10:30	*Plenary 4 - Sustainability: Franz Faupel*						
10:30 - 11:00	Coffee Break (RESOWI Foyer)						
	*HS 15.14 *Updated*	*HS 15.03*	*HS 15.12*	*HS 15.04*	*HS 15.05*	*HS 15.13*	
11:00 - 12:30	ISIF/ISAF/ICE: LiNbO3	ISAF/ICE: Lead-free bulk NBT-based 1/2	ICE/ISAF: Material design, transitions& defects 3/3	ISAF/PFM: Domains & other ferroic topologies 1/5	ISIF/ISAF: Integrated dielectrics	ISAF/ICE: Wurtzite-type materials 1/3	
12:30 - 14:00	Lunch on own or for purchase (RESOWI Foyer)						Student Career Lunch (RESOWI Foyer) *Pre-registration required
14:00 - 15:30	Prof. E. Salje memorial session	ISAF: Lead-free bulk NBT-based 2/2	ICE: Higher-dimensional defects	ISAF/PFM: Domains & other ferroic topologies 2/5	ISAF/ISIF: FE thin films 1/2	ISAF/ISIF: Wurtzite-type materials 2/3	
15:30 - 16:00	Coffee Break (RESOWI Foyer)						
16:00 - 18:00	ISAF/ICE: Lead-free bulk BT-based	ISAF Lead-free bulk KNN 2/2	ICE: Sensing applications	ISAF: Domains & other ferroic topologies 3/5 (modelling)	ISAF/ISIF: FE thin films 2/2	ISAF/ISIF: Wurtzite-type materials 3/3	
18:00 - 19:30	Poster Session 2 (Aula)						WIE & DEI Event - Part I (Aula)

Wednesday, July 16							
8:30 - 14:00	*Registration (RESOWI Foyer)*						
	*HS 15.14 *Updated*	*HS 15.03*	*HS 15.12*	*HS 15.04*	*HS 15.05*	*HS 15.13*	
9:00 - 10:30	ISAF/ICE: High-entropy materials	ISAF: Multilayers & thick films	ICE: Solid oxide cells 1/2	ISAF: Domains & other ferroic topologies 4/5	ISAF/ISIF: Multiferroics & magnetic materials 1/2	ISAF/ISIF: Wurtzite-type Materials & Hafnia 1/6	
10:30 - 11:00	Coffee Break (RESOWI Foyer)						
11:00 - 12:30	ISAF/ISIF: Polymers & composites 1/2	ISAF: Antiferroelectrics & energy storage 1/2	ICE: Solid oxide cells 2/2	ISAF/PFM: Domains & other ferroic topologies 5/5	ISAF/ISIF/ICE: Multiferroics & magnetic materials 2/2	ISAF: Hafnia 2/6	
12:30 - 14:00	Lunch on own or for purchase (RESOWI Foyer)						Student pitch competition (HS 15.02)
14:00 - 22:00	Free Time or Excursions (for purchase)						

Thursday, July 17							
8:30 - 17:00	***Registration (RESOWI Foyer)***						
9:00 - 10:30	**Thursday Plenary (Heizhaus)**						
9:00 - 9:45	*Plenary 5 - ISAF: Yuji Noguchi*						
9:45 - 10:30	*Plenary 6 - ICE: Bilge Yildiz*						
10:30 - 11:00	**Coffee Break (RESOWI Foyer)**						
	HS 15.14 *Updated	***HS 15.03***	***HS 15.12***	***HS 15.04***	***HS 15.05***	***HS 15.13***	
11:00 - 12:30	**ISAF/ISIF/ICE: Polymers & composites 2/2**	**ISAF: Antiferroelectrics & energy storage 2/2**	**ICE: Ion transport & storage**	**ISAF: Ultrasound transducers**	**ISAF/ICE: Catalysis**	**ISAF: Hafnia 3/6**	
12:30 - 14:00	**Lunch on own or for purchase (RESOWI Foyer)**						**WIE & DEI Event - Part II (LS 15.01 & 15.02)**
14:00 - 15:30	**ISAF: Lead-based piezoceramics**	**ISAF: Calorics: fundamentals & materials 1/2**		**ISAF/PFM: Epitaxial films, heterostructures & superlattices 1/3**	**ISAF: Non-perovskite materials 1/2**	**ISAF/ISIF/PFM: Hafnia 4/6**	
15:30 - 16:00	**Coffee Break (RESOWI Foyer)**						
16:00 - 17:30	**ISAF: Textured piezoelectrics and crystals 1/2**	**ISAF: Calorics: fundamentals&materials 2/2**		**ISAF/PFM: Epitaxial films, heterostructures & superlattices 2/3**	**ISAF/PFM: Non-perovskite materials 2/2**	**ISAF/ISIF: Hafnia 5/6**	
17:30- 19:00	**Break**						
19:00 - 22:45	**Banquet Dinner & Ferroelectrics Awards (MESSECONGRESS SOUTH) *Pre-purchased ticket required**						

Friday, July 18							
8:30 - 11:00	**Registration (RESOWI Foyer)**						
	HS 15.14 *Updated	***HS 15.03***	***HS 15.12***	***HS 15.04***	***HS 15.05***	***HS 15.13***	
9:00 - 10:30	**ISAF/ICE: Textured piezoelectrics and crystals 2/2**	**ISAF/ICE: Calorics & related applications**	**ICE: Proton conductors**	**ISAF/PFM/ISIF: Epitaxial films, heterostructures & superlattices 3/3**	**HS 15.05 (195 pax) -E ISAF/PFM: Biomaterials & biological applications**	**ISAF/ISIF: Hafnia 6/6**	
10:30 - 11:00	**Coffee Break (RESOWI Foyer)**						
11:00 - 13:00	**Thursday Plenaries & Closing (Heizhaus)**						
11:00 - 11:45	*Plenary 7 - ICE: Jürgen Fleig*						
11:45 - 12:30	*Plenary 8 - ISAF: Long-Qing Chen, IEEE UFFC DL*						
12:30 - 13:20	*Closing Ceremony*						
13:20 - 14:00	**Lunch on own or for purchase (RESOWI Foyer)**						

Opening
8:30 - 9:00
Heizhaus

Plenary 1
9:00 - 9:45
Heizhaus
Chair: Orlando Auciello, University of Texas at Dallas; Original Biomedical Implants (OBI), United States

Shedding Light on Ferroelectric Solitons: A Review of the Past, Present, and Future
Salia Cherifi-Hertel
CNRS and University of Strasbourg, France

Plenary 2
9:45 - 10:30
Heizhaus
Chair: Seungbum Hong, KAIST, South Korea

Sustainability Crisis and our Responsibility as Scientific Community
Roger Proksch
CNRS and University of Strasbourg, France

Coffee Break
10:30 - 11:00
RESOWI Foyer

ISAF/ICE: Advanced Processing
11:00 - 12:30
HS 15.14
Chairs: Miguel Algueró, Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Spain & Brahim Dkhil, Univ. Paris-Saclay, CentraleSupélec, France

11:00
3413: (Featured Industry Talk) **Vat Photopolymerization as Method for Additive Manufacturing of Dielectric and Piezoelectric Components**
Martin Schwentenwein, Dominik Brouczek, Altan Altun, Lisa Mikiss, Christoph Hofstetter
Lithoz GmbH, Austria

11:30
3469: **Enhanced Longitudinal Piezoelectric Coefficient d33 in Lead-Free Piezoelectric Ceramics (Ba0.85Ca0.15)(Zr0.1Ti0.9)O3 (BCZT) via Introducing a Highly Aligned Porous Structure**
Zihe Li, James Roscow, Hamideh Khanbareh, Chris Bowen
University of Bath, United Kingdom

11:45
3029: **Pressure-Driven Improvements in Coating Homogeneity for High-Performance Lithium-Ion Batteries**
Tomoya Ohno, Hisaaki Matsuura, Jeevan Kumar Padarti, Shigeto Hirai, Takeshi Matsuda
Kitami Institute of Technology, Japan

12:00
3345: (Invited Talk) **Innovative Processes and Ceramics for High Performance and Compactness in Power Electronics Substrates and Capacitors**
Sophie Guillemet{1}, Zarel Valdez-Nava{2}, Paul Etienne Vidal{4}, Romain Raisson{4}, Fanny Pruvost{3}, Lionel Presmanes{1}
{1}CNRS CIRIMAT, France; {2}CNRS LAPLACE, France; {3}Université Toulouse III - Paul Sabatier, CIRIMAT, France; {4}University of Technology Tarbes Occitanie Pyrénées, Laboratoire Génie de Production, France

ISAF/ISIF: Material Design, Transitions & Defects 1/3
11:00 - 12:30
HS 15.12
Chair: Yachin Ivry, Technion-Israel Institute of Technology, Israel

11:00
3471: (Invited Talk) **Towards Defect Engineering of Perovskites by Combining First-Principles Calculations and Machine Learning Methods**
Karsten Albe
Technische Universität Darmstadt, Germany

11:30
3217: **Increased Curie Temperature in Lithium-Substituted Ferroelectric Niobate Perovskites**
Hao-Cheng Thong, Ke Wang
Tsinghua University, China

11:45
3027: (Invited Talk) **P-V-L Theory and First Principle Density of States Calculation for Chemical Bond Evaluation of Microwave Dielectric Ceramics**
Enzhu Li{2}, Hongcheng Yang{1}, Hongyu Yang{3}
{1}Southwest petroleum University, China; {2}University of Electronic Science and Technology of China, China; {3}Xidian University, China

ISAF/ISIF/PFM: Integrated Ferroelectrics 1/2
11:00 - 12:30
HS 15.05
Chair: Andreas Klein, Technical University of Darmstadt, Germany

11:00
3367: (Invited Talk) **Applications of AlOx/TiOy Nanolaminates to MOSFETs and Capacitors**
Yasuo Koide
Meijo University, Japan

11:30
3386: **Analog Neural Networks with FeFETs: Innovations in Ferroelectric Domain Control**
Pavel Mokrý, Vít Kosina
Technical University of Liberec, Czech Rep.

11:45
3426: **Neuromorphic Acoustic Sensors Using Epitaxially Grown BiFeO3 Films on Si**
Takeshi Yoshimura{1}, Meika Takagi{1}, Yohane Fujibayashi{1}, Sengsavang Aphayvong{1}, Norifumi Fujimura{1}, Hidemasa Yamane{2}, Shuichi Murakami{2}
{1}Osaka Metropolitan University, Japan; {2}Osaka Research Institute of Industrial Science and Technology, Japan

12:00
3518: **Neuromorphic Sensing for Alternating Current Using Piezoelectric Resonator**
Kei Nishimura, Norifumi Fujimura, Takeshi Yoshimura
Osaka Metropolitan University, Japan

12:15
3203: **70nm Ferroelectric Y-36 LiNbO3 Multi-State Conductance with Low Coercive Field for In-Memory Computing**
Luis Hurtado, Gianluca Piazza
Carnegie Mellon University, United States

ISAF: Advanced Characterization 1/3
11:00 - 12:30
HS 15.13
Chair: Daniel Sando, University of Canterbury, New Zealand

11:00
3520: (Featured Industry Talk) **Product Development at Anton Paar**
Heiner Santner, Benedikt Schrode, Barbara Puhr, Marius Kremer, Praveen Vir
Anton Paar GmbH, Austria

11:30
3153: **Short-Range Atomic Ordering in PbZrxTi1-xO3 Single Crystal Revealed by Diffuse Scattering and 3D-△PDF Modeling**
Zheyi An{5}, Nan Zhang{5}, Marek Paściak{2}, Arkadiy Simonov{1}, Mike Glazer{4}, Zuo-Guang Ye{3}
{1}Eidgenössische Technische Hochschule Zürich, Switzerland; {2}FZU - Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {3}Simon Fraser University, Canada; {4}University of Oxford, United Kingdom; {5}Xi'an Jiaotong University, China

ISAF: Lead-Free Bulk BiFeO3-based 1/2
11:00 - 12:30
HS 15.03
Chair: Tadej Rojac, Jozef Stefan Institute, Slovenia

11:00
3039: (Invited Talk) **Powder-Based High-Throughput Solid-State Synthesis of BiFeO3-xBaTiO3**
Kyle Grant Webber, Udo Eckstein
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

11:30
3168: **Developing BiFeO3-BaTiO3 System for High-Temperature Piezoelectric Applications: Fabrication, Defect Analysis and Nonlinear Harmonic Behavior**
Antonio Iacomini, Hana Uršič, Tadej Rojac
Jožef Stefan Institute, Slovenia

11:45
3208: **Lead-Free BiFeO3-BaTiO3 Ferroelectric Ceramics for High Temperature Applications**
Jannatul Robaiat Mou, David Hall
University of Manchester, United Kingdom

PFM: Instrumental & Methods 1/2
11:00 - 12:30
HS 15.04
Chair: Alexei Gruverman, University of Nebraska-Lincoln, United States

11:00
3130: (Invited Talk) **Pushing the Limits of Quantitative Analysis in Piezoresponse Force Microscopy and Second Harmonic Generation Microscopy**
Matthias Roeper{2}, Samuel Dominic Seddon{2}, Mike Nico Pionteck{1}, Boris Koppitz{2}, Michael Rüsing{3}, Simone Sanna{1}, Lukas M. Eng{2}
{1}Justus-Liebig-Universität Gießen, Germany; {2}Technische Universität Dresden, Germany; {3}Universität Paderborn, Germany

11:30
3191: **Dual Harmonic Kelvin Probe Force Microscopy for High (>10 V) Surface Potential Measurements of Ferroelectrics**
Qiancheng Zhang{3}, Niyorjyoti Sharma{2}, Katia Gallo{1}, Amit Kumar{2}, Brian J. Rodriguez{3}
{1}KTH Royal Institute of Technology, Sweden; {2}Queen's University Belfast, United Kingdom; {3}University College Dublin, Ireland

11:45
3388: **Localised Piezoresponse Force Microscopy to Enable Ultra-High Resolution PFM**
Subhajit Pal{1}, George R Heath{3}, Emanuele Palladino{1}, Varun Gupta{3}, Muireann Anna de H-Óra{2}, Judith L. Macmanus-Driscoll{2}, Joe Briscoe{1}
{1}Queen Mary University of London, United Kingdom; {2}University of Cambridge, United Kingdom; {3}University of Leeds, United Kingdom

12:00
3247: **Multifrequency and Multimodal Characterization of Piezoelectric Materials Applied to PFM Modes**
Romain Stomp
Zurich Instruments AG, Switzerland

Lunch on own or for purchase
12:30 - 14:00
RESOWI Foyer

ISAF/ICE: Advanced Sintering
14:00 - 15:30
HS 15.14
Chair: Sophie Guillemet, CNRS, France

14:00
3119: **Research on AC High-Voltage Rapid Sintering Method of Lead Containing Piezoelectric Ceramics at Room Temperature**
Lin Niu, Xutao Han, Tianyi Shi, Zhaoyu Zhang, Yang Zhou, Xuanrui Zhang, Junhao Li
Xi'an Jiaotong University, China

14:15
3333: **Towards Reliable Dielectrics via the Cold Sintering Process**
Abdullah Jabr{1}, Clive Randall{2}, Raul Bermejo{1}
{1}Montanuniversität Leoben, Austria; {2}Pennsylvania State University, United States

14:30
3096: **Optimizing Low Temperature Spark Plasma Sintering of KNN Ceramics: Microstructure and Properties Relationships**
Nadia Bencharef{3}, Christopher Castro Chavarria{3}, Sonia Buffiere{3}, Philippe Legros{1}, Dominique Bernard{3}, Michaël Josse{3}, Mario Maglione{3}, Hélène Debeda{2}, U-Chan Chung{3}, Catherine Elissalde{3}
{1}CNRS, Université de Bordeaux, PLACAMAT, UAR 3626, 33600 Pessac, France., France; {2}Université de Bordeaux, Laboratoire IMS, France; {3}University of Bordeaux, CNRS, Bordeaux INP, Institut de Chimie de la Matière Condensée de Bordeaux, France

14:45
3477: **Innovative Approach to Fabricate Core-Shell Structures in NBT-Based Systems**
Marija Dunce, Eriks Birks, Maris Livins, Arturs Atvars, Gusts Agafonovs
Institute of Solid State Physics, University of Latvia, Latvia

15:00
3428: **CuO-TiO2-Nb2O5 (CTN) Composite Oxides Assisted Low Temperature Sintering of Oxide Dielectric Ceramics**
Zhifu Liu
Shanghai Institute of Ceramics, Chinese Academy of Sciences, China

ISAF/ISIF/PFM: Integrated Ferroelectrics 2/2
14:00 - 15:30
HS 15.05
Chair: Takashi Yoshimura, Osaka Metropolitan University, Japan

14:00
3024: **Polarization Switching and Charge Injection at Electrode Interfaces**
Andreas Klein, Binxiang Huang, Melissa Larsson, Pengcheng Hu
Technische Universität Darmstadt, Germany

14:15
3238: **Nanosecond Dielectric Response by Optical Irradiation for Heat Assisted Ferroelectric Reading Technology**
Yasuo Cho, Kohei Yamasue
Tohoku University, Japan

14:30
3053: **Mechanically-Gated Ferroelectric Transistors Based on Low Force Pulse-Induced Domain Polarization Switching**
Jian Sun, Yuchao Zhang
Central South University, China

14:45
3233: **The Importance of the Compensation Process During Switching for Different Applications of Ferroelectrics**
Andra Georgia Boni
National Institute of Materials Physics – Romania, Romania

ISAF/PFM: Advanced Characterization 2/3
14:00 - 15:30
HS 15.13
Chair: Elizabeth Dickey, Carnegie Mellon University, United States

14:00
3537: (Invited Talk) **Phonon Modes and Dynamic Behaviors at Oxide Interfaces by Electron Microscopy and Spectroscopy**
Xiaoqing Pan
University of California, Irvine, United States

14:30
3506: **In-Situ Time-Resolved Atomic-Scale Displacements of 2D TMD WSe2 Under High-Frequency AC Electric Fields**
Christopher Nelson{1}, Ondrej Dyck{1}, Mina Yoon{1}, Jawaher Almutlaq{2}, Drik Englund{2}, Stephen Jesse{1}
{1}Center for Nanophase Materials Sciences / Oak Ridge National Laboratory, United States; {2}Massachusetts Institute of Technology, United States

14:45
3511: **Measuring the Nanoscale Dynamics of Stress-Induced Phase Transitions in Ferroelectric Thin Films by Interferometric Nanoindentation**
Ralph Bulanadi{3}, Joel Lefever{1}, Iaroslav Gaponenko{3}, King-Fa Luo{6}, Sahar Saremi{4}, Daniel Sando{5}, Lane W. Martin{2}, Valanoor Nagarajan{6}, Roger Proksch{1}, Patrycja Paruch{3}
{1}Oxford Instruments, United States; {2}Rice University, United States; {3}Université de Genève, Switzerland; {4}University of California, Berkeley, United States; {5}University of Canterbury, New Zealand; {6}University of New South Wales, Australia

15:00
3512: (Invited Talk) **Probing Local Structure and Polarisation Under Static and Dynamic Conditions of Lead-Free Ferroelectrics Using 4D STEM**
Goran Dražić{2}, Katarina Žiberna{1}, Maja Koblar{1}, Janina Roknić{1}, Matjaž Dlouhy{1}, Matic Poberžnik{1}, Anton Kokalj{1}, Marjan Stoimchev{1}, Matej Martinc{1}, Sašo Džeroski{1}, Andreja Benčan Golob{1}
{1}Jožef Stefan Institute, Slovenia; {2}National Institute of Chemistry, Kemijski inštitut, Slovenia

ISAF/PFM: Material Design, Transitions & Defects 2/3
14:00 - 15:30
HS 15.12
Chair: Karsten Albe, TU Darmstadt, FB 11, Institute of Materials Science, Germany

14:00
3492: (Invited Talk) **An Analytical Theory for Predicting Collective Properties of Ferroelectric Solid Solutions Based on Their Composition and Structure-Property Relationships**
Ilya Grinberg
Bar-Ilan University, Israel

14:30
3357: **The Ferroelectric Phase Transition: It Is Not What You Were Thinking**
Yachin Ivry{8}, Hemaprabha Elangovan{4}, Asaf Hershkovitz{8}, Pravin Kavle{10}, Maya Barzilay{8}, Ching-Che Lin{10}, David Spirito{9}, Semën Gorfman{9}, Bo Wang{5}, Irena Spasojevic{1}, Rajesh Mandal{8}, Ignacio J. Villar-García{2}, Neus Domingo{3}, Long-Qing Chen{6}, Lane W. Martin{7}
{1}Catalan Institute of Nanoscience and Nanotechnology, Spain; {2}CELLS-ALBA Synchrotron Radiation Facility, Spain; {3}Center for Nanophase Materials Sciences / Oak Ridge National Laboratory, United States; {4}Indian Institute of Technology Madras, India; {5}Lawrence Livermore National Laboratory, United States; {6}Pennsylvania State University, United States; {7}Rice University, United States; {8}Technion – Israel Institute of Technology, Israel; {9}Tel Aviv University, Israel; {10}University of California, Berkeley, United States

14:45
3231: **Ferroelectric Phase Transitions in Strain-Free Barium Titanate (BaTiO3) Membranes: Exploring the Origins of Displacive and Order-Disorder Mechanisms**
Tapas Bar{1}, Umair Saeed{1}, Cristian Rodríguez Tinoco{1}, David Pesquera{1}, Kumara Cordero-Edwards{1}, Jessica Padilla-Pantoja{1}, José Manuel Caicedo Roque{1}, Pol Lloveras{3}, José Santiso{1}, Igor Lukyanchuk{2}, Gustau Catalan{1}, Javier Rodríguez Viejo{1}
{1}Catalan Institute of Nanoscience and Nanotechnology, Spain; {2}Laboratory of Condensed Matter Physics, Université de Picardie Jules Verne, France; {3}Universitat Politècnica de Catalunya, Spain

15:00
3480: **Phase Transitions in Mixed Hybrid Perovskites**
Gabrielius Rimkus{2}, Sergejus Balciunas{2}, Anna Gagor{1}, Adam Sieradzki{3}, Miroslaw Maczka{1}, Vidmantas Kalendra{2}, Mantas Simenas{2}, Jūras Banys{2}
{1}Polish Academy of Sciences, Poland; {2}Vilnius University, Lithuania; {3}Wrocław University of Science and Technology, Poland

15:15
3142: **Surface Effect in Nanometer-Scale Barium Titanate Particles**
Yuki Sakai, Yoshiki Iwazaki
Taiyo Yuden Co., Ltd., Japan

ISAF: Lead-Free Bulk BiFeO3-based 2/2
14:00 - 15:30
HS 15.03
Chair: Kyle Webber, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

14:00
3184: **Enhanced Ferroelectric Properties and High-Temperature Dielectric Stability Through Controlled Leakage Current Density in B-Site Modified BiFeO3-BaTiO3**
Mukul Kumar{2}, Shubham Modgil{2}, Arun Kumar Singh{2}, M.L.V. Mahesh{1}, Sanjeev Kumar{2}
{1}Defence Metallurgical Research Laboratory, India; {2}Punjab Engineering College, India

14:15
3484: **Ferroelectric Domain Switching and Shear Mode Piezoelectric Response in BiFeO3-BaTiO3 Ceramics**
David Hall, Yizhe Li
University of Manchester, United Kingdom

14:30
3403: **Ultra-High Content Template Synthesis Various BiFeO3-BaTiO3**
Ronghao Yang, Andrew Bell
University of Leeds, United Kingdom

14:45
3042: **Domain-Engineered Enhancement of Piezoelectric Performance in Bismuth Titanate Ferroelectric Ceramics**
Shaoxiong Xie, Kyle Grant Webber
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

15:00
3078: **Symmetry Modulation and Multiferroic Characteristics of La/Ho Co-Substituted BiFeO3 Ceramics**
Qingtian Li, Xiaoli Zhu, Xiaoqiang Liu, Xiang Ming Chen
Zhejiang University, China

PFM: Instrumental & Methods 2/2
14:00 - 15:30
HS 15.04
Chair: Nagarajan Valanoor, UNSW Sydney, Australia

14:00
3106: (Invited Talk) **Dielectric Gap Between AFM Tip and Ferroelectric Surface**
Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea

14:30
3503: **The Impact of Tip-Sample Electromechanical Coupling in PFM Measurements and Materials Functional Properties**
Marti Checa{2}, Holland Hysmith{2}, Christina Stefani{1}, Kyle Kelley{2}, Liam Collins{2}, Gustau Catalan{1}, Stephen Jesse{2}, Neus Domingo{2}
{1}Catalan Institute of Nanoscience and Nanotechnology, Spain; {2}Center for Nanophase Materials Sciences / Oak Ridge National Laboratory, United States

14:45
3440: **Nanoscale Frictional Imaging of Ferroelectric Domains**
Seongwoo Cho{2}, Iaroslav Gaponenko{2}, Céline Lichtensteiger{2}, Seungbum Hong{1}, Patrycja Paruch{2}
{1}Korea Advanced Institute of Science and Technology, Korea; {2}Université de Genève, Switzerland

15:00
3502: **Understanding the Dynamics of Ferroelectric Domain Walls Under Applied Electric Fields**
Shiva Raghuraman{1}, Jack Eckstein{1}, Rama Vasudevan{1}, Kyle Kelley{1}, Sabine Neumayer{1}, Manuel Zahn{4}, Aaron Muller{2}, Dennis Meier{3}, Jan Schultheiß{5}, Stephen Jesse{1}, Neus Domingo{1}
{1}Center for Nanophase Materials Sciences / Oak Ridge National Laboratory, United States; {2}Eidgenössische Technische Hochschule Zürich, Switzerland; {3}Norwegian University of Science and Technology, Norway; {4}University of Augsburg, Germany; {5}University of Canterbury, New Zealand

15:15
3505: **Driving and Imaging Domain Wall Dynamics in Ferroelectrics Using "Scanning Oscillator" Atomic Force Microscopy**
Shiva Raghuraman, Kyle Kelley, Neus Domingo, Stephen Jesse
Center for Nanophase Materials Sciences / Oak Ridge National Laboratory, United States

Coffee Break
15:30 - 16:00
RESOWI Foyer

ISAF/ICE: Lead-Free Bulk KNN-based 1/2
16:00 - 18:00
HS 15.03
Chair: Paula Huth, PI Ceramic, Germany

16:00
3406: (Invited Talk) **New Insights Into Synthesis of (K,Na)NbO3 and BiFeO3 from in Situ, High Temperature X-Ray Diffraction**
Jacob Jones, Jennifer Forrester, Thomas Rowe
North Carolina State University, United States

16:30
3519: **Effect of Nb2O5 Precursors on the Synthesis of Potassium Sodium Niobate Ceramics: A Comparison of Solid-State and Hydrothermal Approaches**
Hyunwook Nam{2}, Taiki Kaneko{2}, Takuma Shoji{2}, Yuka Takagi{2}, Yasuhiro Yoneda{1}, Hajime Nagata{2}
{1}Japan Atomic Energy Agency, Japan; {2}Tokyo University of Science, Japan

16:45
3525: **Stress-Induced Variant Selection of Precipitates and the Electrical Anisotropy in Lithium Sodium Niobate Piezoceramics**
Changhao Zhao{3}, Andreja Benčan Golob{2}, Matthias Bohnen{4}, Fangping Zhuo{4}, Xiaolong Ma{1}, Goran Dražić{2}, Ralf Müller{4}, Shengtao Li{6}, Jurij Koruza{5}, Jürgen Rödel{4}
{1}City University of Hong Kong, China; {2}Jožef Stefan Institute, Slovenia; {3}State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China; {4}Technische Universität Darmstadt, Germany; {5}Technische Universität Graz, Austria; {6}Xi'an Jiaotong University, China

17:00
3366: **Humidity Effects During Sintering and Storage of Sodium Potassium Niobate Piezoelectric Ceramics**
Astri Bjørnetun Haugen{2}, Gianni Ferrero{1}, Malgorzata Pierchala{1}, Konstantin Astafiev{1}, Bhaskar Reddy Sudireddy{2}, Erling Ringgaard{1}
{1}CTS Denmark A/S, Denmark; {2}Technical University of Denmark, Denmark

17:15
3475: **Sintering and Characterization of KNNLT-Based Lead-Free Multilayer Actuators with Nickel Electrodes**
Mohamad Wael Alkanj{1}, Jörg Töpfer{1}, Franz Schubert{2}
{1}Ernst-Abbe-Hochschule Jena, Germany; {2}PI Ceramic GmbH, Germany

17:30
3434: **Defect Engineering in K0.5Na0.5NbO3-Based Ceramics: From Microstructure to Electromechanical Properties**
Barbara Malič, Silvo Drnovšek, Brigita Kmet, Maja Koblar, Andreja Benčan Golob, Andraž Bradeško
Jožef Stefan Institute, Slovenia

ISAF/ISIF: Energy Harvesting
16:00 - 18:00
HS 15.14
Chair: Andrew Bell, University of Leeds, United Kingdom

16:00
3294: (Invited Talk) **Pyroelectric Energy Harvesting – from Joules to Watts**
Longfei Song{2}, Junning Li{1}, Veronika Kovacova{2}, Ashwath Aravindhan{2}, Glinsek Sebastjan{2}, Uros Prah{3}, Olivier Bouton{2}, Tomoyasu Usui{4}, Sakyo Hirose{4}
{1}Hunan University, China; {2}Luxembourg Institute of Science and Technology, Luxembourg; {3}Luxembourg Institute of Science and Technology / Jožef Stefan Institute, Luxembourg; {4}Murata Manufacturing Co., Ltd., Japan

16:30
3504: **Pyroelectric Composites for Heat to Electricity Conversion**
Qingping Wang, Chris Bowen
University of Bath, United Kingdom

17:00
3443: **Dual-Mode Energy Harvester Based on NFO and KNN/PVDF Nanocomposite**
Babita Sharma{5}, Reema Gupta{3}, Anjali Sharma{2}, Arijit Chowdhuri{1}, Monika Tomar{4}
{1}Acharya Narendra Dev College, University of Delhi, India; {2}Atma Ram Sanatan Dharma College – University of Delhi, India; {3}Hindu College, University of Delhi, India; {4}Miranda House, University of Delhi, India; {5}University of Delhi, India

17:15
3398: **Evaluation of a Piezoelectric Harvester and Signal Conditioning System for a Temperature Monitoring System**
Mayara Cardozo Dos Santos{3}, Veronika Kovacova{3}, Nagamalleswara Rao Alluri{3}, Olivier Bouton{3}, Jérôme Polesel{3}, Torsten Granzow{4}, Vincent Frick{1}, Liana Wassouf{1}, Costel Cojocaru{2}, Gilles Feugnet{5}, Paolo Bondavalli{5}, Emmanuel Defay{3}
{1}ICube, University of Strasbourg/CNRS, France; {2}Laboratory of Physics of Interfaces and Thin Films, CNRS, École Polytechnique, France; {3}Luxembourg Institute of Science and Technology, Luxembourg; {4}Luxembourg Institute of Science and Technology / Jožef Stefan Institute, Luxembourg; {5}Thales Research and Technology, France

17:30
3145: (Video Presentation) **Flexible Thin-Film Keyboard Generator Based on Piezotronic Heterojunction Diode**
Shuxin Lin{2}, Haojie Zhong{2}, Emad Iranmanesh{1}, Kai Wang{2}
{1}National University of Ireland, Ireland; {2}Sun Yat-sen University, China

ISAF/PFM: Relaxors
16:00 - 18:00
HS 15.12
Chair: Uroš Prah, Luxembourg Institute of Science and Technology, Luxembourg

16:00
3385: (Invited Talk) **Decoding the Short-Range Correlations in Relaxor-Ferroelectrics from Diffuse Scattering Analysis**
Nan Zhang{3}, Zheyi An{3}, Jiajie Zhang{3}, Marek Paściak{2}, Arkadiy Simonov{1}, Fei Li{3}
{1}Eidgenössische Technische Hochschule Zürich, Switzerland; {2}FZU - Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {3}Xi'an Jiaotong University, China

16:30
3273: **Time-Resolved Piezoresponse Force Spectroscopy Study of Local Polarization Dynamics in SrxBa1-xNb2O6 Relaxor Single Crystals**
Vladimir Shvartsman{1}, Boris Slautin{1}, Jan Dec{2}, Sergei Kalinin{3}, Doru Lupascu{1}
{1}Universität Duisburg-Essen, Germany; {2}University of Silesia, Poland; {3}University of Tennessee-Knoxville, United States

16:45
3320: **Is Electric Field or Temperature More Crucial for Augmenting the Functionality of Relaxor Ferroelectrics**
Cecile Saguy{2}, Alp Sehirlioglu{1}, Yachin Ivry{2}
{1}Case Western Reserve University, United States; {2}Technion – Israel Institute of Technology, Israel

17:00
3393: (Invited Talk) **Piezoelectric Nonlinearity and Hysteresis in Lead-Based and Lead-Free Relaxor Ferroelectric Ceramics**
Antonio Iacomini, Janina Roknić, Mojca Otoničar, Mirela Dragomir, Hana Uršič, Tadej Rojac
Jožef Stefan Institute, Slovenia

17:30
3424: **Quantitative Correlation Between Structural (dis-)order and Phase Transition Diffuseness in Lead Scandium Tantalate**
Torsten Granzow{3}, Youri Nouchokgwe{2}, Ashwath Aravindhan{2}, Ivana Goričan{1}, Hana Uršič{1}, Sakyo Hirose{5}, Tomoyasu Usui{5}, Wook Jo{6}, Chang-Hyo Hong{4}, Veronika Kovacova{2}, Sebastjan Glinšek{2}, Emmanuel Defay{2}
{1}Jožef Stefan Institute, Slovenia; {2}Luxembourg Institute of Science and Technology, Luxembourg; {3}Luxembourg Institute of Science and Technology / Jožef Stefan Institute, Luxembourg; {4}MLCC Manufacturing Technology, Samsung Electro-Mechanics, Korea; {5}Murata Manufacturing Co., Ltd., Japan; {6}Ulsan National Institute of Science and Technology, Korea

17:45
3120: **Study of the Dielectric Non-Linearities in 0.5(Ba0.7Ca0.3TiO3)–0.5(BaZr0.2Ti0.8O3) Thin Film**
Kévin Nadaud{1}, Guillaume Nataf{1}, Nazir Jaber{1}, Béatrice Negulescu{1}, Jérôme Wolfman{2}
{1}Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France; {2}Université de Tours, GREMAN Laboratory, CNRS, INSA Centre Val de Loire, France

ISAF: Advanced Characterization 3/3
16:00 - 18:00
HS 15.13
Chair: Goran Drazic, National Institute of Chemistry, Ljubljana, Slovenia

16:00
3376: (Invited Talk) **Understanding Disorder and Domains in Wurtzite Ferroelectrics by Electron Microscopy and Spectroscopy**
Elizabeth Dickey, Sebastian Calderon
Carnegie Mellon University, United States

16:30
3362: **Cold-Sintered Perovskites: Atomic-Scale Insights Into Sustainable Ceramic Processing**
Meryem Lachhab{2}, Maja Koblar{2}, Katarina Žiberna{2}, Goran Dražić{2}, Maxime Vallet{1}, Brahim Dkhil{1}, Mojca Otoničar{2}
{1}CentraleSupélec, Université Paris-Saclay, CNRS, Laboratoire SPMS, France; {2}Jožef Stefan Institute, Slovenia

16:45
3397: **Novel Electrical Characterization Method for Antiferroelectric ZrO2 Using a Positive Up Negative Down Approach**
Sara Gonzalez{3}, Grégoire Magagnin{2}, Martine Le Berre{2}, Damien Deleruyelle{3}, Bertrand Vilquin{2}, Jordan Bouaziz{1}
{1}Ecole Centrale de Lyon - Institut des Nanotechnologies de Lyon, France; {2}Institut des Nanotechnologies de Lyon, France; {3}Institut des Nanotechnologies de Lyon, CNRS, France

17:00
3129: **In-Situ Second Harmonic Generation Investigation of Domain Wall Conductivity in Lithium Niobate**
Iuliia Kiseleva, Boris Koppitz, Elke Beyreuther, Matthias Roeper, Samuel Dominic Seddon, Lukas M. Eng
Technische Universität Dresden, Germany

17:15
3309: (Featured Industry Talk) **The Latest Advances in Metrology Tools and Techniques for Precise Characterization of Piezoelectric and Ferroelectric Materials**
Peter Mardilovich, Tom Kremers, Thorsten Schmitz-Kempen
aixACCT Systems GmbH, Germany

ISIF: MEMS & NEMS
16:00 - 18:00
HS 15.05
Chair: Orlando Auciello, University of Texas at Dallas ; Original Biomedical Implants (OBI), United States

16:00
3437: **Direct Characterization of AlScN in Sub-µm² Areas**
Niklas Kyoushi{1}, Simon Fichtner{2}
{1}Christian-Albrechts-Universität zu Kiel, Germany; {2}Christian-Albrechts-Universität zu Kiel / Fraunhofer Institute for Silicon Technology ISIT, Germany

16:15
3507: **Efficient Control of AlScN Ferroelectric Switching Based on Rectangular Waves and its Multi-Modal Characteristics in FBAR**
Bozuo Jing, Jinghong Lu, Zhiqiang Mu, Xuanqi Huang
Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China

16:30
3451: **Pushing the Electromechanical Limits of Thin Film piezoMEMS**
Runar Dahl-Hansen, Andreas Vogi, Paul Wittendorp, Guido Sordo
SINTEF, Norway

16:45
3337: **Piezoelectric-Capacitive Hybrid Micromachined Ultrasonic Transducer with Center-Anchored Bottom Electrode**
Yan Wang{1}, Ning Lv{1}, Weijiang Xu{2}, Junyan Ren{1}
{1}Fudan University, China; {2}Université Polytechnique des Hauts-de-France, France

17:00
3308: **The Effect of CH4/H2 Gas Admixture on the Selectivity Towards Pt in Dry Etching of PZT Thin Films by ICP-RIE**
Madeleine Petschnigg{3}, Nikolai Andrianov{3}, Syed Munir Azeem{3}, Thomas Griesser{1}, Marco Deluca{3}, Susan Trolier-McKinstry{2}
{1}Montanuniversität Leoben, Austria; {2}Pennsylvania State University, Austria; {3}Silicon Austria Labs GmbH, Austria

17:15
3463 (Video Presentation): **Optimizing Out-of-Plane Displacement in Piezoelectric Micromachined Ultrasonic Transducers via Prestress Engineering in AlSc30%N**
Javad Abbaszadeh
Silicon Austria Labs GmbH, Austria

17:30
3355: (Video Presentation) **Switchable High Overtone Bulk Acoustic Resonator on RT Duroid 5880 Substrate Using Ba0.5Sr0.5TiO3 Thin Film**
Shivakumar Chedurupalli{2}, Akhil Raman T S{2}, Sandeep Sharma Kongbrailatpam{1}, James Raju K C{2}
{1}Indian Institute of Science, India; {2}University of Hyderabad, India

17:45
3522: **Magnetic Field Response of Stress Reconfigurable Micro-Beam Magnetoelectric Resonators**
Peter Finkel, Thomas Mion
U.S. Naval Research Laboratory, United States

PFM/ISIF/ISAF: 2D Materials, Membranes, Flexoelectricity
16:00 - 18:00
HS 15.04
Chair: Celine Lichtensteiger, DQMP - University of Geneva, Switzerland

16:00
3527: (Invited Talk) **Flexoelectric Engineering of Two-Dimensional Materials, Structures, and Devices**
Jiangyu Li
Southern University of Science and Technology, China

16:30
3188: **Tunable Strain Gradients and Flexoelectric Phenomena in Centrosymmetric Oxide Thin Films**
Timo Piecuch, Nick Shepelin, Thomas Lippert
Paul Scherrer Institute, Switzerland

16:45
3158: **Extraordinary Piezoresponse in Free-Standing Two-Dimensional Bi2O2Se Semiconductor Toward High-Performance Light Perception Synapse**
Anyang Cui{3}, Yafang Li{1}, Kai Jiang{2}, Zhigao Hu{1}
{1}East China Normal University, China; {2}Shanghai Dianji University, China; {3}Shanghai Normal University, China

17:00
3045: **Mechanical Control of the Electronic Properties of 2D Semiconductors**
Alexei Gruverman
University of Nebraska–Lincoln, United States

17:15
3335: **On-Demand Patterning of Ferroelectric Oxide Membranes**
Alban Degezelle{1}, Jonas Strobelt{4}, Sarah Leobner{4}, Stéphane Fusil{2}, Vincent Garcia{2}, Svetlana Santer{4}, Thomas Maroutian{3}
{1}Centre de Nanosciences et de Nanotechnologies - Université Paris-Saclay, France; {2}Laboratoire Albert Fert, CNRS, Thales, Université Paris-Saclay, France; {3}Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies, France; {4}University of Potsdam, Germany

17:30
3363: (Invited Talk) **Free-Standing Ferroelectric and Magnetoelectric Single Crystal Membranes with Super-Elasticity**
Ming Liu, Guohua Dong, Bin Peng, Yanan Zhao, Zhiguang Wang, Zhongqiang Hu
Xi'an Jiaotong University, China

Poster Session ISAF: Processing
18:00 - 19:30
Old University Aula 2/5

3066: **Freestanding BaTiO3 Nanocrystalline Films Formed by Screen Printing Method**
Hiroshi Takashima{1}, Tetsuhiro Katsumata{2}, Kiwamu Sue{1}
{1}National Institute of Advanced Industrial Science and Technology, Japan; {2}Tokai University, Japan

3195: **Room Temperature Aerosol Spray Deposition of Pb(Mg1/3Nb2/3)O3-PbTiO3 Thick Films**
Brooke Downing, Geoff L. Brennecka
Colorado School of Mines, United States

3196: **Sodium Niobate (NN) Based High Energy Density Ceramic Capacitors**
Yubo Zhu{2}, Ian M. Reaney{2}, Ke Wang{1}
{1}Tsinghua University, China; {2}University of Sheffield, United Kingdom

3200: **Effect of Microstructure on Antiferroelectricity in Nanbo3**
Cenk Abdurrahmanoglu{1}, Temesgen Tadeyos Zate{1}, Bhaskar Reddy Sudireddy{1}, Jurij Koruza{2}, Astri Bjørnetun Haugen{1}
{1}Technical University of Denmark, Denmark; {2}Technische Universität Graz, Austria

3315: **Comparative Study of Different Polarization Methods on the Structure and Electrophysical Properties of Polymer Ferroelectric Films**
Bogdan Basov, Kamila Makarova, Eugenia Buryanskaya, Konstantin Moiseev, Alexy Osipkov
Bauman Moscow State Technical University, Russia

3353: **Enhanced Strain Response of Bismuth Sodium Potassium Titanate Lead-Free Ceramics by Mg, Sn Codoped, a Promissing Candidate for Sensor and Actuator Applications**
Ky Nam Pham, Hong Phu Pham, Tien Dat Vu
Viettel Aerospace Institute - Viettel Group, Vietnam

3356: **Simultaneous Increase in the Electromechanical Response and Curie Point of BaTiO3**
Getaw Abebe Tina, Rajeev Ranjan
Indian Institute of Science, India

3374: **Fe-Acceptor-Doping of Lead-Free (Ba,Ca)(Zr,Ti)O3 Piezoceramics**
Anamaria Mihaljevic, Alexander Fally, Anna Paulik, Max Schmallegger, Jurij Koruza
Technische Universität Graz, Austria

3421: **Fabrication of BiFeO3 Ceramics via Sol-Gel and Cold Sintering Process**
Takuya Hoshina, Kanau Urakawa, Sou Yasuhara
Institute of Science Tokyo, Japan

3423: **Synthesis of Sn-Containing Perovskite-Type Oxides by Ion Exchange Method**
Yuna Kato, Sou Yasuhara, Takuya Hoshina
Institute of Science Tokyo, Japan

3456: **Manufacturing Porous Piezoelectric Ceramics Through Inkjet Freeze Printing**
Andrew Jennings, Chris Bowen
University of Bath, United Kingdom

3102: **High Energy Density Lead-Free Thin Films for Energy Storage Applications in the Internet of Things**
Marco Deluca{2}, Herbert Kobald{1}, Alexander Kobald{1}, Theresa Gindel{1}, Ivana Panzic{3}
{1}Materials Center Leoben Forschung GmbH, Austria; {2}Silicon Austria Labs GmbH, Austria; {3}University of Zagreb / Materials Center Leoben Forschung GmbH, Croatia

3167: **High-Quality C-Textured Sc0.36Al0.67N Thin Films on 200 mm Si Wafers for Piezoelectric Applications**
Sanjay Nayak{2}, Dmytro Solonenko{2}, Ravindra Bisht{2}, Nallagatla Venkata Raveendra{2}, Anirban Ghosh{2}, Washim Reza Ali{2}, Humberto Campanella{2}, Martin Kratzer{1}, Demian Henzen{1}, Carla Maria Lazzari{3}, Sonia Constantini{3}, Andreas Picco{3}, Marco Deluca{2}
{1}Evatec AG, Switzerland; {2}Silicon Austria Labs GmbH, Austria; {3}STMicroelectronics NV, Italy

3183: **Post-Deposition Modification of LiNbO3 Thin Films for Improved Optical and Electrical Properties**
Éva Tichy-Rács{2}, Hyeyeon Cho{1}, Jutta Schwarzkopf{1}, Holger Fritze{2}, Yuriy Suhak{2}
{1}Leibniz-Institut für Kristallzüchtung, Germany; {2}Technische Universität Clausthal, Germany

3269: **Enhanced Energy Storage Properties in $Nanbo_3$-Based Thin Films**
Alexander Kobald{1}, Herbert Kobald{1}, Marco Deluca{2}, Ivana Panzic{3}
{1}Materials Center Leoben Forschung GmbH, Austria; {2}Silicon Austria Labs GmbH, Austria; {3}University of Zagreb / Materials Center Leoben Forschung GmbH, Austria

3314: **Epitaxial Growth of Orthorhombic LaTaO4 Film**
Yosuke Hamasaki{2}, Yoshitaka Ehara{2}, Shitaro Yasui{1}, Shinya Sawai{2}
{1}Institute of Science Tokyo, Japan; {2}National Defense Academy, Japan

3526: **Large Area PLD PZT Thin Films for Fast Growing Piezoelectric Thin Film Demand for Internet of Things (IOT)**
Sarunas Bagdzevicius{2}, Ramin Matloub{3}, Paul Muralt{1}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}FoXmat SA, Switzerland; {3}Piemacs Sàrl, Switzerland

Poster Session ISAF: Characterization 1/2
18:00 - 19:30
Old University Aula 3/5

3007: **Polarization Stability and Effects in B-Site Substituted Perovskite High Entropy Oxide Films**
Maximillian Urban, Yeongwoo Son, Susan Trolier-McKinstry
Pennsylvania State University, United States

3023: **Composition Dependence of Domain Morphology and Local Piezoelectric Properties in Lead-Free (1-x)(K0.5Na0.5)NbO3 – xBaZrO3 Ceramics**
Dmitry Kiselev{1}, Tatiana Ilina{1}, Ekaterina Politova{2}
{1}National University of Science and Technology MISiS, Russia; {2}Semenov Federal Research Center for Chemical Physics, Russia

3047: **Ferroelastic Domain Behaviour with Machine Learning: Insights from In-Situ Heating STEM Analysis**
Luka Geddis Zellmann{3}, Sumner Harris{2}, John Scott{3}, Rama Vasudevan{1}, Miryam Arredondo{3}
{1}Center for Nanophase Materials Sciences / Oak Ridge National Laboratory, United States; {2}Oak Ridge National Laboratory, United States; {3}Queen's University Belfast, United Kingdom

3064: **Temperature and Frequency-Dependent Field Effects on Polar States in BaHf0.6Ti0.4O3 Thin Films**
Meenal Dhanetwal{1}, Akash Surampalli{2}, V.Raghavendra Reddy{1}
{1}UGC-DAE Consortium for Scientific Research, Indore, India; {2}University of California, Berkeley, United States

3070: **Enhanced Ferroelectric and Piezoelectric Characteristics in Ca-Substituted BaTi0.88Zr0.12O3 Ceramics**
Shaobo Chen, Shuya Wu, Xiang Ming Chen
Zhejiang University, China

3076: **Restoration of Resistance Degradation in Sputtered Lead Zirconate Titanate (PZT) and Sodium Potassium Niobate (KNN) Thin Films**
Kuan-Ting Ho{2}, Daniel Monteiro Diniz Reis{2}, Karla Hiller{1}
{1}Chemnitz University of Technology, Germany; {2}Robert Bosch GmbH, Germany

3098: **Investigating the Piezoelectric Performance of Ceramic Powders Using Piezo-Response Force Microscopy**
Nejc Suban, Hana Uršič
Jožef Stefan Institute, Slovenia

3164: **Optimizing New Generation of ALD Precursors and Annealing Conditions for Ferroelectric Hafnium-Zirconium Oxide for Enhanced Memory Performance**
Alison Erlene Viegas, Ayse Suenbuel, Konstantinos Falidas, David Lehninger, Konrad Seidel
Fraunhofer Institute for Photonic Microsystems IPMS, Germany

3175: **Investigation of AlN-Based Wurtzite Ferroelectrics Through Thermally Stimulated Depolarization Current Measurements**
Margaret Brown, Nate Bernstein, Wayne Jun Weng Yeo, Keisuke Yazawa, Geoff L. Brennecka
Colorado School of Mines, United States

3192: **Doubling the Ferroelectric Bandgap: The BaTiO3-Al2O3 Story**
Yiying Xu, Shay Zimmerman, Lior Kornblum, Yachin Ivry
Technion – Israel Institute of Technology, Israel

3215: **Synthesis and Characterization of Polar Pb1-xBaxMg2V2O8**
Nanami Masukawa{3}, Yosuke Hamasaki{3}, Akihisa Aimi{3}, Tetsuhiro Katsumata{4}, Yoshiyuki Inaguma{1}, Mitsuru Itoh{2}, Shinya Sawai{3}
{1}Gakushūin University, Japan; {2}Institute of Science Tokyo, Japan; {3}National Defense Academy, Japan; {4}Tokai University, Japan

3239: **Non-Ambient X-Ray Diffraction: An Indispensable Method to Characterize the Structure and Structural Changes During Processing of Ferroelectric Materials**
Barbara Puhr, Marius Kremer, Benedikt Schrode, Martin Lombaard, Praveen Vir, Heiner Santner
Anton Paar GmbH, Austria

3245: **Modeling and Predicting the Piezoelectric Properties of (Ba,Ca)(Zr,Ti)O3 Films with Composition Gradient Using Machine Learning**
Hugo Kuentz{1}, Béatrice Negulescu{1}, Kévin Nadaud{1}, Jérôme Wolfman{2}, Koushik Dey{2}
{1}Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France; {2}Université de Tours, GREMAN Laboratory, CNRS, INSA Centre Val de Loire, France

3253: **Investigating Domain and Superdomain Structures in Ferroelectric PbTiO3 Based Heterostructures on DyScO3**
Ludovica Tovaglieri{2}, Marios Hadjimichael{4}, Pau Torruella{1}, Chih-Ying Hsu{3}, Lukas Korosec{2}, Duncan T.L. Alexander{1}, Patrycja Paruch{2}, Jean-Marc Triscone{2}, Céline Lichtensteiger{2}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Université de Genève, Switzerland; {3}Université de Genève, École Polytechnique Fédérale de Lausanne, Switzerland; {4}University of Warwick, United Kingdom

3274: **Thickness Scaling of HZO-Films for Low-Voltage Ferroelectric Memories: BEOL Compatibility, Thickness Limits, and Reliability**
David Lehninger, Yasser Najeeb, Tianren Zhang, Konrad Seidel, Maximilian Lederer
Fraunhofer Institute for Photonic Microsystems IPMS, Germany

3557: **Unveiling the Mechanism of Substitution-Induced High Piezoelectric Performance in PLZT Ceramics**
Wanting Hu{1}, Ciaran O'malley{1}, Xuyao Tang{1}, Vladimir Koval{2}, Kan Chen{1}, Zixuan Wu{1}, Krishnarjun Banerjee{1}, Haixue Yan{1}
{1}Queen Mary University of London, United Kingdom; {2}Slovak Academy of Sciences, Slovakia

3562: **Investigation of Phase Transitions in PMN-PT Using Birefringence Microscopy**
Elena Pelegova, Semën Gorfman
Tel Aviv University, Israel

Poster Session ISAF: Characterization 2/2
18:00 - 19:30
Old University Aula 4/5

3279: **Influence of Polarization Dynamics on Electro-Optic Response in Ferroelectric and Antiferroelectric Pb(Zr, Ti)O3 Thin Films**
Shinya Kondo{3}, Haruka Kondo{3}, Tatsuki Utsunomiya{3}, Takashi Teranishi{3}, Kazuki Okamoto{1}, Tomoaki Yamada{2}, Akira Kishimoto{3}
{1}Institute of Science Tokyo, Japan; {2}Nagoya University, Japan; {3}Okayama University, Japan

3280: **Imprint in Wurtzite Ferroelectrics: Impact of Chemical Composition and Temperature Treatments**
Maike Gremmel{1}, Roberto Guido{3}, Uwe Schröder{3}, Simon Fichtner{2}
{1}Christian-Albrechts-Universität zu Kiel, Germany; {2}Christian-Albrechts-Universität zu Kiel / Fraunhofer Institute for Silicon Technology ISIT, Germany; {3}NaMLab gGmbH, Germany

3283: **Piezoelectric Ceramics Functional Characterization Under Uniaxial Compressive Stress**
Emmanuel Dumons{1}, Michaël Caliez{2}, Franck Levassort{3}
{1}GREMAN Laboratory, CNRS, Université de Tours, INSA Centre Val de Loire, France; {2}LaMé Laboratory, France; {3}Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France

3289: **The Impact of Electric Field Cycling Protocols on Electrocaloric Response and Efficiency in (Na0.5Bi0.5)TiO3 - BaTiO3 Perovskite Ceramics**
Sobhan M. Fathabad, Vladimir Shvartsman, Doru Lupascu
Universität Duisburg-Essen, Germany

3292: **Full Set of Piezoelectric Properties Using Single Sample Electrical Impedance**
Julien Vasseur{3}, Rémi Rouffaud{1}, Isabelle Monot-Laffez{1}, Franck Levassort{2}
{1}Université de Tours, France; {2}Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France; {3}Université de Tours, GREMAN Laboratory, CNRS, INSA Centre Val de Loire, France

3325: **Structural, Electric and Optical Properties of CoFe2O4/Bi4Ti3O12 Bilayer and Particulate Thin Films**
Rodrigo A. R. de Carvalho, Fabio L. Zabotto, Ricardo P. Bonini, José A. Eiras
Federal University of São Carlos, Brazil

3352: **Asymmetric Friction and Shear of Ferroelectric P(VDF-TrFE)**
Uichang Jeong{1}, Md Akibul Islam{2}, Nima Barri{2}, Tobin Filleter{2}, Seungbum Hong{1}
{1}Korea Advanced Institute of Science and Technology, Korea; {2}University of Toronto, Canada

3373: **Enhancing the Electromechanical Properties of Lead-Free (Ba,Ca)(Zr,Ti)O3 Piezoceramics Using Stoichiometry, Processing and Dopants**
Anna Paulik, Alexander Fally, Jurij Koruza
Technische Universität Graz, Austria

3377: **The Effect of Europium Doping on Structural Phase Transitions in KNbO3**
Kota Moriguchi{2}, Lixu Xie{1}, Maria Rita Cicconi{1}, Koji Kimura{2}, Kyle Grant Webber{1}, Koichi Hayashi{2}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Nagoya Institute of Technology, Japan

3389: **C-V Measurement of Ferroelectric Nanocapacitors**
Yoshiomi Hiranaga
Tohoku University, Japan

3425: **Excellent Piezoelectric Property in Bi3TiTaO9-Based High Temperature Piezoceramics**
Qian Wang, Chun-Ming Wang
Shandong University, China

3438: **Influence of Stoichiometry and Na/Bi Ratio on Electronic Structure and Properties of Relaxor 0.94(NaxBiy)TiO3- 0.06BaTiO3 Ceramics**
Chinmay Chandan Parhi{2}, Pengchang Hu{1}, Andreas Klein{1}, Jurij Koruza{2}
{1}Technische Universität Darmstadt, Germany; {2}Technische Universität Graz, Austria

3448: **Functional Properties of 0.5BaZr0.2Ti0.8O3–0.5Ba0.7Ca0.3TiO3 Thick Films Prepared by Aerosol Deposition**
Ivana Goričan, Soukaina Merselmiz, Victor Regis de Moraes, Matej Šadl, Val Fišinger, Brigita Kmet, Andreja Benčan Golob, Tadej Rojac, Vid Bobnar, Andrej Debevec, Barbara Malič, Hana Uršič
Jožef Stefan Institute, Slovenia

3468: **Probing Absolute Structure of Polar Materials by X-Ray Diffraction**
Sara Polo-Filisan
Leibniz-Institut für Kristallzüchtung, Germany

3501: **Ferroelectric Switching and Phase Transitions of Hf1-xZrxO Films Investigated by Grazing Incidence X-Ray Diffraction**
Marilia de Oliveira Guimaraes{1}, Carsten Richter{1}, Moritz Engl{2}, Stefan Slesazeck{2}, Jutta Schwarzkopf{1}, Martin Schmidbauer{1}
{1}Leibniz-Institut für Kristallzüchtung, Germany; {2}NaMLab gGmbH, Germany

3523: **Anisotropy of Acoustic Attenuation and Acoustooptical Quality Factor in Lithium Niobate Crystals**
Farkhad Akhmedzhanov, Ulugbek Abdirakhmonov
Institute of Ion-plasma and Laser Technologies of the Academy of Sciences of Uzbekistan, Uzbekistan

3563: **Digital Correlation Image on 3D Printed Architected Lead-Free Ferroelectric Ceramics**
Chaimae Babori{1}, Abhijit Pramanick{1}, David Hall{2}, Laurent Daniel{1}
{1}CentraleSupélec, Université Paris-Saclay, CNRS, Laboratoire de Génie Electrique et Electronique de P, France; {2}University of Manchester, United Kingdom

Plenary 3
9:00 - 9:45
Heizhaus
Chair: Hana Uršič, Jožef Stefan Institute, Slovenia

Designing Reliability Into Ferroelectric Films for MEMS and Memory
Susan Trolier-McKinstry
Pennsylvania State University, United States

Plenary 4
9:45 - 10:30
Heizhaus
Chair: Klaus Reichmann. Graz University of Technology, Austria

Sustainability Crisis and Our Responsibility as Scientific Community
Franz Faupel
Christian-Albrechts-Universität zu Kiel, Germany

Coffee Break
10:30 - 11:00
RESOWI Foyer

ICE/ISAF: Material Design, Transitions & Defects 3/3
11:00 - 12:30
HS 15.12
Chair: Jacob Jones, North Carolina State University, United States

11:00
3022: (Invited Talk) **Experimental Benchmarking of ab-initio Defect Calculations**
Andreas Klein
Technische Universität Darmstadt, Germany

11:30
3301: **The Role of Voltage-Control of Oxygen-Vacancy-Induced Magnetic Transition on the Electrical Conductivity of la0.5sr0.5feo3-δ**
Paul Nizet{2}, Francesco Chiabrera{2}, Nicolau Lopez-Pintó{4}, Nerea Alayo{2}, Philipp Langner{2}, Sergio Valencia{3}, Arantxa Fraile{5}, Federico Baiutti{2}, Alevtina Smekhova{3}, Alex Morata{2}, Jordi Sort{4}, Albert Tarancón{1}
{1}Catalan Institution for Research and Advanced Studies/Institut de Recerca en Energia de Catalunya, Spain; {2}Catalonia Institute for Energy Research, Spain; {3}Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; {4}Universitat Autònoma de Barcelona, Spain; {5}Universitat de Barcelona, Spain

11:45
3414: **Optical Characterization of the Nonlinear Chemical Expansion in Ceria-Based Thin Films at High Temperatures**
Hendrik Wulfmeier{2}, Dhyan Kohlmann{2}, Thomas Defferriere{1}, Carsten Steiner{3}, Ralf Moos{3}, Harry L. Tuller{1}, Holger Fritze{2}
{1}Massachusetts Institute of Technology, United States; {2}Technische Universität Clausthal, Germany; {3}University of Bayreuth, Germany

12:00
3031: **Geometric Aspect of Chemical Doping in Oxides**
Jaichan Lee{3}, Minsu Choi{3}, Kitae Eom{3}, Bongwook Chung{3}, Jungseek Hwang{3}, Yunsang Lee{2}, Warren Pickett{4}, Sang Ho Oh{1}, Chang-Beom Eom{5}
{1}Korea Institute of Energy Technology, Korea; {2}Soongsil University, Korea; {3}Sungkyunkwan University, Korea; {4}University of California, Davis, United States; {5}University of Wisconsin-Madison, United States

12:15
3197: (Video Presentation) **Nanostructured Platform for Analyzing Surface Acidity Modulated Electronic Properties in Functional Oxides**
Gyu Rac Lee, Thomas Defferriere, Harry L. Tuller
Massachusetts Institute of Technology, United States

ISAF/ICE: Lead-Free Bulk NBT-based 1/2
11:00 - 12:30
HS 15.03
Chair: Lovro Fulanović, TU Graz / ICMT, Austria

11:00
3277: **Tuning Microstructure and Properties of NBT-Based Ceramics by Inducing Chemical Inhomogeneities**
Sophie Bauer{2}, Till Frömling{1}
{1}Forschungszentrum Jülich GmbH, Germany; {2}Technische Universität Darmstadt, Germany

11:15
3442: **Oxygen Vacancy Control and Electrical Properties of (Bi0.5Na0.5)TiO3 Ceramics**
Kanaka Iwasaki{2}, Yuka Takagi{2}, Hyunwook Nam{2}, Hajime Nagata{2}, Isao Sakaguchi{1}
{1}National Institute for Materials Science, Japan; {2}Tokyo University of Science, Japan

11:30
3103: **Effect of Ba on the Nanoscale Structure of (1-x)Na0.5Bi0.5TiO3-xBaTiO3: Insights from High-Pressure Structural Analyses**
Constanze Rösche{4}, Tiziana Boffa Ballaran{3}, Thomas Malcherek{4}, Carsten Paulmann{4}, Ross Angel{1}, Semën Gorfman{2}, Boriana Mihailova{4}
{1}CNR, Italy; {2}Tel Aviv University, Israel; {3}University of Bayreuth, Germany; {4}University of Hamburg, Germany

11:45
3199: **Multi-Approach Study of Structural and Order Transitions in the Lead-Free Relaxor Ferroelectric Bi0.5Na0.5TiO3**
Thomas Fourgassie{2}, Cécile Autret-Lambert{3}, Pierre-Eymeric Janolin{1}
{1}CentraleSupélec, Université Paris-Saclay, CNRS, Laboratoire SPMS, France; {2}Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France; {3}Université de Tours, GREMAN Laboratory, CNRS, INSA Centre Val de Loire, France

ISAF/ICE: Wurtzite-type Materials 1/3
11:00 - 12:30
HS 15.13
Chair: Betul Akkopr-Akgun, Penn State University, United States

11:00
3535: (Invited Talk) **Discovery, Synthesis, and Properties of Novel Ferroelectric Crystals**
Jon-Paul Maria
Pennsylvania State University, United States

11:30
3410: **Two-Dimensional, Physical-Vapor Growth of Low-Coercivity, Epitaxial Ferroelectric Nitrides on Scalable Substrates**
Jonathan Spanier{1}, Yu Yun{1}, Liyan Wu{1}, Drew Behrendt{3}, Pariasadat Musavigharavi{3}, Dhiren Pradhan{3}, Yunfei Hei{3}, Yichen Guo{1}, Songsong Zhou{3}, Craig Johnson{1}, Eric Stach{3}, Joshua Agar{1}, Brendan Hanrahan{2}, Deep Jariwala{3}, Roy Olsson{3}, Andrew Rappe{3}
{1}Drexel University, United States; {2}U.S. Army Combat Capabilities Development Command Army Research Laboratory, United States; {3}University of Pennsylvania, United States

11:45
3369: **Ferroelectricity in Atomic Layer Deposited Wurtzite Zinc Magnesium Oxide Zn1-xMgxO**
Benjamin Aronson{4}, Kyle Kelley{2}, Ece Gunay{1}, Ian Mercer{3}, Susan Trolier-McKinstry{3}, Jon-Paul Maria{3}, Elizabeth Dickey{1}, Jon F. Ihlefeld{4}
{1}Carnegie Mellon University, United States; {2}Center for Nanophase Materials Sciences / Oak Ridge National Laboratory, United States; {3}Pennsylvania State University, United States; {4}University of Virginia, United States

12:00
3230: **Optimization of Processing Techniques for Scandium Doped Aluminum Nitride to Achieve Piezoelectric Performance Improvement**
Hui Li{1}, Shashidhara Acharya{1}, Ming Sheng Zhang{1}, Yasmin Mohamed Yousry{1}, Pooi See Lee{2}, Kui Yao{1}
{1}Institute of Materials Research and Engineering, Agency for Science, Technology and Research, Singapore; {2}Nanyang Technological University Singapore, Singapore

ISAF/PFM: Domains & Other Ferroic Topologies 1/5
11:00 - 12:30
HS 15.04
Chair: Neus Domingo, CNMS/ORNL, United States

11:00
3539: **Screening Moiré Interactions Between Twisted Ferroelectric Membranes**
Jacobo Santamaria
Universidad Complutense de Madrid, Spain

11:30
3030: **Correlation Between Domain Structure Dynamics and Electromechanical Behavior in Sn-Doped BaTiO3 Photoferroelectrics**
Viktoria Kraft{2}, Subhajit Pal{4}, Maria Rita Cicconi{2}, Michel Kuhfuß{2}, Udo Eckstein{2}, Neamul Hayet Khansur{1}, Alexander Martin{3}, Koichi Hayashi{3}, Joe Briscoe{4}, Kyle Grant Webber{2}
{1}Case Western Reserve University, United States; {2}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {3}Nagoya Institute of Technology, Japan; {4}Queen Mary University of London, United Kingdom

11:45
3085: (Invited Talk) **Stability and Conductivity of Ferroelectric Nanoscale Bubbles**
Peggy Qi Zhang{1}, Vivasha Govinden{3}, Suyash Rijal{2}, Yousra Nahas{2}, Sergei Prokhorenko{2}, Laurent Bellaiche{2}, Nagarajan Valanoor{3}
{1}Commonwealth Scientific and Industrial Research Organisation, Australia; {2}University of Arkansas, United States; {3}University of New South Wales, Australia

ISIF/ISAF/ICE: LiNbO3
11:00 - 12:30
HS 15.14
Chair: Lukas Eng, TU Dresden, Germany

11:00
3037: **Direct Growth of Lithium Niobate Epitaxial Thin Films**
Zhen Ye{3}, Huajun Liu{1}, Seeram Ramakrishna{2}
{1}Institute of Materials Research and Engineering, Agency for Science, Technology and Research, Singapore; {2}National University of Singapore, Singapore; {3}National University of Singapore, Institute of Materials Research and Engineering, ASTAR, Singapore

11:15
3350: **Defect Related Electro-Acoustic Properties of Li(Nb,Ta)O3 Solid Solutions at High Temperatures**
Uliana Yakhnevych{2}, Parvana Dogan{2}, Fatima Ezzahrae El Azzouzi{2}, Yuriy Suhak{2}, Steffen Ganschow{1}, Harald Schmidt{2}, Holger Fritze{2}
{1}Leibniz-Institut für Kristallzüchtung, Germany; {2}Technische Universität Clausthal, Germany

11:30
3435: **Electric Field Poling of Li(Nb,Ta)O3 Solid Solutions at Elevated Temperatures**
Fatima Ezzahrae El Azzouzi{3}, Steffen Ganschow{2}, Hendrik Wulfmeier{3}, Boris Koppitz{4}, Lukas M. Eng{4}, Simone Sanna{1}, Holger Fritze{3}
{1}Justus-Liebig-Universität Gießen, Germany; {2}Leibniz-Institut für Kristallzüchtung, Germany; {3}Technische Universität Clausthal, Germany; {4}Technische Universität Dresden, Germany

11:45
3049: **Electrical and Transport Properties of Near Stoichiometric Single Crystalline LiNb1-xTaxO3 Solid Solutions Up to 900 °C**
Yuriy Suhak{2}, Claudia Kofahl{2}, Éva Tichy-Rács{2}, Harald Schmidt{2}, Steffen Ganschow{1}, Holger Fritze{2}
{1}Leibniz-Institut für Kristallzüchtung, Germany; {2}Technische Universität Clausthal, Germany

12:00
3131: **Investigation of Natural Domain Walls in Lithium Niobate-Tantalate with Different Second Harmonic Generation Contrast Methods**
Boris Koppitz{2}, Tanya Saxena{2}, Steffen Ganschow{1}, Michael Rüsing{3}, Lukas M. Eng{2}
{1}Leibniz-Institut für Kristallzüchtung, Germany; {2}Technische Universität Dresden, Germany; {3}Universität Paderborn, Germany

12:15
3521: **Effect of Dielectric Losses on the Attenuation of Piezoactive Acoustic Waves in Lithium Niobate Crystals**
Farkhad Akhmedzhanov, Jakhongir Kurbanov
Institute of Ion-plasma and Laser Technologies of the Academy of Sciences of Uzbekistan, Uzbekistan

ISIF/ISAF: Integrated Dielectrics
11:00 - 12:30
HS 15.05
Chair: Ahmad Safari, Rutgers, United States

11:00
3003: (Invited Talk) **Dielectric Integration for the Newest Melt-Grown Semiconductor: β-Ga2O3**
Ahmad Islam
Air Force Research Laboratory, United States

11:30
3116: **Mechanical Characterization of Brittle Substrate Materials for Microelectronic Applications**
Manuel Gruber, Peter Supancic, Irina Kraleva, Raul Bermejo
Montanuniversität Leoben, Austria

11:45
3459: **Concurrent Electrical Characterization of Heterogeneously Integrated Functional Oxides**
Anwesha Panda{2}, Yanming Zhang{2}, Simon Mellaerts{1}, Wei-Fan Hsu{3}, Jean-Pierre Locquet{3}, Laura Bégon-Lours{2}
{1}Integrated Systems Laboratory, D-ITET, ETH Zürich and Lumiphase AG, Switzerland; {2}Integrated Systems Laboratory, Eidgenössische Technische Hochschule Zürich, Switzerland; {3}Katholieke Universiteit Leuven, Belgium

12:00
3390: (Featured Industry Talk) **Driving Industrialization Using Piezoelectric and Ferroelectric Materials in Power Semiconductor Devices and Sensors**
Saurabh Roy{2}, Thomas Aichinger{2}, Mohanraj Soundara Pandian{1}
{1}Infineon Technologies AG, Germany; {2}Infineon Technologies Austria AG, Austria

Lunch on own or for purchase
12:30 - 14:00
RESOWI Foyer

ICE: Higher-dimensional Defects
14:00 - 15:30
HS 15.12
Chair: Thomas Defferriere, MIT, United States

14:00
3532: (Invited Talk) **Space-Charge Zones at Surfaces, Grain Boundaries and Domain Walls in Complex Oxides: Detection, Description and Consequences**
Roger De Souza
RWTH Aachen University, Germany

14:30
3149: **Grain Boundary Impedance Evolution During Cold Sintering Process of Electroceramics**
Thomas Herisson de Beauvoir{1}, Catherine Elissalde{2}, Claude Estournès{1}
{1}CNRS - CIRIMAT, France; {2}University of Bordeaux, CNRS, Bordeaux INP, Institut de Chimie de la Matière Condensée de Bordeaux, France

14:45
3202: **Tuning Nucleation Sites in Metal Exsolution Reactions by Dislocation Engineering**
Moritz Lukas Weber{3}, Moritz Kindelmann{1}, Dylan Jennings{1}, Jan Hoelschke{4}, Xufei Fang{2}, Felix Gunkel{1}
{1}Forschungszentrum Jülich GmbH, Germany; {2}Karlsruhe Institute of Technology, Germany; {3}Kyushu University & Massachusetts Institute of Technology, Japan; {4}Technische Universität Darmstadt, Germany

15:00
3485: **Leveraging Defects for Optimal Stability-Activity Tradeoff in Mixed Conductors**
Federico Baiutti{2}, Juan de Dios Sirvent{2}, Francesco Chiabrera{2}, Albert Tarancón{1}
{1}Catalan Institution for Research and Advanced Studies/Institut de Recerca en Energia de Catalunya, Spain; {2}Catalonia Institute for Energy Research, Spain

15:15
3187: (Video Presentation) **Grain Boundary Engineering for Enhanced Performance and Reduced Degradation in Electrochemical Cells**
Zijie Sha{1}, Thomas Defferriere{1}, Igor Lubomirsky{2}, Harry L. Tuller{1}
{1}Massachusetts Institute of Technology, United States; {2}Weizmann Institute, Israel

ISAF/ISIF: Ferroelectric Thin Films 1/2
14:00 - 15:30
HS 15.05
Chair: Marko Vrabelj, TDK Electronics GmbH & Co OG, Slovenia

14:00
3387: **Thickness-Dependence of Ferroelectric and Piezoelectric Properties of Mn-Doped 0.5Ba(Zr0.2Ti0.8)O3-0.5(Ba0.7Ca0.3)TiO3 Thin Films on Platinized Sapphire Substrates**
Sabi William Konsago{1}, Aleksander Matavž{1}, Katarina Žiberna{1}, Maja Koblar{1}, Barnik Mandal{2}, Sebastjan Glinšek{2}, Andreja Benčan Golob{1}, Barbara Malič{1}
{1}Jožef Stefan Institute, Slovenia; {2}Luxembourg Institute of Science and Technology, Luxembourg

14:15
3370: **Piezoelectric Properties Enhancement by Continuous Multi-Doping in Lead-Free (Ba,Ca)(Ti,Zr)O3 Thin Films Libraries**
Jérôme Wolfman{3}, Kévin Nadaud{2}, Hugo Kuentz{2}, Koushik Dey{3}, Béatrice Negulescu{2}, Nazir Jaber{2}, Fabien Giovannelli{1}
{1}Université de Tours, France; {2}Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France; {3}Université de Tours, GREMAN Laboratory, CNRS, INSA Centre Val de Loire, France

14:30
3091: **Lead-Free Piezoelectric Thin Films Based on BiFeO3-BaTiO3**
Alexander Komar{1}, Nicolas Godard{1}, Marko Vrabelj{1}, Thorsten Bayer{1}, Manfred Schweinzger{1}, Klaus Reichmann{2}
{1}TDK Electronics GmbH & Co OG, Austria; {2}Technische Universität Graz, Austria

14:45
3405: **Flexible Films on Mica with Enhanced Performances Obtained from Activated Solutions**
Jesús Ricote, Julia Hernández Ruiz, Ricardo Jiménez, M. Lourdes Calzada, Íñigo Bretos
Consejo Superior de Investigaciones Científicas, Instituto de Ciencia de Materiales de Madrid , Spain

15:00
3399: **(K,Na)NbO3 Thin Films for Surface Haptics**
Sebastjan Glinšek{1}, Nagamalleswara Rao Alluri{1}, Longfei Song{1}, Barnik Mandal{1}, Juliette Cardoletti{3}, Torsten Granzow{2}, Veronika Kovacova{1}, Adrian-Marie Philippe{1}, Emmanuel Defay{1}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}Luxembourg Institute of Science and Technology / Jožef Stefan Institute, Luxembourg; {3}Technische Universität Darmstadt / Luxembourg Institute of Science and Technology, Luxembourg

15:15
3205: **Synthesis and Characterization of Piezoelectric and Nanomechanical Properties of Transformational Lead-Free K0.1Na0.9Nb0.97Sb0.03O3 Films**
Orlando Auciello{4}, Joaquín Flores Valenzuela{2}, Jesus Leal Perez{1}, Jorge Lmaral Sanchez{2}, Sion Olive Mendez{2}, Manuel Cruz{3}, Abel Hurtado Macias{1}
{1}Centro de Investigación en Materiales Avanzados, Mexico; {2}Universidad Autónoma de Sinaloa, Mexico; {3}Universidad Nacional Autónoma de México, Mexico; {4}University of Texas at Dallas, United States

ISAF/ISIF: Wurtzite-type Materials 2/3
14:00 - 15:30
HS 15.13
Chair: Keisuke Yazawa, Colorado School of Mines, United States

14:00
3243: **Exceptional Structural Quality in AlScN/GaN and Ferroelectricity in AlN/GaN Heterostructures**
Georg Schönweger{2}, Niklas Wolff{1}, Isabel Streicher{3}, Stefano Leone{3}, Lorenz Kienle{1}, Simon Fichtner{2}
{1}Christian-Albrechts-Universität zu Kiel, Germany; {2}Christian-Albrechts-Universität zu Kiel / Fraunhofer Institute for Silicon Technology ISIT, Germany; {3}Fraunhofer Institute for Applied Solid State Physics IAF, Germany

14:15
3263: **Piezoelectric Properties of Aluminum Scandium Nitride Thin Film: Insights from Experimental and Computational Studies**
Shashidhara Acharya{1}, Xian Wang{3}, Qinwen Xu{2}, Ming Sheng Zhang{1}, Jianwei Chai{1}, Lei Shen{4}, Chengliang Sun{5}, Kui Yao{1}
{1}Institute of Materials Research and Engineering, Agency for Science, Technology and Research, Singapore; {2}Institute of Materials Research and Engineering, ASTAR, Wuhan University, China; {3}Nanyang Technological University, Singapore; {4}National University of Singapore, Singapore; {5}Wuhan University, China

14:30
3293: **O-Doping for Reduced Leakage in Sputtered Wurtzite-Type Al0.73Sc0.27N Thin Films**
Md Redwanul Islam{1}, Niklas Wolff{1}, Georg Schönweger{2}, Margaret Brown{3}, Patrik Stranak{4}, Geoff L. Brennecka{3}, Simon Fichtner{2}, Lorenz Kienle{1}
{1}Christian-Albrechts-Universität zu Kiel, Germany; {2}Christian-Albrechts-Universität zu Kiel / Fraunhofer Institute for Silicon Technology ISIT, Germany; {3}Colorado School of Mines, United States; {4}Fraunhofer Institute for Applied Solid State Physics IAF, Germany

14:45
3359: **Leakage Reduction in Sub 10V Switching Ferroelectric Al0.92B0.08N and Al0.92B0.02Sc0.2N Sputtered Thin Films**
Ian Mercer{3}, Sarah Olandt{3}, Sebastian Calderon{1}, Erdem Ozdemir{3}, Betul Akkopru-Akgun{3}, Bogdan Dryzhakov{2}, Kyle Kelley{2}, Susan Trolier-McKinstry{3}, Elizabeth Dickey{1}, Jon-Paul Maria{3}
{1}Carnegie Mellon University, United States; {2}Center for Nanophase Materials Sciences / Oak Ridge National Laboratory, United States; {3}Pennsylvania State University, United States

15:00
3213: **CMOS Compatible Ferroelectric AlScN Films with TiN Electrode Optimization**
Xuanyu Zhao, Jie Yu, Hao Jiang, Yingfen Wei
Fudan University, China

ISAF/PFM: Domains & Other Ferroic Topologies 2/5
14:00 - 15:30
HS 15.04
Chair: Seungbum Hong, KAIST, South Korea

14:00
3297: (Invited Talk) **Domains, Superdomains and Wrinkles in Epitaxially Strained and Freestanding PbTiO3**
Céline Lichtensteiger{3}, Ludovica Tovaglieri{3}, Greta Segantini{3}, Marios Hadjimichael{6}, Edoardo Zatterin{2}, Chia-Ping Su{5}, Iaroslav Gaponenko{3}, Chih-Ying Hsu{4}, Pau Torruella{1}, Lukas Korosec{3}, Willem Rischau{3}, Chang-Jae Roh{3}, Seongwoo Cho{3}, Stefano Gariglio{3}, Duncan T.L. Alexander{1}, Patrycja Paruch{3}, Alexandre Gloter{5}, Andrea Caviglia{3}, Jean-Marc Triscone{3}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}European Synchrotron Radiation Facility, France; {3}Université de Genève, Switzerland; {4}Université de Genève, École Polytechnique Fédérale de Lausanne, Switzerland; {5}Université Paris-Saclay, France; {5}Université Paris-Saclay, Switzerland; {6}University of Warwick, United Kingdom

14:30
3232: **Atomic-Resolution Analysis of the Interplay of 180º and 90º Conductive Domain Walls in PZT Thin Films**
César Magén{1}, Panagiotis Koutsogiannis{1}, Felix Risch{2}, José Ángel Pardo{1}, Igor Stolichnov{2}
{1}Instituto de Nanociencia y Materiales de Aragón, CSIC-Universidad de Zaragoza, Spain; {2}Nanoelectronic Devices Laboratory, École Polytechnique Fédérale de Lausanne, Spain

14:45
3177: **Stabilization of Head-to-Head Domain Walls by Light Ion Implantation and Annealing in LiTaO3 Single Crystals**
Joachim Montoussé{5}, Guillaume Nataf{5}, Silvana Mercone{4}, Alexis Drouin{3}, Micka Bah{4}, Kévin Nadaud{5}, Kévin Alhada-Lahbabi{2}, Brice Gautier{1}, Didier Landru{3}
{1}Institut des Nanotechnologies de Lyon, CNRS, France; {2}Institut National des Sciences Appliquées de Lyon, CNRS, France; {3}Soitec SA, France; {4}Université de Tours, France; {5}Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France

15:00
3246: (Invited Talk) **Engineering Conductive Domain Walls and Interfaces in LiNbO3**
Lukas M. Eng
Technische Universität Dresden, Germany

ISAF: Lead-Free Bulk NBT-based 2/2
14:00 - 15:30
HS 15.03
Chair: Satoshi Wada, University of Yamanashi, Japan

14:00
3541: (Featured Industry Talk) **Lead-Free Piezoceramics in Ultrasonic Measurement Devices**
Hans-Juergen Schreiner{1}, Richard Miles{2}, Oksana Jaroszak{2}, Florian Schoenhoefer{1}, Tanja Einhellinger-Müller{1}
{1}CeramTec GmbH, Germany; {2}CeramTec UK Ltd., United Kingdom

14:30
3290: **DC-Bias Induced Electromechanical Hardening in Na1/2Bi1/2TiO3-Based Lead-Free Piezoceramics**
Kriti Batra{2}, Mihail Slabki{1}, Jurij Koruza{2}
{1}Technische Universität Darmstadt, Germany; {2}Technische Universität Graz, Austria

14:45
3466: **Tuning of Piezoelectric Properties in Na0.5Bi0.5TiO3-Based Piezoceramics by Precipitation Hardening**
Sabrina Kahse{2}, Lovro Fulanović{2}, Tanja Einhellinger-Müller{1}, Jürgen Rödel{2}
{1}CeramTec GmbH, Germany; {2}Technische Universität Darmstadt, Germany

15:00
3082: **The Development of Lead-Free Potassium Bismuth Titanate Based Ferroelectric Solid Solution**
Jianxi Wen, Ge Wang
University of Manchester, United Kingdom

15:15
3075: **Development of Template Synthesis for Texturing of Lead-Free Piezoelectric Ceramics**
Christian Molin, Holger Neubert, Sylvia Gebhardt
Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany

Prof. E. Salje Memorial Session
14:00 - 15:30
HS 15.14
Chair: Guillaume Nataf, University of Tours, CNRS, INSA Centre Val de Loire, France

14:00
3568: (Invited Talk) **Raman Spectroscopy of Ferroelectric and Ferroelastic Domain Walls**
Guillaume Nataf
Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France

14:20
3569 (Invited Talk) **Polar Domain Boundaries in Ferroelastics Using a Second Harmonic Generation Microscopy**
Hiroko Yokota
Institute of Science Tokyo, Japan

14:40
3122: (Invited Talk) **Size-Effects in Ferroelastic Domains: A Study by in Situ Microscopy Techniques**
John Scott{1}, Guangming Lu{5}, Brian J. Rodriguez{2}, Ian Maclaren{4}, Ekhard Salje{3}, Miryam Arredondo{1}
{1}Queen's University Belfast, United Kingdom; {2}University College Dublin, Ireland; {3}University of Cambridge, United Kingdom; {4}University of Glasgow, United Kingdom; {5}Yantai University, China

15:00
3570: (Invited Talk) **The Supersonic Kink and Other Gems From Salje's Simulation Vault**
Jorge Íñiguez-González
Luxembourg Institute of Science and Technology and University of Luxembourg, Luxembourg

Coffee Break
15:30 - 16:00
RESOWI Foyer

ICE: Sensing Applications
16:00 - 18:00
HS 15.12
Chair: Anna Staerz, Colorado School of Mines, United States

16:00
3291: (Invited Talk) **Approaches and Opportunities for Grain Boundary Space Charge Engineering in Ceramic Ionic Conductors**
Thomas Defferriere
Massachusetts Institute of Technology, United States

16:30
3431: **Effect of Laser Irradiation on Room Temperature Dibutyl Sulfide (DBS) Sensing Properties of MoO3 Coated Quartz Crystal Microbalance (QCM)**
Jatinder Pal Singh{4}, Anjali Sharma{2}, Monika Tomar{3}, Arijit Chowdhuri{1}
{1}Acharya Narendra Dev College, University of Delhi, India; {2}Atma Ram Sanatan Dharma College – University of Delhi, India; {3}Miranda House, University of Delhi, India; {4}University of Delhi, India

16:45
3391: **Effect of Post-Annealing Treatment on the Electrochemical Properties of Graphite-Based Thick Films**
Barbara Repič{1}, Gregor Marolt{2}, Danjela Kuščer{1}
{1}Jožef Stefan Institute, Slovenia; {2}University of Ljubljana, Slovenia

17:00
3418: (Video Presentation) **A Dual-Function Cell for In-Situ Oxygen Pumping, Sensing and Defect Chemical Analysis**
Yuming Shu, Zijie Sha, Thomas Defferriere, Harry L. Tuller
Massachusetts Institute of Technology, United States

17:15
3212: (Video Presentation) **High-Temperature Performance and Frequency Drift of Scandium-Doped Aluminum Nitride PMUTs for Advanced Temperature Sensing Applications**
Haochen Lyu, Ahmad Safari
Rutgers University, United States

ISAF/ICE: Lead-Free Bulk BT-based
16:00 - 18:00
HS 15.14
Chair: Giovanna Canu, CNR - ICMATE, Italy

16:00
3225: (Invited Talk) **Piezoelectric Enhancement of Barium Titanate Ceramics by AC Poling Over Tc and Their Domain Size Effects**
Adisu Shibiru, Piyush Sapkota, Gopal Khanal, Ichiro Fujii, Shintaro Ueno, Satoshi Wada
University of Yamanashi, Japan

16:30
3005: **Improved Recipe for Synthesis of Ceramics and Single Crystals of Lead-Free Ferroics**
Milan Klicpera
Charles University, Czech Rep.

16:45
3008: **Large Electrostrain in Plastically Deformed Single-Crystal BaTiO3**
Fangping Zhuo{2}, Bo Wang{1}, Jürgen Rödel{2}
{1}Lawrence Livermore National Laboratory, United States; {2}Technische Universität Darmstadt, Germany

17:00
3538: **Understanding the Mechanism and Kinetics of the Formation of (Ba0.92Ca0.08) (Ti0.9Zr0.10) (BCZT) System Synthesized by Low Temperature Solid—State Route**
Sebastiano Garroni{3}, Marzia Mureddu{3}, Laura Caggiu{3}, Costantino Cau{3}, Fabrizio Murgia{3}, Claudio Pistidda{2}, José F. Bartolomé{1}, Sonia Lopez-Esteban{1}, Lorena Pardo{1}
{1}Consejo Superior de Investigaciones Científicas, Instituto de Ciencia de Materiales de Madrid , Spain; {2}Helmholtz-Zentrum hereon GmbH Inst. of Hydrogen Technology, Germany; {3}University of Sassari, Italy

17:15
3286: **Influence of Polymorphism on Dielectric and Ferroelectric Properties of Cd-Doped BCZT Ceramics Sintered at Different Temperatures**
Salma Shahni{1}, A.K Shukla{1}, Ajay. K Gupta{3}, Renuka Bokolia{2}, Neeraj Piplani{4}
{1}Amity University Noida, India; {2}Delhi Technological University, India; {3}Mahatma Gandhi Central University, India; {4}Marine India Private Limited, India

17:30
3126: **The Effects of Ca Substitution on the Structure and Dielectric Properties of BaTiO3 Ceramics**
Zichen He, Zhifu Liu
Shanghai Institute of Ceramics, Chinese Academy of Sciences, China

ISAF/ISIF: Ferroelectric Thin Films 2/2
16:00 - 18:00
HS 15.05
Chair: Emmanuel Defay, Luxembourg Institute of Science and Technology, Luxembourg

16:00
3340: (Featured Industry Talk) **CSD-Derived Piezoelectric Thin Films: From Solution Synthesis to MEMS Micro Mirrors**
Marko Vrabelj, Matthias Wulf, Nicolas Godard, Alexander Melischnig, Sebastian Glassner, Franz Rinner, Kerstin Schmoltner, Pavol Kudela, Johannes Kofler, Keyvan Ghanavitchi, Markus Puff, Manfred Schweinzger
TDK Electronics GmbH & Co OG, Austria

16:30
3201: **Oxide Piezoelectric Films on Flexible Glass**
Juliette Cardoletti{3}, Longfei Song{2}, Adrian-Marie Philippe{2}, Stéphanie Girod{2}, Barbara Malič{1}, Emmanuel Defay{2}, Sebastjan Glinšek{2}
{1}Jožef Stefan Institute, Slovenia; {2}Luxembourg Institute of Science and Technology, Luxembourg; {3}Technische Universität Darmstadt / Luxembourg Institute of Science and Technology, Luxembourg

16:45
3206: **Effect of Orientation Polarization and Texturing on Nano-Mechanical and Piezoelectric Properties of Pb (Zr0.52Ti0.48) O3 Films**
Orlando Auciello{4}, Abel Hurtado Macias{2}, Carlos Ramos Cano{2}, Mario Yoshida{2}, Raul Basurto{1}, Franciso Mercader Trejo{3}, Luis Fuentes Cobas{2}
{1}Centro de Ingeniería y Desarrollo Industrial, Mexico; {2}Centro de Investigación en Materiales Avanzados, Mexico; {3}Universidad Politécnica de Santa Rosa Jeauregui, Mexico; {4}University of Texas at Dallas, United States

17:00
3481: **Redox Engineering of Pb(Ti,Zr)O3 Thin Film Surfaces**
Thomas Buttiens{2}, Anouk Goossens{2}, Luis Moreno{2}, Maxime Vallet{1}, Brahim Dkhil{1}, Thomas Maroutian{3}, Manuel Bibes{2}
{1}CentraleSupélec, Université Paris-Saclay, CNRS, Laboratoire SPMS, France; {2}Laboratoire Albert Fert, France; {3}Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies, France

17:15
3101: **Bi0.5Na0.5TiO3-Based Thin Films from Chemical Solution Deposition for Energy Storage Applications**
Herbert Kobald{1}, Alexander Kobald{1}, Ivana Panzic{3}, Marco Deluca{2}
{1}Materials Center Leoben Forschung GmbH, Austria; {2}Silicon Austria Labs GmbH, Austria; {3}University of Zagreb / Materials Center Leoben Forschung GmbH, Croatia

ISAF/ISIF: Wurtzite-type Materials 3/3
16:00 - 18:00
HS 15.13
Chair: Jon Spanier, Drexel University, United States

16:00
3026: (Invited Talk) **Weeds or Flowers? Effects of Heterovalent Additions in AlN-Based Thin Films**
Geoff L. Brennecka{1}, Nate Bernstein{1}, Margaret Brown{1}, Cheng-Wei Lee{1}, Wayne Jun Weng Yeo{1}, Daniel Drury{3}, Keisuke Yazawa{1}, Brendan Hanrahan{3}, Prashun Gorai{2}
{1}Colorado School of Mines, United States; {2}Rensselaer Polytechnic Institute, United States; {3}U.S. Army Combat Capabilities Development Command Army Research Laboratory, United States

16:30
3490: **Microstructure Control in AlScN**
Sarah Olandt, Ian Mercer, Jon-Paul Maria, Morteza Kayyalha, Aida Ebrahimi
Pennsylvania State University, United States

16:45
3419: **Off-Axis Oriented (Al,Sc)N Films on b-Ga2O3 Substrate**
Keisuke Yazawa, Margaret Brown, Geoff L. Brennecka
Colorado School of Mines, United States

17:00
3018: **Predicting Long-Term Retention in Ferroelectric Al1-xScxN Through Switching Kinetics**
Roberto Guido{3}, Maike Gremmel{1}, Thomas Mikolajick{3}, Simon Fichtner{2}, Uwe Schröder{3}
{1}Christian-Albrechts-Universität zu Kiel, Germany; {2}Christian-Albrechts-Universität zu Kiel / Fraunhofer Institute for Silicon Technology ISIT, Germany; {3}NaMLab gGmbH, Germany

17:15
3491: **Rayleigh and Switching Kinetics Behavior of Pristine and Fatigued Al0.93B0.07N**
Erdem Ozdemir{2}, Betul Akkopru-Akgun{2}, Leonard Jacques{2}, Keisuke Yazawa{1}, Ian Mercer{2}, Chloe Skidmore{2}, Jon-Paul Maria{2}, Clive Randall{2}, Susan Trolier-McKinstry{2}
{1}Colorado School of Mines, United States; {2}Pennsylvania State University, United States

17:30
3117: **Identifying Ferroelectric Domain Structures in Lattice-Matched Al1-xScxN/GaN Heterostructures by Electron Microscopy**
Niklas Wolff{1}, Georg Schönweger{2}, Simon Fichtner{2}, Lorenz Kienle{1}
{1}Christian-Albrechts-Universität zu Kiel, Germany; {2}Christian-Albrechts-Universität zu Kiel / Fraunhofer Institute for Silicon Technology ISIT, Germany

17:45
3342: **Defects in Nitrate Ferroelectrics: Exploring Mechanisms, Fatigue Behavior, and Reliability Challenges in Al1-xBxN Films**
Betul Akkopru-Akgun{1}, Erdem Ozdemir{1}, Ian Mercer{1}, Leonard Jacques{1}, Pedram Yousefian{2}, Clive Randall{1}, Jon-Paul Maria{1}, Susan Trolier-McKinstry{1}
{1}Pennsylvania State University, United States; {2}University of Pennsylvania, United States

ISAF: Domains & Other Ferroic Topologies 3/5
16:00 - 18:00
HS 15.04
Chair: Pavel Mokrý, Technical University of Liberec, Czech Republic

16:00
3351: (Invited Talk) **Dynamic Motion of Polar Skyrmions in Oxide Heterostructures**
Yongjun Wu, Zijian Hong
Zhejiang University, China

16:30
3224: **Creating Currents of Electric Bubbles**
Jorge Íñiguez-González{2}, Hugo Aramberri{1}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}Luxembourg Institute of Science and Technology and University of Luxembourg, Luxembourg

16:45
3159: **Reinforcement Learning-Assisted Ferroelectric Domain Wall Design Using a Machine Learning Phase-Field Surrogate**
Kévin Alhada-Lahbabi{2}, Damien Deleruyelle{1}, Brice Gautier{1}
{1}Institut des Nanotechnologies de Lyon, CNRS, France; {2}Institut National des Sciences Appliquées de Lyon, CNRS, France

17:00
3083: (Invited Talk) **Topological States in Nanostructured Ferroelectrics of Different Dimensionalities**
Igor Lukyanchuk{2}, Anna Razumnaya{1}, Yuri Tikhonov{4}, Svitlana Kondovych{3}
{1}Jožef Stefan Institute, Slovenia; {2}Laboratory of Condensed Matter Physics, Université de Picardie Jules Verne, France; {3}Leibniz Institute for Solid State and Materials Research Dresden, Germany; {4}Université de Picardie Jules Verne, France

ISAF: Lead-Free Bulk KNN 2/2
16:00 - 18:00
HS 15.03
Chair: Barbara Malič, Jožef Stefan Institute, Slovenia

16:00
3132: **Replacement of PZT Piezoceramics with Lead-Free Alternatives in Selected Applications**
Paula Huth, Frank Eder, Markus Stephan, Faramarz Kazemi, Franz Schubert
PI Ceramic GmbH, Germany

16:15
3176: **Temperature-Independent High-Power Resonance Performance of (K,Na)NbO3-Based Piezoceramics**
Lovro Fulanovic{3}, Maryam Azadeh{3}, Alexander Frisch{1}, Kentaro Ichihashi{2}, Yoshinobu Hirose{2}, Jürgen Rödel{3}, Jurij Koruza{4}
{1}KIT, Germany; {2}Niterra Co., Ltd, Japan; {3}Technische Universität Darmstadt, Germany; {4}Technische Universität Graz, Austria

16:30
3194: **Poling Effect on Domain Structure and Piezoelectric Property of Lead-Free Piezoceramics**
Takumi Nozaki{3}, Alexander Martin{3}, Kyle Grant Webber{1}, Tadachika Nakayama{2}, Ken-Ichi Kakimoto{3}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Nagaoka University of Technology, Japan; {3}Nagoya Institute of Technology, Japan

16:45
3218: **Unveiling the Chemopiezoelectric Effect in High Electrostrain Lead-Free Piezoceramics**
Ze Xu, Ke Wang
Tsinghua University, China

17:00
3354: **Hardening and Temperature Dependence of K0.5Na0.5NbO3 Cu- Doped Piezoceramics for High-Power Applications**
Laura Cangini{2}, Haofeng Huang{4}, Changhao Zhao{1}, Jurij Koruza{3}, Ke Wang{4}, Jürgen Rödel{2}, Lovro Fulanović{2}
{1}State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China; {2}Technische Universität Darmstadt, Germany; {3}Technische Universität Graz, Austria; {4}Tsinghua University, China

17:15
3156: **Enhancing Core–Rim Structure Control in (K,Na)NbO3-Based Lead-Free Piezoceramics via Rapid Sintering Method**
Faqiang Zhang{2}, Juanjuan Xing{3}, Zhifu Liu{1}
{1}Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; {2}Shanghai Institute of Silicate, Chinese Academy of Sciences, China; {3}Shanghai University, China

17:30
3181: **Improvement of Piezoelectric Properties of Textured KNN by Template Grain Growth**
Justin Jeannneau{3}, Ana Borta-Boyon{3}, Astri Bjørnetun Haugen{2}, Temesgen Tadeyos Zate{2}, Franz Schubert{1}, Paula Huth{1}
{1}PI Ceramic GmbH, Germany; {2}Technical University of Denmark, Denmark; {3}Thales Research and Technology, France

WIE and D&I Topics (Part 1)
18:00 - 19:30
Aula

Poster Session ISAF: Applications
18:00 - 19:30
Old University Aula 1/5

3111: **High Performance Artificial Muscles Based on Relaxor Ferroelectric Polymer Materials**
Cenling Huang, Xin Chen
Shanghai Jiao Tong University, China

3148: **Chemical Solution Deposition Derived Bismuth Ferrite Nanocrystals for Photoelectrocatalysis Applications**
Xueqing Fang
University of New South Wales, Australia

3150: **Enhanced Ferroelectric Coupled Gate Control of AlGaN/GaN HEMT with a Patterned AlScN Gate Stack**
Gyuhyung Lee, Geonwook Yoo
Soongsil University, Korea
3207: **BiFeO3 Ferroelectric Resonant Tunneling Diodes**
King-Fa Luo
University of New South Wales, Australia

3258: **Advanced Energy Solutions via Bi-Directional Electrocaloric Effect and Enhanced Storage in Ba0.5Sr0.5TiO3 Based Relaxor Ferroelectrics**
Amiya Ranjan Sahoo{2}, V.Raghavendra Reddy{1}, Oroosa Subohi{2}
{1}UGC-DAE Consortium for Scientific Research, Indore, India; {2}Visvesvaraya National Institute of Technology, Nagpur, India

3264: **Piezoelectric Polymer Sensors Integrated Into Fiber-Reinforced Plastics**
Michael Wegener{1}, Daniel Pinkal{1}, Mathias Koehler{1}, Olaf Kahle{1}, Andreas Bernascheck{3}, Christian Dreyer{2}
{1}Fraunhofer Institute for Applied Polymer Research IAP, Germany; {2}Fraunhofer Institute for Applied Polymer Research IAP, Technical University of Applied Sciences Wild, Germany; {3}Technical University of Applied Sciences Wildau, Germany

3288: **Mechanism Analysis and Performance Enhancement Through Ferroelectric Coating of Cathode Materials in Lithium-Ion Batteries**
Gumin Kang, Batzorig Buyantogtokh, Wonjeong Yu, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea

3322: **Investigation of the Effect of Pillar Geometry on the Crosstalk and Electroacoustic Performance of 1-3 Piezocomposites**
Nisa Hacıoğlu, Ezgi Kumraltekin, Şahin Guren, Muhammet Boz, Sedat Alkoy
Gebze Technical University, Turkey

3326: **Influence of Ceramic Volume Fraction on the Electroacoustic Performance of 1-3 Piezocomposites**
Ilgın Uslu, Yağmur Öztürk, Ayşenur Yazıcıoğlu, Muhammet Boz, Sedat Alkoy
Gebze Technical University, Turkey

3360: **Polarization Modulated Photo-Response in Hf0.5Zr0.5O2 Non-Volatile Memory for Potential Application in Self-Adaptive Visual Recognition**
Xiao Long, Yuanxiang Chen, Hong Xie, Xiaocheng Huang, Yang Yang, Dashan Shang, Yan Wang
Institute of Microelectronics, Chinese Academy of Sciences, China

3361: **Switchable Surface Chemistry of BiFeO3: A New Approach for Photoelectrochemical Water Splitting**
Michael Gunawan{1}, Owen Bowdler{1}, Rose Amal{1}, Nagarajan Valanoor{1}, Jason Scott{1}, Judy Hart{1}, Cui Ying Toe{2}
{1}University of New South Wales, Australia; {2}University of Newcastle, Australia

3401: **Effective Moisture Protection for Bulk and Thin Film Piezoelectric Actuators**
Anthony Diaz-Huemme{2}, Johannes Neumüller{1}, Susan Trolier-McKinstry{2}
{1}Montan Universität Leoben, Austria; {2}Pennsylvania State University, United States

3415: **Advanced Modeling of Buckling Behavior in Piezoelectric MEMS Diaphragms for High-Efficiency Energy Conversion Transducers**
Kaoru Yamashita, Kentaro Yamamoto
Kyoto Institute of Technology, Japan

3495: **PVDF-BaTiO3 Composites by Electrospinning for Flexible Wearable Electronics**
Alessandro Talone{3}, Giovanna Canu{2}, Giovanni Carraro{3}, Chiara Gambardella{1}, Veronica Piazza{1}, Roberto Spotorno{4}, Dario Cavallo{4}, Maria Fiorella Pantano{5}, Marco Smerieri{3}
{1}CNR-IAS, Institute for the Study of Anthropic Impact and Sustainability in the Marine Environment, Italy; {2}CNR-ICMATE, Institute of Condensed Matter Chemistry and Technologies for Energy, Italy; {3}CNR-IMEM, Institute of Materials for Electronics and Magnetism, National Research Council of Italy, Italy; {4}University of Genoa, Italy; {5}University of Trento, Italy

3561: **Portable Cancer Detector Based on Piezoelectric Sensor with DNA Probe for Prostate Cancer**
Soodkhet Pojprapai{2}, Suparat Tongpeng{2}, Thita Sonklin{2}, Chayapat Weerapakdee{2}, Snong Sukswang{2}, Chutima Kranrod{1}, Shinji Tokonami{1}, Sukanda Jiansirisomb{2}
{1}Hirosaki University, Japan; {2}Suranaree University of Technology, Thailand

3566: **Study of the Metal-Ferroelectric-Semicondoctor-Metal Structure Influencing Hzo and Oxide Semiconductor**
Donghyug Park, Dongsu Kim, Heechang Park, Jeonghun Lee, Taehoun Roh, Hongsoo Choi, Jaeeun Jang
Daegu Gyeongbuk Institute of Science and Technology, Korea

3567: **Unveiling the Capacitance Overestimation of HfO_2-ZrO_2 Solid Solution in Morphotropic Phase Boundary**
Jaehyeon Yun{2}, Seungyeon Kim{2}, Woojin Jeon{2}, Taehwan Moon{1}
{1}Ajou University, Korea; {2}Kyung Hee University, Korea

Poster Session ICE
18:00 - 19:30
Old University Aula 2/5

3071: **The Effects of the HfO2 Buffer Layer on the Electrocaloric Properties of Sol-Gel-Derived (Na, K, Li)NbO3- Based Films**
Tzu-Ting Huang{1}, Po-Chun Chen{1}, Yi-An Chen{1}, Guan-Ru Lin{1}, Sheng-Yuan Chu{1}, Cheng-Che Tsai{2}
{1}National Cheng Kung University, Taiwan; {2}Research Center, Ag Pro Technology Co., Ltd., Taiwan

3072: **Investigation of the Effects of HfO2 Buffer Layer on the Piezoelectric Properties of Sol-Gel-Derived (Na, K, Li)NbO3- Based Films**
Tzu-Ting Huang{1}, Po-Chun Chen{1}, Yi-An Chen{1}, Guan-Ru Lin{1}, Sheng-Yuan Chu{1}, Cheng-Che Tsai{2}
{1}National Cheng Kung University, Taiwan; {2}Research Center, Ag Pro Technology Co., Ltd., Taiwan

3382: **Solid Oxide Fuel Cell Fabrication Using Tape-Casting and Screen-Printing Methods**
Žiga Bertalanič{1}, Kostja Makarovič{1}, Andraž Bradeško{1}, Maja Koblar{1}, Borut Kosec{2}, Barbara Malič{1}
{1}Jožef Stefan Institute, Slovenia; {2}University of Ljubljana, Slovenia

3303: **Shining Light in Ion Insertion in Mixed Ionic-Electronic Conductors: An In-Situ Study Using Iono-Optic Impedance Spectroscopy (I-OIS)**
Paul Nizet{2}, Francesco Chiabrera{2}, Yunqing Tang{2}, Nerea Alayo{2}, Beatrice Laurenti{2}, Federico Baiutti{2}, Alex Morata{2}, Albert Tarancón{1}
{1}Catalan Institution for Research and Advanced Studies/Institut de Recerca en Energia de Catalunya, Spain; {2}Catalonia Institute for Energy Research, Spain

3383: **Fast Li+ Diffusion in Lithiated LATP as Seen by Motion-Induced Nuclear Spin Relaxation**
Annika Marko, Thomas Scheiber, Bernhard Gadermaier, H. Martin R. Wilkening
Technische Universität Graz, Austria

3395: **High Ionic Conductivity in Na3SbS4: The Dominant Role of Na-Ion Vacancies Over Structural Transition**
Jana Königsreiter, Bernhard Gadermaier, H. Martin R. Wilkening
Technische Universität Graz, Austria

3099: **Understanding Low-Temperature Direct Liquid-to-Solid Synthesis and Chemistry of Li-Garnet Electrolytes for Hybrid and Solid-State Batteries**
Lucie Quincke{1}, Jennifer L.M. Rupp{2}
{1}Technische Universität München, Germany; {2}Technische Universität München & TUM International Energy, Germany

3115: **Proton Conducting Ceramic Single Chamber Glucose Fuel Cells for Human Implants**
Lisa Winkler{1}, Jennifer L.M. Rupp{2}
{1}Technische Universität München, Germany; {2}Technische Universität München & TUM International Energy, Germany

3276: **Towards Disentangling the Site-Specific Charge Transition Levels of Manganese in Spinels**
Gero Pickel{2}, Jakob Laux{2}, Karla Marlene Mena Aguilar{1}, Mariona Coll{1}, Klaus Reichmann{3}, Andreas Klein{2}
{1}Institute of Materials Science of Barcelona (ICMAB-CSIC), Spain; {2}Technische Universität Darmstadt, Germany; {3}Technische Universität Graz, Austria

3327: **3D Visualization of Conductive Filament in TiO_2 Using C-AFM Tomography**
Kunwoo Park, Chaewon Gong, Sunghwan Park, Sang-Hee Ko Park, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea

3540: **Development of Biomimetic Ferroelectric Field Effect Transistor by Simulations**
Cristian Ravariu{4}, Bianca Adiaconiță{3}, Eugen Chiriac{3}, Sarada Musala{5}, Avireni Srinivasulu{2}, Appasani Bhargav{1}
{1}Kalinga Institute of Industrial Technology, India; {2}Mohan Babu University Tirupati, India; {3}National Institute for Research and Development in Microtechnologies, Romania; {4}National University of Science and Technology Politehnica Bucharest, Roman

3479: **Unveiling the Oxidation Mechanisms of Prussian White Through Magnetic and Electrochemical Techniques**
Olzhas Kaupbay, Stefan Eber, Roland Würschum, Stefan Topolovec, H. Martin R. Wilkening, Ilie Hanzu
Technische Universität Graz, Austria

Poster Session ISIF
18:00 - 19:30
Old University Aula 3/5

3009: **Investigations of SiC Doping Effects on the Performance Improvement of ZnO-Based RRAMs**
Ting-Jui Wang, Po-An Shih, Kuan-Lin Yeh, Jai-Hao Wang, Cheng-Ying Li, Sheng-Yuan Chu
National Cheng Kung University, Taiwan

3012: **Reduced Nonlinearity in Yttrium Doped Hafnium Oxide Buffer Layer for Synaptic Applications**
Kuan-Lin Yeh, Po-An Shih, Wei-Chueh Cheng, Kai-Ling Hsu, Sheng-Yuan Chu
National Cheng Kung University, Taiwan

3256: **Ferroelectric Characterization of Epitaxial Atomic Layer Deposited (Hf, Zr)O2 Ultra-Thin Films**
Sajmohan Mohandas Moolayil, Melania Rogowska, Ola Nilsen, Henrik Hovde Sønsteby
University of Oslo, Norway

3422: **Investigations on the Ferroelectric Properties of LiNbO3 Thin Films and Their Applications in Ferroelectric In-Memory Computing**
Tian Tian, Wenjie Xu, Ming Xi, Jiayue Xu
Shanghai Institute of technology, China

3014: **Sputter-Deposited PMUTs: Resonance Analysis and Validation with an Analytical Solution**
Jan Helmerich{2}, Annika Hofmann{1}, Manfred Wich{1}, Thomas Schaechtle{1}, Benedikt Szabo{2}, Stefan Rupitsch{1}
{1}Albert-Ludwigs-Universität Freiburg, Germany; {2}Albert-Ludwigs-Universität Freiburg, Laboratory for Biomedical Microtechnology, Germany

3035: **Diaphragm-Type Piezoelectric MEMS Accelerometers with Bulk Ferroelectric Crystals**
Burcu Dursun{2}, Susan Trolier-McKinstry{2}, Yoonsang Jeong{1}, Sang-Goo Lee{1}
{1}iBULe Photonics Inc, Korea; {2}Pennsylvania State University, United States

3046: **Temperature Optimization of AlN-Based Hybrid-SAW/BAW Resonators with Compensated and High-Sensitivity Modes**
Tamara Terzic, Dmytro Solonenko, Vladimir Pashchenko
Silicon Austria Labs GmbH, Austria

3079: **Influence of MWCNTs Length on the Ferroelectric and Piezoelectric Properties of PVDF-TrFE Composite Films**
Kejun Shi, Mónica Acuautla
University of Groningen, Netherlands

3189: **Exploration of the (AlN)X(Sic)1-X System for Increased Acoustic Velocity**
Wayne Jun Weng Yeo, Margaret Brown, Nate Bernstein, Laszlo Wolf, Vladan Stevanović, Geoff L. Brennecka
Colorado School of Mines, United States

3298: **Barium Titanate Thin Films for Ferroelectric Devices: Insights on Ozone-Assisted ALD**
Dharsana Pulikkottil Dinesh, Ola Nilsen, Henrik Hovde Sønsteby
University of Oslo, Norway

3185: **Toward Solution Deposition of BiFeO3-Based Perovskite Films on Flexible Bio-Based Polymer Substrates**
M. Lourdes Calzada{2}, Adriana Barreto{1}, Ricardo Jiménez{2}, Íñigo Bretos{2}, Jesús Ricote{2}, Miguel Algueró{2}, Adrián L. Leonés{3}, Valentina Sessini{3}, Marta E.G. Mosquera{3}
{1}Consejo Superior de Investigaciones Científicas (CSIC), Instituto de Ciencia de Materiales de Madrid, Spain; {2}Consejo Superior de Investigaciones Científicas, Instituto de Ciencia de Materiales de Madrid , Spain; {3}Universidad de Alcalá, Spain

3216: **Enhancing Mechanical and Electrochemical Performance of Direct-Spun Carbon Nanotube Yarn Through Sucrose Dehydration for Advanced Energy Harvesting**
Hocheol Gwac, Jae Sang Hyeon, Seon Jeong Kim
Hanyang University, Korea

3348: **Integration of Zinc-Air Batteries and Carbon Nanotube Yarn Actuators for Self-Powered Artificial Muscles**
Jong Woo Park, Jae Sang Hyeon, Hocheol Gwac, Seon Jeong Kim
Hanyang University, Korea

3368: **Exploring Polarization Direction in Potassium Sodium Niobate by 4D STEM, First-Principles Calculations and Machine-Learning Algorithms**
Janina Roknić{1}, Katarina Žiberna{1}, Meryem Lachhab{1}, Maja Koblar{1}, Mojca Otoničar{1}, Matic Poberžnik{1}, Anton Kokalj{1}, Marjan Stoimchev{1}, Matej Martinc{1}, Sašo Džeroski{1}, Goran Dražić{2}, Andreja Benčan Golob{1}
{1}Jožef Stefan Institute, Slovenia; {2}National Institute of Chemistry, Kemijski inštitut, Slovenia

3417: **Intelligent Structures: How to Handle Them Using the Variational-Asymptotic Method**
Khanh Chau Le
Ton Duc Thang University, Vietnam

Poster Session PFM
18:00 - 19:30
Old University Aula 4/5

3396: **Electrical and Electromechanical Characterization of Sn2P2(SexS1-x)6 Single Crystals Family**
Ilona Zamaraite{2}, Andrius Dziaugys{2}, Yulian Vysochanskii{1}, Jūras Banys{2}
{1}Uzhhorod National University, Ukraine; {2}Vilnius University, Lithuania

3190: **Integrating Spin Crossover and Ferroelectricity in Dual Switchable Transition Metal Complexes for Enhanced Data Storage**
Qiancheng Zhang, David Laughlin, Nuala Caffrey, Brian J. Rodriguez, Grace Morgan
University College Dublin, Ireland

3508: **On-Demand Generation of Ferroelectric Topologies via Scan Path Engineered Ferroelectric Lithography**
Marti Checa{1}, Bharat Pant{4}, Alexander Puretzky{1}, Bogdan Dryzhakov{1}, Rama Vasudevan{1}, Yongtao Liu{1}, Pravin Kavle{3}, Aravind Dasgupta{3}, Lane W. Martin{2}, Ye Cao{4}, Liam Collins{1}, Stephen Jesse{1}, Kyle Kelley{1}, Neus Domingo{1}
{1}Center for Nanophase Materials Sciences / Oak Ridge National Laboratory, United States; {2}Rice University, United States; {3}University of California, Berkeley, United States; {4}University of Texas at Arlington, United States

3214: **Spatially Correlated Electronic-Ionic Processes Under Resistive Switching Phenomena in TiO2 Thin Films**
Chaewon Gong, Sunghwan Park, Sang-Hee Ko Park, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea

3152: **Artifacts of Electrochemical Strain Microscopy (ESM) Caused by Topography Change and Electrostatic Force**
Dongyan Chen, Seungbum Hong
Korea Advanced Institute of Science and Technology, Korea

3450: **Local-Scale Characterization of MoS2/BTO Heterosctructures via Scanning Probe Microscopy**
Julia Hernández Ruiz{1}, Thomas Pucher{1}, Victor Zamora{2}, Victor Rouco{2}, Jacobo Santamaria{2}, Carmen Munuera{1}, Jesús Ricote{1}
{1}Consejo Superior de Investigaciones Científicas, Instituto de Ciencia de Materiales de Madrid , Spain; {2}Universidad Complutense de Madrid, Spain

3486: **Dielectric and Optical Properties of Diphenylalanine (FF) Thin Films**
Marija Dunce{1}, Svitlana Kopyl{2}, Denis Alikin{2}, Karlis Kundzins{1}, Eriks Birks{1}, Andrei Kholkin{1}
{1}Institute of Solid State Physics, University of Latvia, Latvia; {2}University of Aveiro, Portugal

3266: **Advanced Tuning of Local Electromechanical Properties in Polymer Poly (L-Lactic Acid) Coating**
Maxim Ivanov, Júlio Rocha, Paula Vilarinho
University of Aveiro, Portugal

3267: **Role of Mechanical and Electrical Stimuli on Domain Stability in Hafnia Thin Films**
Waseem Ahmad Wani{2}, Kyle Lam{3}, Kristina Holsgrove{1}, Gerald Bejger{4}, Christina M. Rost{4}, Amit Kumar{1}, Jon F. Ihlefeld{3}, Brian J. Rodriguez{2}
{1}Queen's University Belfast, United Kingdom; {2}University College Dublin, Ireland; {3}University of Virginia, United States; {4}Virginia Polytechnic Institute and State University, United States

3169: **Local Electric-Field Inhomogeneities at the Interface of Hafnia-Film**
Dmitry Pelegov{2}, Florian Wunderwald{1}, Uwe Schröder{1}, Yachin Ivry{2}
{1}NaMLab gGmbH, Germany; {2}Technion – Israel Institute of Technology, Israel

Poster Session ISAF: Fundamentals
18:00 - 19:30
Old University Aula 5/5

3108: **New Dielectric Materials, Zr Substituted Ta2O5 with a Noncentrosymmetric Structure**
Takanori Mimura, Suzuka Udagawa, Yoshiyuki Inaguma
Gakushūin University, Japan

3109: **Composition Dependence of the Structure and Dielectric Properties in the Non-Centrosymmetric ZrxTa1-xO2.5-δ**
Suzuka Udagawa, Takanori Mimura, Yoshiyuki Inaguma
Gakushūin University, Japan

3112: **Modification of BiFeO3 Multiferroic Ceramics by Multi-Elements Co-Substitution**
Xiang Ming Chen, Lu Liu, Xiaoli Zhu
Zhejiang University, China

3125: **Spectroscopic Insights on Doped Lead-Free Antiferroelectric Niobates**
Anirudh K R, Lucía Imhoff, Teťana Ostapčuk, Dmitrij Nužnyj, Elena Buixaderas
Institute of Physics of the Czech Academy of Sciences, Czech Rep.

3304: **Assessment of Structural, Dielectric, Electrical, and Ferroelectric Properties in W-Modified SrBi6Nb2Ti3O21 Intergrowth Aurivillius Ceramics for High-Temperature Applications**
Astha Sharma, Oroosa Subohi
Visvesvaraya National Institute of Technology, Nagpur, India

3433: **The Search for Large Polarization Molecular Ferroelectrics – Large Scale Screening of Polarization**
Sindre Mjøen Svendsen{2}, Sverre Magnus Selbach{2}, Mari-Ann Einarsrud{2}, Kristian Berland{1}, Didrik Småbråten{2}, Julian Bradley Walker{2}
{1}Norwegian University of Life Sciences, Norway; {2}Norwegian University of Science and Technology, Norway

3560: **Molecular Dynamics Modelling of Oxygen Diffusion in Perovskite-Type Neodymium Strontium Ferrite Nd0.3Sr0.7FeO3-δ**
Wolfgang Preis
Montanuniversität Leoben, Austria

3564: **Electrostrain Goes Bananas**
Yizhe Li, David Hall
University of Manchester, United Kingdom

3565: **Predicting and Enhancing Electrocaloric Behavior in Lead-Free Ceramics via Gradient Boosting**
Mustafa Cagri Bayir, Ebru Mensur
Gebze Technical University, Turkey

ICE: Solid Oxide Cells 1/2
9:00 - 10:30
HS 15.12
Chair: Edith Bucher, Montanuniversitaet Leoben, Austria

9:00
3546: (Invited Talk) **Advanced Materials for Solid Oxide Cells**
Albert Tarancón{1}, Juan de Dios Sirvent{2}, Federico Baiutti{2}, Francesco Chiabrera{2}, Kosova Kreka{2}, Fjorelo Buzi{2}, Alex Morata{2}, Antonio Maria{2}, Lucile Bernadet{2}, Marc Torrell{2}, Carlota Bozal-Ginesta{3}
{1}Catalan Institution for Research and Advanced Studies/Institut de Recerca en Energia de Catalunya, Spain; {2}Catalonia Institute for Energy Research, Spain; {3}Swiss Federal Laboratories for Materials Science and Technology, Catalonia Institute for Energy Rese, Switzerland

9:30
3464: **Electrochemical Analysis of Ni-Based Anode Materials for Solid Oxide Fuel Cells**
Thi Thuy Duyen Nguyen{1}, Victor Zapata{1}, Olivier Joubert{2}, Annie Le Gal La Salle{2}
{1}Institut des Matériaux de Nantes Jean Rouxel, France; {2}Institut des Matériaux de Nantes Jean Rouxel, CNRS, France

9:45
3094: **Phase Engineering of High-Entropy Oxides Promotes Oxygen Evolution Reactivity**
Hao Luo, Chaoyun Zhang, Siyuan Zhang, Danyang Wang
University of New South Wales, Australia

10:00
3375: **Strategies to Tailor the Active Oxygen Species in the Electrochemical Oxidative Coupling of Methane**
Filip Grajkowski, Mengren Liu, Subhash Chandra, Sanaz Koohfar, Dongha Kim, Georgios Dimitrakopoulos, Bilge Yildiz
Massachusetts Institute of Technology, United States

10:15
3324: **Novel In-Operando Spectro-Electrochemical Setup to Study Electrode Degradations in Solid Oxide Fuel Cells**
Krishna Teja Valeti, Kazi Rifat Bin Rafiq, Sierra Astle, Anna Staerz
Colorado School of Mines, United States

ISAF/: Wurtzite-type Materials & Hafnia 1/6
9:00 - 10:30
HS 15.13
Chair: Geoff Brennecka, Colorado School of Mines, United States

9:00
3533: (Featured Industry Talk) **Ultra-High Piezoelectric Coupling in AlScN Thin Films Deposited by Lam Research Pulsed Laser Deposition Platform**
Matthijn Dekkers, Arjen Janssens
Lam Research, Netherlands

9:30
3222: (Invited Talk) **Towards Structural Softness and Enhanced Electromechanical Responses in HfO2 Ferroelectrics**
Jorge Íñiguez-González
Luxembourg Institute of Science and Technology and University of Luxembourg, Luxembourg

10:00
3305: **Unveiling Structure-Property Correlations in Ferroelectric Hf0.5Zr0.5O2 Films Using Variational Autoencoders**
Kévin Alhada-Lahbabi{3}, Brice Gautier{2}, Damien Deleruyelle{2}, Grégoire Magagnin{1}
{1}Institut des Nanotechnologies de Lyon, France; {2}Institut des Nanotechnologies de Lyon, CNRS, France; {3}Institut National des Sciences Appliquées de Lyon, CNRS, France

10:15
3038: **Exchange Interactions Between Electric Dipoles in Hafnia**
Longju Yu{2}, Hong Jian Zhao{2}, Peng Chen{1}, Laurent Bellaiche{3}, Yanming Ma{2}
{1}Guangdong Technion-Israel Institute of Technology, China; {2}Jilin University, China; {3}University of Arkansas, United States

ISAF/ICE: High-Entropy Materials
9:00 - 10:30
HS 15.14
Chair: Jon-Paul Maria, Penn State University, United States

9:00
3240: (Invited Talk) **Defect Engineering and Analysis in Perovskite-Structured High-Entropy Materials**
Soonil Lee
Changwon National University, Korea

9:30
3392: **High-Entropy BiFeO3 Ceramics with Rare Earth Elements, Ferroelectric, and Magnetic Properties**
Marianela Escobar, Onur Atmaca, Soma Salamon, Vladimir Shvartsman, Heiko Wende, Doru Lupascu
Universität Duisburg-Essen, Germany

9:45
3095: **High-Throughput Solid-State Synthesis and Dielectric Properties of High-Entropy Perovskite Oxides with A-Site Disorder**
Udo Eckstein, Kyle Grant Webber
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

10:00
3339: (Invited Talk) **Enhanced Piezoelectric Performance and Energy Storage Performance in Lead-Free Ceramics Through Regulating Local Ferroelectric Distortion**
Jinzhu Zou{1}, Tongxin Wei{1}, Shujun Zhang{3}, Yuanhua Lin{2}, Dou Zhang{1}
{1}Central South University, China; {2}Tsinghua University, China; {3}University of Wollongong, Australia

ISAF/ISIF: Multiferroics & Magnetic Materials 1/2
9:00 - 10:30
HS 15.05
Chair: Lynnette Keeney, Tyndall National Institute, University College Cork, Ireland

9:00
3220: **Crystal Structure and Magnetization Reversal in Single-Layered Ruddlesden–Popper Caeufeo4 Ceramics**
Zhang Zhengduan, Liu Xiaoqiang, Xiang Ming Chen
Zhejiang University, China

9:15
3165: **Direct Magnetoelectric Coupling in Thin Film PVDF-TrFE/Ni Foil Composites**
Federica Luciano{2}, Erica Giorgione{5}, Emma Van Meirvenne{3}, Andrei Galan{6}, Ilaria Marzorati{4}, Arne De Coster{3}, Dominika Wysocka{1}, Bart Sorée{3}, Stefan De Gendt{3}, Florin Ciubotaru{1}, Christoph Adelmann{1}
{1}IMEC, Belgium; {2}Katholieke Universiteit Leuven / IMEC, Belgium; {3}Ku Leuven / Imec, Belgium; {4}Politecnico di Milano, Italy; {5}Politecnico di Torino / IMEC, Italy; {6}Université de Liège / IMEC, Belgium

9:30
3252: **PLLA-Matrix Magnetoelectric Composites with Spinel Oxide Particles for Flexible Smart Devices and Energy Harvesting**
Miguel Algueró{1}, Adrián L. Leonés{2}, Cristina Pascual-González{1}, Valentina Sessini{2}, Asier Medel{2}, Rafael P Del Real{1}, Pablo Ramos{2}, Alicia Castro{1}, Marta E.G. Mosquera{2}, Harvey Amorín{1}
{1}Consejo Superior de Investigaciones Científicas, Instituto de Ciencia de Materiales de Madrid , Spain; {2}Universidad de Alcalá, Spain

9:45
3346: **Thermally Induced Interfacial Effects in PMN-0.4PT/Ferromagnetic Heterostructures**
Giovanni Vinai{1}, Deepak Dagur{1}, Federico Motti{1}, Hemanita Sharma{1}, Aleksandr Petrov{1}, Giorgio Rossi{2}, Piero Torelli{1}
{1}CNR - Istituto Officina dei Materiali, Italy; {2}University of Milan, Italy

10:00
3510: **Enhanced Magnetoelectric Effect Controlled by Magnetic Anisotropy in Ferromagnetic-Piezoelectric Heterostructure**
Peter Finkel
U.S. Naval Research Laboratory, United States

10:15
3284: **Comparative Analysis of Multiferroic Properties in Bi2FeNiO6 Double Perovskite Flexible Film and Bulk Form**
Rahul Kumar Sahu, Oroosa Subohi
Visvesvaraya National Institute of Technology, Nagpur, India

ISAF: Domains & Other Ferroic Topologies 4/5
9:00 - 10:30
HS 15.04
Chair: Jesús Ricote, Instituto de Ciencia de Materiales de Madrid, CSIC, Spain

9:00
3019: (Invited Talk) **Strategies to Build Ferroelectric Thermal Conductivity Switches**
Guillaume Nataf
Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France

9:30
3088: **Local Polar Domain in Perovskite Oxyfluoride, Sr1-xBaxFeO2F**
Tetsuhiro Katsumata{3}, Yoshiyuki Inaguma{1}, Yasuhiro Yoneda{2}
{1}Gakushūin University, Japan; {2}Japan Atomic Energy Agency, Japan; {3}Tokai University, Japan

9:45
3133: **Thermal Conductivity Switches Based on Ba0.85Ca0.15ZrxTi1-x and SrxBa1-xNb2O6 Ceramics**
Vijaya Bhasker{1}, Tatiana Chartier{1}, Fabien Giovannelli{1}, Guillaume Nataf{2}
{1}Université de Tours, France; {2}Université de Tours, CNRS, GREMAN Laboratory, INSA Centre Val de Loire, France

10:00
3534: **Prediction and Observation of Polar Topological Domain Structures in Ferroelectric Thin Films**
Yu-Jia Wang
Institute of Metal Research, Chinese Academy of Sciences, China

10:15
3394: **Switching of Ferroelectric Domains in Monoclinic (K,Na)NbO3 Strained Epitaxial Films Investigated by In-Operando X-Ray Diffraction**
Marilia de Oliveira Guimaraes{2}, Carsten Richter{2}, Moritz Engl{3}, Jutta Schwarzkopf{2}, Dmitri Novikov{1}, Martin Schmidbauer{2}
{1}Deutsches Elektronen-Synchrotron, Germany; {2}Leibniz-Institut fÃ¼r KristallzÃ¼chtung, Germany; {3}NaMLab gGmbH, Germany

ISAF: Multilayers & Thick Films
9:00 - 10:30
HS 15.03
Chair: Hana Ursic, Jožef Stefan Institute, Slovenia

9:00
3242: (Invited Talk) **Evaluation of Generation Energy by Vibration Using Pb-Free Piezoelectric Thick Film Formed on Stainless Steel Substrate by Aerosol Deposition Method**
Yoshihiro Kawakami
Research Institute for Electromagnetic Materials, Japan

9:30
3041: **Annealing Mechanisms and Cooling Rate Dependence of Aerosol Deposited Barium Titanate Thick Films**
Michel Kuhfuß{1}, Alexander Martin{2}, Ken-Ichi Kakimoto{2}, Kyle Grant Webber{1}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Nagoya Institute of Technology, Japan

9:45
3034: **Piezoceramic Thick Film Sensors for Process Monitoring**
Sylvia Gebhardt{1}, Paul Günther{1}, Miguel Antonio Panesso Perez{2}, Jan Berthold{2}
{1}Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany; {2}Fraunhofer Institute for Machine Tools and Forming Technology IWU, Germany

10:00
3457: (Featured Industry Talk) **Recent Advances and Developments in Multilayer Ceramic Technology**
Kostja Makarovič
KEKO-Equipment d.o.o., Slovenia

Coffee Break
10:30 - 11:00
RESOWI Foyer

ICE: Solid Oxide Cells 2/2
11:00 - 12:30
HS 15.12
Chair: Federico Baiutti, IREC - Fundacio Institut de Recerca en Energia de Catalunya, Spain

11:00
3170: (Invited Talk) **Materials for Electrochemical Energy Conversion and Storage in Solid Oxide Cells**
Edith Bucher
Montanuniversität Leoben, Austria

11:30
3330: **Impact of Infiltrant Cation Size on Surface Acidity/Basicity Stability of La0.6Sr0.4Co0.2Fe0.8 Solid Oxide Cell Cathodes**
Masahiro Yasutake{2}, Han Gil Seo{1}, Yohei Nagatomo{2}, Ryota Ozaki{2}, Junko Matsuda{2}, Kazunari Sasaki{2}, Harry L. Tuller{3}
{1}Dankook University, Korea; {2}Kyushu University, Japan; {3}Massachusetts Institute of Technology, United States

11:45
3228: **Influence of Gas Phase Impurities on the Oxygen Exchange Kinetics of Mixed Conducting Oxides**
Clement Nicollet
Nantes Université, CNRS, Institut des Matériaux de Nantes Jean Rouxel, IMN, France

12:00
3358: **Control of Electrode Surface Acidity/Basicity: A Key to Recovering Degradation and Enhancing Tolerance to Poisoning in Solid Oxide Fuel/Electrolysis Cells**
Han Gil Seo{1}, Harry L. Tuller{2}
{1}Dankook University, Korea; {2}Massachusetts Institute of Technology, United States

12:15
3452: **Unveiling Termination-Specific Reactivity in Solid/Gas Interface Reactions Through Atomically Precise Control**
Di Chen{3}, Hongyang Su{3}, Jie Zheng{4}, Wenxiang Mu{1}, William C. Chueh{2}, Sulei Hu{4}
{1}Shandong University, China; {2}Stanford University, United States; {3}Tsinghua University, China; {4}University of Science and Technology of China, China

ISAF/ISIF/ICE: Multiferroics & Magnetic Materials 2/2
11:00 - 12:30
HS 15.05
Chair: Antonio Iacomini, Jožef Stefan Institute, Slovenia

11:00
3329: **Thermally Assisted Current Induced Magnetization Switching**
Zhiguang Wang, Jingen Wu, Zhongqiang Hu, Ming Liu
Xi'an Jiaotong University, China

11:15
3331: **Impact of Magnetic Ion Substitution on the Crystal Structure of Multiferroic Aurivillius Phases**
Jennifer Halpin{2}, Michael Schmidt{2}, Roger Whatmore{1}, Lynette Keeney{3}
{1}Imperial College London, United Kingdom; {2}Tyndall National Institute, Ireland; {3}Tyndall National Institute, University College Cork, Ireland

11:30
3025: **Electric Field Control of Single-Domain Multiferroic BiFeO3**
Amr Abdelsamie{1}, Arthur Chaudron{1}, Noela Rezi{1}, Aurore Finco{2}, Karim Bouzehouane{1}, Vincent Jacques{2}, Stéphane Fusil{1}, Vincent Garcia{1}
{1}Laboratoire Albert Fert, CNRS, Thales, Université Paris-Saclay, France; {2}Laboratoire Charles Coulomb, Université de Montpellier and CNRS, France

11:45
3193: **High-Temperature Study of Negative Permittivity and Electrical Behaviour of (La1-xSrx)FeO3**
Rajni Baranwal, Shail Upadhyay
Indian Institute of Technology (Banaras Hindu University), Varanasi, India

12:00
3160: **Magnetic and Polar Properties of (010) DyFeO3 Thin Films**
Christof Schneider, Banani Biswas, Ekaterina Pomjakushina, Uwe Stuhr, Thomas Lippert
Paul Scherrer Institute, Switzerland

12:15
3032: **Magneto-Dielectric Effect in Corundum-Type Oxide**
Asish Kundu
Pandit Dwarka Prasad Mishra Indian Institute of Information Technology, Design & Manufacturing, India

ISAF/ISIF: Polymers & Composites 1/2
11:00 - 12:30
HS 15.14
Chairs: Philipp Schaeffner and Barbara Stadlober, Joanneum Research Forschungsgesellschaft mbH, Austria

11:00
3011: (Invited Talk) **Designing Polymer Systems with Enhanced Dielectric Response**
Vid Bobnar
Jožef Stefan Institute, Slovenia

11:30
3092: **Hierarchical Arrangements in Electroactive P(VDF-TrFE) Copolymers: Combining SAXS and AFM**
Pedro Resende, Sara Zanchi, Jean-David Isasa, Raymond Khayat, Georges Hadziioannou, Guillaume Fleury
Laboratoire de Chemie des Polymères Organiques, France

11:45
3493: **PVDF Nanofibers Functionalized with Cyclodipeptides for Energy Harvesting Applications**
Daniela Santos{3}, Rosa Baptista{2}, Etelvina de Matos Gomes{2}, Francis Deepak{1}, Bernardo Almeida{2}
{1}INL, Portugal; {2}University of Minho, Portugal; {3}University of Minho, International Iberian Nanotechnology Laboratory, Portugal

12:00
3137: **Halide Perovskite Inducing Anomalous Nonvolatile Polarization in Poly(Vinylidene Fluoride)-Based Flexible Nanocomposites for Multifunctional Applications**
Yao Wang
Beihang University, China

12:15
3494: **Design and Characterization of Eco-Friendly Piezoelectric Composite Thin Films Based on Chitosan and Na0.5Bi0.5TiO3-Based Nanostructures**
Jacem Zidani{1}, Moneim Zannen{2}, Antonio Da Costa{4}, Oumayma Mlida{4}, Arash Jamali{3}, Mustapha Majdoub{2}, Mimoun El Marssi{1}, Abdelilah Lahmar{1}, Anthony Ferri{4}
{1}Laboratoire de Physique de la Matière Condensée - Université de Picardie Jules Verne, France; {2}Laboratory of Interfaces and Advanced Materials - University of Monastir, Tunisia; {3}Plateforme de Microscopie Électronique - Université de Picardie Jules Verne, France; {4}Unité de Catalyse et Chimie du Solide Site Artois - Université d'Artois, France

ISAF/PFM: Domains & Other Ferroic Topologies 5/5
11:00 - 12:30
HS 15.04
Chair: Andreja Benčan Golob, Jožef Stefan Institute, Slovenia

11:00
3380: (Invited Talk) **Response of Ferroelectric Nanodomains by Applying External Electric Fields Studied by Transmission Electron Microscopy**
Yukio Sato
Kumamoto University, Japan

11:30
3237: **Nonlinearity and Domain Switching Behavior in Different Architectures of 3D Printed Ferroelectric Ceramics**
Abhijit Pramanick{2}, Chaimae Babori{2}, Frederc Albertini{3}, Frederik Holm Gjorup{1}, Ashutosh Kumar{4}, Mads Ry Vogel Jorgensen{1}, Laurent Daniel{2}
{1}Aarhus University, Denmark; {2}CentraleSupélec, Université Paris-Saclay, CNRS, Laboratoire de Génie Electrique et Electronique de P, France; {3}CentraleSupélec, Université Paris-Saclay, CNRS, Laboratoire SPMS, France; {4}Indian Institute of Technology, Bhilai, India

11:45
3436: **Subsecond Optically Controlled Domain Switching in Freestanding Ferroelectric BaTiO3 Membrane**
Joe Briscoe{3}, Subhajit Pal{3}, Anna Grünebohm{4}, Lan-Tien Hsu{1}, Haoying Sun{2}, Sheng-Han Teng{4}, Vivek Dwij{5}, Emanuele Palladino{3}, Yuefeng Nie{2}, Samuel John{5}, S. S. Prabhu{5}
{1}ICAMS - Ruhr-Universität Bochum, Germany; {2}Nanjing University, China; {3}Queen Mary University of London, United Kingdom; {4}Ruhr-Universität Bochum, Germany; {5}Tata Institute of Fundamental Research, India

12:00
3379: (Video Presentation) **Are Oxygen Vacancies Driving Ferroelectric Domain Repeatability ?**
Elangovan Hemaprabha{1}, Asaf Hershkovitz{4}, Doaa Khorshid{4}, Liyang Ma{2}, Shi Liu{2}, Shai Cohen{3}, Yachin Ivry{4}
{1}Indian Institute of Technology Madras, India; {2}Key Laboratory for Quantum Materials of Zhejiang Province, China; {3}Nuclear Research Center Negev, Israel; {4}Technion – Israel Institute of Technology, Israel

114:45
3517: **Exploring Domain Switching Dynamics and Phase Configuration in Ferroelectrics**
Peter Finkel, Thomas Mion
U.S. Naval Research Laboratory, United States

ISAF: Antiferroelectrics & Energy Storage 1/2
11:00 - 12:30
HS 15.03
Chair: Hiroko Yokota, Institute of Science Tokyo, Japan

11:00
3036: **Ultrahigh Electromechanical Response Arised from Competition Between Antiferroelectric and Ferroelectric Phases**
Baichen Lin{1}, Yeng Ming Lam{2}, Huajun Liu{1}
{1}Institute of Materials Research and Engineering, Agency for Science, Technology and Research, Singapore; {2}Nanyang Technological University, Singapore

11:15
3221: **Room-Temperature Antiferroelectricity of Titanite (CaTiSiO5) Thin Film for High-Voltage Energy Storage Application**
Weirong Yang{1}, Taro Kuwano{1}, Hiroki Taniguchi{2}, Shintaro Yasui{1}
{1}Institute of Science Tokyo, Japan; {2}Nagoya University, Japan

11:30
3162: **Advanced Ternary Lead-Free Ferroelectric Ceramics: Unrivaled Energy Storage and Thermal Stability in $(1-x)[0.94(Bi_{0.5}Na_{0.5})TiO_3\text{-}0.06BaTiO_3]\text{-}xBa(Mg_{1/3}Nb_{2/3})O_3$**
Prosun Mondal, Akhilesh Kumar Singh
Indian Institute of Technology (Banaras Hindu University), Varanasi, India

11:45
3302: **Antiferroelectric Fluorite-Based Capacitors for Ultra-High Energy Storage Density Applications**
Jordan Bouaziz{1}, Grégoire Magagnin{2}, Martine Le Berre{2}, Sara Gonzalez{3}, Ingrid Cañero Infante{2}, Damien Deleruyelle{3}, Bertrand Vilquin{2}
{1}Ecole Centrale de Lyon - Institut des Nanotechnologies de Lyon, France; {2}Institut des Nanotechnologies de Lyon, France; {3}Institut des Nanotechnologies de Lyon, CNRS, France

12:00
3043: **NaNbO3-Based Dielectric Ceramics: A Quasi-Linear Approach to High Field and Energy Density Capacitors**
Ge Wang
University of Manchester, United Kingdom

ISAF: Hafnia 2/6
11:00 - 12:30
HS 15.13
Chair: Uwe Schroeder, Namlab, Germany

11:00
3144: (Invited Talk) **Robust Ferroelectricity in Y-Doped HfO2 Materials**
Takao Shimizu{3}, Takanori Mimura{1}, Hiroshi Funakubo{2}
{1}Gakushūin University, Japan; {2}Institute of Science Tokyo, Japan; {3}National Institute for Materials Science, Institute of Science Tokyo, Japan

11:30
3416: Growth of Epitaxial Y-Doped HfO2 Films on Substrates with Different Orientations and Lattice Parameter
Kazuki Okamoto{1}, Yoshiki Maekawa{3}, Takao Shimizu{2}, Hiroshi Funakubo{1}
{1}Institute of Science Tokyo, Japan; {2}National Institute for Materials Science, Institute of Science Tokyo, Japan; {3}Tokyo Institute of Technology, Japan

11:45
3040: **Impact of Interlayer Composition in $Hf_{0.5}Zr_{0.5}O_2$-Based Epitaxial Nanolaminates with Fast Switching Time**
Mehrdad Ghiasabadi Farahani{1}, Alberto Quintana{1}, Tingfeng Song{1}, Rohit Kumar{1}, Andrea Rubano{2}, Faizan Ali{1}, Florencio Sánchez{1}, Ignasi Fina Martínez{1}
{1}Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain; {2}Università Federico II, Italy

12:00
3316: **Ferroelectricity in PLD-Grown HZO on Si Substrate**
Cristina Florentina Chirila
National Institute of Materials Physics – Romania, Romania

Plenary 5
9:00 - 9:45
Heizhaus
Chair: Julia Glaum, Norwegian University of Science and Technology (NTNU), Norway

Defect Control in Polar Perovskites - Ferroelectric and Ferrielectric Oxides
Yuji Noguchi
Kumamoto University, Japan

Plenary 6
9:45 - 10:30
Heizhaus
Chair: Harry Tuller, MIT, United States

Electrochemical Ionic Synapses for Energy-Efficient Brain-Inspired Computing
Bilge Yildiz
Massachusetts Institute of Technology, United States

Coffee Break
10:30 - 7/17/2025 11:00
RESOWI Foyer

ICE: Ion Transport & Storage
11:00 - 12:30
HS 15.12
Matthäus Siebenhofer, TU Wien, Austria

11:00
3555: (Invited Talk) **Lithium, Light & Action: Designing Novel Mixed Conducting Lithium Titanate Compounds for Novel Hybrid Energy Supercap-Intercalation and Solar Battery Storage**
Jennifer L.M. Rupp
Technische Universität München & TUM International Energy, Germany

11:30
3248: **All-Oxide All-Solid-State Li-Ion Batteries**
Mohammadhossein Montazerian, Adil Baiju, Nick Shepelin, Mario El Kazzi, Thomas Lippert, Daniele Pergolesi
Paul Scherrer Institute, Switzerland

12:00
3334: **Deconvoluting Surface and Bulk Charge Storage Processes in Redox-Active Oxides by Integrating Electrochemical and Optical Insights**
Qiyang Lu
Westlake University, China

12:15
3372: **Rechargeable Oxygen Ion Batteries Based on Mixed Conducting Oxides**
Alexander Schmid, Barbara Wagner, Tobias Huber, Jürgen Fleig
Technische Universität Wien, Austria

ISAF/ICE: Catalysis
11:00 - 12:30
HS 15.05
Chair: Moritz Lukas, Weber Kyushu University (NEXT-FC) & Massachusetts Institute of Technology (DMSE), Japan

11:00
3204: (Invited Talk) **Ferroelectric Polarization as a Route to Enhancing Catalytic and Photoelectrochemical Performance for Clean Fuel Generation**
Judy Hart{1}, Owen Bowdler{1}, Michael Gunawan{1}, Rose Amal{1}, Nagarajan Valanoor{1}, Jason Scott{1}, Cui Ying Toe{2}
{1}University of New South Wales, Australia; {2}University of Newcastle, Australia

11:30
3343: **Harnessing the Piezocatalytic Properties of BaTiO3 Nanoparticles Functionalized with Camelid Antibodies to Treat Triple-Negative Breast Cancer**
Alain Pignolet{3}, Akram Asadi{2}, Vinayak Venkataraman{2}, Noémie D'Auteuil{1}, Yves St-Pierre{1}
{1}INRS - Centre Armand-Frappier Santé Biotechnologie, Canada; {2}INRS - Centre Énergie Matériaux Télécommunications, Canada; {3}Institut National de la Recherche Scientifique / Université du Québec / Centre Énergie Matériaux Tél, Canada

11:45
3483: (Invited Talk) **Materials Strategy for Enhancing Piezocatalytic Activity**
Brahim Dkhil
CentraleSupélec, Université Paris-Saclay, CNRS, Laboratoire SPMS, France

12:00
3002: **Au Decorated Perovskite BiFeO3 3D Nanostructures for Piezo-Plasmon Phototronically Enhanced Direct Solar-Chemical Translations**
Khalid Mujasam Batoo
King Saud University, Saudi Arabia

ISAF/ISIF/ICE: Polymers & Composites 2/2
11:00 - 12:30
HS 15.14
Chair: Vid Bobnar, Jozef Stefan Institute, Slovenia

11:00
3010: (Invited Talk) **Sensing Everywhere: Printed Ferroelectric Polymer Sensors for Human-Machine Interfaces, Biosignal Monitoring and Large-Area Sensor Networks**
Barbara Stadlober{1}, Jonas Groten{1}, Oliver Werzer{1}, Philipp Schäffner{1}, Martin Zirkl{1}, Andreas Tschepp{1}, Andreas Petritz{1}, Manfred Adler{1}, Tsuyoshi Sekitani{2}
{1}JOANNEUM RESEARCH Forschungsgesellschaft mbH, Austria; {2}University of Osaka, Japan

11:30
3058: **Structure Design and Enhanced Properties of Polymer-Based Piezoelectric Composites for Energy Harvesting and Self-Powered Sensing**
Qilong Zhang, Heng Yao, Zheng Zhou, Zhaoyue Xia, Huang Lin
Zhejiang University, China

11:45
3249: **Printed Piezoelectric Transducers for Highly Integrated Motion, Vibration and Magnetic Field Harvesting**
Philipp Schäffner{1}, Asier Alvarez Rueda{2}, Andreas Petritz{1}, Oliver Werzer{1}, Manfred Adler{1}, Jonas Groten{1}, Barbara Stadlober{1}
{1}JOANNEUM RESEARCH Forschungsgesellschaft mbH, Austria; {2}n.a., Austria

12:00
3061: **Colossal Electrocaloric Effect in an Interface-Augmented Ferroelectric Polymer**
Shanyu Zheng, Xiaoshi Qian
Shanghai Jiao Tong University, China

12:15
3154: **Carbon Dots Induced Synergistic Enhancement of Electrocaloric and Electrostriction Effects in Relaxor Ferroelectric Polymers**
Ruhong Luo, Tiannan Yang, Xin Chen, Xiaoshi Qian
Shanghai Jiao Tong University, China

ISAF/ISIF: Hafnia 3/6
11:00 - 12:30
HS 15.13
Chair: Takao Shimizu, National Institute for Materials Science, Japan

---

11:00
3127: **Oxygen Vacancy Distribution and Phase Composition in Scaled Hf0.5Zr0.5O2-Based Ferroelectric Capacitors**
Tom Iung{4}, Lucía Pérez Ramírez{4}, Andrei Gloskovskii{1}, Chen-Yi Cho{3}, Ming-Yeh Lao{3}, Sourav De{2}, Tuo-Hung Hou{3}, Christophe Lubin{4}, Nick Barrett{4}
{1}Deutsches Elektronen-Synchrotron, Germany; {2}National Tsing Hua University, Taiwan; {3}National Yang Ming Chiao Tung University, Taiwan; {4}SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France

11:15
3408: **Oxygen Diffusion Coefficients in Ferroelectric Hafnium Zirconium Oxide Thin Films**
Jon F. Ihlefeld{2}, Liron Shvilberg{2}, Chuanzhen Zhou{1}
{1}North Carolina State University, United States; {2}University of Virginia, United States

11:30
3063: **Temperature-Dependent {111}-Texture Transfer to Hf0.5Zr0.5O2 Films from {111}-Textured TiN Electrode and Its Impact on Ferroelectricity**
Dong Hee Han{4}, Seungyeon Kim{2}, Hyun Woo Jeong{4}, Younghwan Lee{1}, Young Yong Kim{3}, Woojin Jeon{2}, Min Hyuk Park{4}
{1}Chonnam National University, Korea; {2}Kyung Hee University, Korea; {3}Pohang Accelerator Laboratory, Korea; {4}Seoul National University, Korea

11:45
3476: **Activated Piezoelectricity in Monoclinic HfZrO2 Thin Films**
Achilles John Bergne{1}, Milica Vasiljevic{3}, Denis Alikin{4}, Alexander Tselev{4}, Victor Buratto Tinti{3}, Javier Zamudio Garcia{3}, Leonardo Soares de Oliveira{2}, Jesper Wallentin{2}, Andrei Kholkin{4}, Vincenzo Esposito{3}
{1}Denmark Technical University, Denmark; {2}Lund University, Sweden; {3}Technical University of Denmark, Denmark; {4}University of Aveiro, Portugal

12:00
3033: **Exploiting Interface Engineering in Epitaxial Ferroelectric Hafnia to Investigate Novel Phenomena**
Ignasi Fina Martínez{1}, Tingfeng Song{1}, Huan Tan{1}, Tetiana Zakusylo{1}, Alberto Quintana{1}, Nico Dix{2}, Panagiotis Koutsogiannis{3}, José Luis Ortola{1}, Jike Lyu{1}
{1}Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain; {2}Institute of Materials Science of Barcelona (ICMAB-CSIC), Spain; {3}Instituto de Nanociencia y Materiales de Aragón, CSIC-Universidad de Zaragoza, Spain

ISAF: Antiferroelectrics & Energy Storage 2/2
11:00 - 12:30
HS 15.03
Chair: Xiaoli Tan, Iowa State University, United States

11:00
3338: (Invited Talk) **The Emergence of Polarity at the Antiphase Boundary in PbZrO3**
Hiroko Yokota
Institute of Science Tokyo, Japan

11:30
3105: **Chemical Modifier to Improve Processibility of PbZrO3-Based Antiferroelectric Ceramics**
Xiaoli Tan, Odin Taylor, Binzhi Liu, Anand Gaur, Jun Cui
Iowa State University, United States

11:45
3143: **Perovskite Sodium Niobate Bismuth Ferrite Ceramics and PLD Thin Films**
Adam Wynne, Jack Leber, Ahmad Safari
Rutgers University, United States

12:00
3174: **Unrevealing the Role of Compressive Stress Upon Polycrystalline NaNbO3 Ceramics**
Lixu Xie{1}, Ali Hussain{2}, Maria Rita Cicconi{1}, Udo Eckstein{1}, Shaoxiong Xie{1}, Kyle Grant Webber{1}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Institute of Space Technology, Pakistan

ISAF: Ultrasound Transducers
11:00 - 12:30
HS 15.04
Chair: Zuo-Guang Ye, Simon Fraser University, Canada

11:00
3134: (Featured Industry Talk) **Characterising Transducer Output Through Radiation Force Balance Measurements**
Thomas Kelley
Precision Acoustics Ltd., United Kingdom

11:30
3310: **Improvement of Electroacoustic Performance of New Class V Sea-Shell Flextensional PMN-PZT Transducers with Texture Orientation**
Ayşe Berksoy Yavuz{2}, Ezgi Yalçın{1}, Sinan Dursun{1}, Ebru Menşur{1}, Sedat Alkoy{1}
{1}Gebze Technical University, Turkey; {2}İstanbul Gedik University, Turkey

11:45
3004: **Effects of Composition Segregation and Alternative Current Poling in PMN-PT Crystals on Ultrasound Transducer Performance**
Zibo Jiang{2}, Chenxue Hou{3}, Zhaoxi Li{3}, Chunlong Fei{3}, Zuo-Guang Ye{1}
{1}Simon Fraser University, Canada; {2}Xi'an Jiaotong University & Innovia Materials (Shanghai) Co., Ltd, China; {3}Xidian University, China

12:00
3349: (Featured Industry Talk) **Nami Surgical: Unlocking the Future of Ultrasonic Surgery**
Nico Fenu
Nami Surgical Ltd., United Kingdom

Lunch on own or for purchase
12:30 - 14:00
RESOWI Foyer

ICE: Prof. Tuller Birthday Symposium - Advancing Materials and Devices for Energy and Beyond
14:00 - 15:30
HS 15.12
Chair: Jennifer L.M. Rupp, Technische Universität München, Germany

14:00
3550: (Invited Talk) **Regenerative Electroceramics for Regenerative Energy Technologies**
Anke Weidenkaff
Technische Universität Darmstadt, Germany

14:30
3121: (Invited Talk) **The Beginning of the Ion Age: Switchable Materials and Devices Based on Iontronics**
Albert Tarancón{1}, Philipp Langner{2}, Paul Nizet{2}, Juan de Dios Sirvent{2}, Carlota Bozal-Ginesta{3}, Kosova Kreka{2}, Alex Morata{2}, Marlene Anzengruber{2}, Federico Baiutti{2}, Francesco Chiabrera{2}
{1}Catalan Institution for Research and Advanced Studies/Institut de Recerca en Energia de Catalunya, Spain; {2}Catalonia Institute for Energy Research, Spain; {3}Swiss Federal Laboratories for Materials Science and Technology, Catalonia Institute for Energy Rese, Spain

15:00
3548: (Invited Talk) **Engineering the Switching Kinetics of Valence Change-Based Memristive Devices for Neuromorphic Computing**
Regina Dittmann
Forschungszentrum Jülich GmbH, Germany

15:30
3544: (Invited Talk) **Lithium Ion Battery Cathode Materials Meet Oxide Ion Conductors**
Jürgen Fleig
Technische Universität Wien, Austria

16:00
3553: (Invited Talk) **Solid State Ionics for Hydrogen Energy: Japanese Challenges**
Kazunari Sasaki
Kyushu University, Japan

ISAF/ISIF/PFM: Hafnia 4/6
14:00 - 15:30
HS 15.13
Chair: Jon Ihlefeld, University of Virginia, United States

14:00
3178: **Using Strain Results for Improved Thickness Scaling of Hf0.5Zr0.5O2-Based MIM Capacitors**
Florian Wunderwald{2}, Bohan Xu{2}, Kristina Holsgrove{3}, Thomas Mikolajick{2}, Alfred Kersch{1}, Uwe Schröder{2}
{1}Munich University of Applied Sciences, Germany; {2}NaMLab gGmbH, Germany; {3}Queen's University Belfast, United Kingdom

14:15
3086: **Stress Effects on Hf0.5Zr0.5O2 Ferroelectrics Due to Different Substrates and Thicknesses**
Hyun Woo Jeong{2}, Younghwan Lee{1}, Min Hyuk Park{2}
{1}Chonnam National University, Korea; {2}Seoul National University, Korea

14:30
3281: **Electrically Induced Inversion of Piezoelectric Coefficient in Ferroelectric W/Hf0.5Zr0.5O2/W Capacitors**
Dong-Jik Kim{1}, Haidong Lu{6}, Hugo Aramberri{3}, Marco Holzer{2}, Pratyush Buragohain{6}, Sangita Dutta{3}, Uwe Schröder{5}, Veeresh Deshpande{2}, Jorge Íñiguez-González{4}, Alexei Gruverman{6}, Catherine Dubourdieu{2}
{1}Helmholtz-Zentrum Berlin, Germany; {2}Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; {3}Luxembourg Institute of Science and Technology, Luxembourg; {4}Luxembourg Institute of Science and Technology and University of Luxembourg, Luxembourg; {5}NaMLab gGmbH, Germany; {6}University of Nebraska–Lincoln, United States

14:45
3265: **Environmental Control of Ferroelectricity in Hafnia-Based Films: Insights Into Domain Relaxation Dynamics**
Waseem Ahmad Wani{2}, Kyle Lam{3}, Kristina Holsgrove{1}, Gerald Bejger{4}, Christina M. Rost{4}, Amit Kumar{1}, Jon F. Ihlefeld{3}, Brian J. Rodriguez{2}
{1}Queen's University Belfast, United Kingdom; {2}University College Dublin, Ireland; {3}University of Virginia, United States; {4}Virginia Polytechnic Institute and State University, United States

15:15
3300 (Video Presentation): **Thickness Dependence of Electro-Optic Response in Epitaxial Hf0.5Zr0.5O2 Thin Films: Size Free Behavior Down to 10 nm**
Tomoaki Yamada{2}, Afeefa Dastgir{2}, Xueyou Yuan{2}, Yufan Shen{1}, Daisuke Kan{1}, Yuichi Shimakawa{1}
{1}Kyoto University, Japan; {2}Nagoya University, Japan

ISAF/PFM: Epitaxial Films, Heterostructures & Superlattices 1/3
14:00 - 15:30
HS 15.04
Chair: Brahim Dkhil, Univ. Paris-Saclay, CentraleSupélec, France

14:00
3087: **Topological Phase Transitions in Epitaxial Bismuth Ferrite Superlattices**
Mohammadmoein Seyfouri{3}, Vivasha Govinden{3}, Peiran Tong{4}, Xiangwei Guo{4}, Qi Zhang{3}, Sukriti Mantri{1}, Sergei Prokhorenko{1}, Yousra Nahas{1}, Laurent Bellaiche{1}, He Tian{4}, Zijian Hong{4}, Daniel Sando{2}, Nagarajan Valanoor{3}
{1}University of Arkansas, United States; {2}University of Canterbury, New Zealand; {3}University of New South Wales, Australia; {4}Zhejiang University, China

14:15
3097: **Epitaxial Strain in Ferroelectric Films and Superlattices: Exploring the Role of Growth Direction and Depolarization Field**
Lan-Tien Hsu{1}, Chien-Wen Hao{1}, Anna Grünebohm{2}
{1}ICAMS - Ruhr-Universität Bochum, Germany; {2}Ruhr-Universität Bochum, Germany

14:30
3409: **Structural, Dielectric, and Ferroelectric Properties of $BiFeO_3/BaTiO_3$ Superlattices**
Reda Kardous{4}, Jamal Belhadi{3}, Nina Daneu{1}, Antonio Da Costa{5}, Anthony Ferri{5}, Matjaž Spreitzer{1}, Mimoun El Marssi{2}
{1}Jožef Stefan Institute, Slovenia; {2}Laboratoire de Physique de la Matière Condensée - Université de Picardie Jules Verne, France; {3}Laboratory of Physics of Condensed Matter, France; {4}Laboratory of Physics of Condensed Matter, University of Picardie Jules Verne, France; {5}Unité de Catalyse et Chimie du Solide Site Artois - Université d'Artois, France

14:45
3465: **Tunable Ferroionic Properties of CeO2/BaTiO3 Heterostructures**
Milica Vasiljevic{4}, Francesco Chiabrera{1}, Denis Alikin{5}, Federico Motti{2}, Javier Zamudio-García{4}, Giovanni Vinai{2}, Ivano E. Castelli{4}, Vincenzo Esposito{4}, Andrei Kholkin{3}
{1}Catalonia Institute for Energy Research, Spain; {2}CNR - Istituto Officina dei Materiali, Italy; {3}Institute of Solid State Physics, University of Latvia, Latvia; {4}Technical University of Denmark, Denmark; {5}University of Aveiro, Portugal

15:00
3500: **Thermally Stable Capacitive Energy-Density and Colossal Electrocaloric and Pyroelectric Effects of Sm-Doped** Pb(Mg1/3Nb2/3)O3–PbTiO3 Thin Films
Matjaz Spreitzer{1}, Zouhair Hanani{1}, Urska Trstenjak{1}, Nina Daneu{1}, Hana Ursic1}, Vid Bobnar{1}, Nikola Novak{1}, Zdravko Kutnjak{1}, Anna Razumnaya{1}, Igor Lukyanchuk{2}, Yuri Tikhonov{3}, Jamal Belhadi{3}, Gertjan Koster{4}
{1}JoJožef Stefan Institute, Slovenia; {2}Laboratory of Condensed Matter Physics, University de Picardie Jules Verne, France; {3}University de Picardie Jules Verne, France; {4}University of Twente, Netherlands

15:15
3136: (Video Presentation) **Morphotropic Phase Boundary Tuning in Ferroelectrics Using Liquid PFM**
Lima Zhou{2}, Waseem Ahmad Wani{2}, Xingsen Gao{1}, Brian J. Rodriguez{2}
{1}South China Normal University, China; {2}University College Dublin, Ireland

ISAF: Calorics (Fundamentals & Materials) 1/2
14:00 - 15:30
HS 15.03
Chair: Sakyo Hirose, Murata Manfacturing Co., LTD, Japan

14:00
3048: (Invited Talk) **Conventional and Inverse Electrocaloric Effects in Perovskites: Insights from Ab Initio Based Modelling**
Anna Grünebohm{3}, Lan-Tien Hsu{1}, Mauwa Namisi{3}, Madhura Marathe{2}
{1}ICAMS - Ruhr-Universität Bochum, Germany; {2}KTH Royal Institute of Technology, Sweden; {3}Ruhr-Universität Bochum, Germany

14:30
3180: **High-Quality Epitaxial Five-Layer Aurivillius Films for Electrocaloric Cooling**
Sara Lafuerza{3}, Javier Blasco{3}, Marco Evangelisti{3}, Gloria Subías{3}, David Gracia{3}, José Ángel Pardo{3}, Eduardo Barriuso{3}, Xavier Torrelles{2}, Jessica Padilla-Pantoja{1}, José Manuel Caicedo Roque{1}, José Santiso{1}
{1}Catalan Institute of Nanoscience and Nanotechnology, Spain; {2}Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain; {3}Instituto de Nanociencia y Materiales de Aragón, CSIC-Universidad de Zaragoza, Spain

14:45
3155: **Room-Temperature Multicaloric Composite Thick Films Prepared via the Powder Aerosol Deposition Method**
Victor Regis de Moraes{1}, Matej Šadl{1}, Andreja Benčan Golob{1}, Goran Dražić{2}, Saso Gyergyek{1}, Jan Cerar{5}, Jaka Tusek{5}, Urban Tomc{5}, Andrej Kitanovski{5}, Enric Stern-Taulats{4}, Klara Lunser{3}, Lluis Manosa{4}, Hana Uršič{1}
{1}Jožef Stefan Institute, Slovenia; {2}National Institute of Chemistry, Kemijski inštitut, Slovenia; {3}Universitat de Barcelona, Spain; {4}Universitat of Barcelona, Spain; {5}University of Ljubljana, Slovenia

15:00
3427: **Direct Analysis of Electrocaloric and Pyroelectric Effect in PZT Thin Films**
Jun Usami, Yuki Okamoto, Hisashi Inoue, Natsumi Makimoto, Takeshi Kobayashi, Hiroyuki Yamada
National Institute of Advanced Industrial Science and Technology, Japan

15:15
3157: **Improved Ferroelectric Nanocomposites for Sustainable Electrocaloric Refrigeration**
Qiang Li, Xiaoshi Qian, Jiangping Chen
Shanghai Jiao Tong University, China

ISAF: Lead-Based Piezoelectrics
14:00 - 15:30
HS 15.14
Chair: Nan Zhang, Xi'an Jiaotong University, China

14:00
3531: (Invited Talk) **Multiscale Structural Characterization of Polar Functional Materials: Challenges and Potential**
Yun Liu
Australian National University, Australia

14:30
3056: **Influence of Monoclinic Phase on Energy Harvesting Performance and Contribution of Tetragonal Phase to Uncertainty in Pb(Mg,Nb)O3-PbTiO3 Ceramics**
Yang Bai{2}, Suhas Yadav{2}, Denial Aias{1}, Sivagnana Sundaram Anandakrishnan{2}, Vasilii Balanov{2}, Ilya Grinberg{1}, Jani Peräntie{2}
{1}Bar-Ilan University, Israel; {2}University of Oulu, Finland

14:45
3332: **Low-Field-Driven Large Strain in Lead Zirconate Titanium-Based Piezoceramics Incorporating Relaxor Lead Magnesium Niobate for Actuation**
Yixuan Liu{1}, Yuqi Jiang{1}, Mao-Hua Zhang{2}, Wen Gong{2}, Ke Wang{1}
{1}Tsinghua University, China; {2}Wuzhen Laboratory, China

15:00
3161: **Morphotropic Phase Boundary Approach Toward Optimization of Piezoelectric Properties in 0.55Pb(Ni1/3Nb2/3)-(x)PbZrO3-(0.45-x)PbTiO3 (X = 0, 0.135) Ceramics**
Shubham Modgil, Mukul Kumar, Varun Kamboj, Shobhna Dhiman, Arun Kumar Singh, Sanjeev Kumar
Punjab Engineering College, India

15:15
3244: (Video Presentation) **Doping Induced Simultaneous Increase of d33 and Curie Point in PZT: The Phenomenon and the Mechanism**
Gudeta Jafo Muleta{1}, Gobinda Das Adhikary{2}, Rajeev Ranjan{1}
{1}Indian Institute of Science, India; {2}Ramakrishna Mission Residential College, India

ISAF: Non-Perovskite Materials 1/2
14:00 - 15:30
HS 15.05
Chair: Alenka Mertelj, Jožef Stefan Institute, Slovenia

14:00
3336: **Progress with Ionic Molecular Ferroelectrics: Molecular Rotation, Alternative Synthesis and Composite Engineering**
Julian Bradley Walker
Norwegian University of Science and Technology, Norway

14:15
3467: **Phase Evolution, Ferroelectric Properties, and Potential Enhancement of [HDabco]ClO4 for High-Energy Storage Capacitors**
Shuaib Bolaji Issa, Julian Bradley Walker, Mari-Ann Einarsrud
Norwegian University of Science and Technology, Nigeria; Norwegian University of Science and Technology, Norway; Norwegian University of Science and Technology, Australia3197

14:30
3488: (Invited Talk / Video Presentation) **Computation-Guided Development of Sustainable Biomolecular Piezoelectric Devices**
Sarah Guerin
University of Limerick, Ireland

15:00
3054: (Video Presentation) **Study of Ferrielectricity and Resistive Switching in β'-In2Se3**
Lin Wang{2}, Yinfeng Long{2}, Saiyu Bu{1}
{1}Peking University, China; {2}Shanghai Jiao Tong University, China

Coffee Break
15:30 - 16:00
RESOWI Foyer

ICE: Prof. Tuller Birthday Symposium - Advancing Insights into Defects and Transport Phenomena
16:00 - 17:30
HS 15.12
Chair: Thomas Defferriere, MIT, United States

16:00
3545: (Invited Talk) **Point Defect Chemistry as Key to Understand Battery Function**
Joachim Maier
Max Planck Institute for Solid State Research, Germany

16:30
3552: (Invited Talk) **Lattice Dynamics to Uncover Fast Proton Conductors**
Bilge Yildiz
Massachusetts Institute of Technology, United States

17:00
3549: (Invited Talk) **Origins of Space Charge Effects at the Grain Boundaries of Ceria**
Sossina Haile
Northwestern University, United States

17:30
3547: (Invited Talk) **A Useful, Quantitative Expression for the Oxygen Surface Exchange Coefficient k***
Roger De Souza
RWTH Aachen University, Germany

ISAF/ISIF: Hafnia 5/6
16:00 - 17:30
HS 15.13
Chair: Tony Schenk, Ferroelectric Memory GmbH, Germany

16:00
3307: **Wake-Up Free Hf0.5Zr0.5O2 Capacitors with MoOx Seed for Ferroelectric Memory Applications**
Mihaela Ioana Popovici{1}, Jasper Bizindavyi{1}, Dae Seon Kwon{2}, Hyun-Cheol Kim{1}, Gwon Kim{1}, Gourab De{1}, Paola Favia{1}, Pradyumna Kumar Parida{1}, Olivier Richard{1}, Thierry Conard{1}, Attilio Belmonte{1}, Jan Van Houdt{1}
{1}IMEC, Belgium; {2}Sookmyung Women's University, Korea

16:15
3371: **Electrode Elastic Modulus as the Dominant Factor in the Capping Effect in Ferroelectric Hafnium Zirconium Oxide Thin Films**
Megan Lenox{2}, Md Rafiqul Islam{2}, Md Shafkat Bin Hoque{2}, Chloe Skidmore{1}, Alejandro Salanova{2}, Shelby Fields{2}, Samantha Jaszewski{2}, Jon-Paul Maria{1}, Patrick Hopkins{2}, Jon F. Ihlefeld{2}
{1}Pennsylvania State University, United States; {2}University of Virginia, United States

16:30
3118: **Interface-Modulated Antiferroelectric-to-Ferroelectric-Like Transition in Ultrathin Hf0.5Zr0.5O2 Films**
Haoyu Lu, Yu Li, Yingfen Wei
Fudan University, China

16:45
3138: **Ferroelectric HfO2-ZrO2 Multilayers with Reduced Wake-Up**
Barnik Mandal{1}, Adrian-Marie Philippe{1}, Nathalie Valle{1}, Emmanuel Defay{1}, Torsten Granzow{2}, Sebastjan Glinšek{1}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}Luxembourg Institute of Science and Technology / Jožef Stefan Institute, Luxembourg

17:00
3458: **Characterization of Pyroelectric Effect in Zr/Si Co-Doped HfO2 Thin-Films**
Markus Neuber, Mbadiwe Samuel Benyeogor, Thomas Kämpfe
Fraunhofer Institute for Photonic Microsystems IPMS, Germany

17:15
3278: **Exploring Ferroelectricity of Epitaxial Hf1-xZrxO2 Films Without Conducting Buffer**
César Magén{3}, Hugo Romero{3}, Ruben Corcuera{3}, Lourdes Martínez de Baños{1}, Ricardo Jiménez{2}, Eric Langenberg{4}, Panagiotis Koutsogiannis{3}, Javier Blasco{3}, Irene Lucas{3}, Luis Morellón{3}, Pedro Algarabel{3}, Miguel Algueró{2}, José Ángel Pardo{3}
{1}Centro Universitario de la Defensa, Instituto de Nanociencia y Materiales de Aragón, CSIC-Universida, Spain; {2}Consejo Superior de Investigaciones Científicas, Instituto de Ciencia de Materiales de Madrid , Spain; {3}Instituto de Nanociencia y Materiales de Aragón, CSIC-Universidad de Zaragoza, Spain; {4}Universitat de Barcelona, Spain

ISAF/PFM: Epitaxial Films, Heterostructures & Superlattices 2/3
16:00 - 17:30
HS 15.04
Chair: Martin Sarott, University of Groningen / CogniGron, Netherlands

16:00
3241: (Invited Talk) **Study of Ferroelectric and Mechanical Properties of Wrinkled $SrRuO3/PbTiO3$ Membranes**
Greta Segantini{2}, Ludovica Tovaglieri{2}, Chang-Jae Rho{2}, Chih-Ying Hsu{3}, Seongwoo Cho{2}, Patrycja Paruch{2}, Duncan T.L. Alexander{1}, Jean-Marc Triscone{2}, Céline Lichtensteiger{2}, Andrea Caviglia{2}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Université de Genève, Switzerland; {3}Université de Genève, École Polytechnique Fédérale de Lausanne, Switzerland

16:30
3449: **Enhanced Polarization and Unit-Cell Ferroelectricity in Epitaxial Carpy-Galy Layered Ferroelectrics**
Elzbieta Gradauskaite{1}, Anouk Goossens{3}, Xiaoyan Li{4}, Lucia Iglesias{3}, Alexandre Gloter{4}, Quintin Meier{2}, Manuel Bibes{3}
{1}Eidgenössische Technische Hochschule Zürich, Laboratoire Albert Fert, France; {2}Institut Néel, France; {3}Laboratoire Albert Fert, France; {4}Université Paris-Saclay, France

16:45
3461: **Strain Engineering in Ferroelectric-Semiconductor Nanocomposites with Enhanced Bulk Photovoltaic Response**
Emanuele Palladino{1}, Subhajit Pal{1}, Judith Driscoll{2}, Joe Briscoe{1}
{1}Queen Mary University of London, United Kingdom; {2}University of Cambridge, United Kingdom

17:00
3299: **Engineering Ferroelectricity in Thin Films Using Lattice Chemistry**
Ipek Efe{1}, Alexander Vogel{3}, William S. Huxter{1}, Elzbieta Gradauskaite{2}, Christian L. Degen{1}, Marta D. Rossell{3}, Manfred Fiebig{1}, Morgan Trassin{1}
{1}Eidgenössische Technische Hochschule Zürich, Switzerland; {2}Eidgenössische Technische Hochschule Zürich, Laboratoire Albert Fert, Switzerland; {3}Swiss Federal Laboratories for Materials Science and Technology, Switzerland

ISAF/PFM: Non-Perovskite Materials 2/2
16:00 - 17:30
HS 15.05
Chair: Julian Walker, Norwegian University of Science and Technology, Norway

16:00
3259: (Invited Talk) **Ferroelectric Nematic Liquids**
Alenka Mertelj
Jožef Stefan Institute, Slovenia

16:30
3528: **Domain Formation and Dielectric Response of Ferroelectric Nematic Liquid Crystal RM734**
Xiangzhong Chen, Hao Bao
Fudan University, China

16:45
3509: **Gate-Tunable Electroresistance in a Sliding Ferroelectric Tunnel Junction**
Bozo Vareskic{1}, Finn Kennedy{1}, Takashi Taniguchi{2}, Kenji Watanabe{2}, Kenji Yasuda{1}, Daniel Ralph{1}
{1}Cornell University, United States; {2}National Institute for Materials Science, Japan

17:00
3065: **Rich Polarization States Inducing Unusual Ferroelectric Phenomena in Ferroionic Van der Waals CuInP2S6**
Yongyi Wu{3}, Tao Li{3}, Mingxing Chen{1}, Zhenyu Zhang{2}, Tai Min{3}
{1}Hunan Normal University, China; {2}University of Science and Technology of China, China; {3}Xi'an Jiaotong University, China

17:15
3430: **Sliding Stabilization of Highly Polarized State in CuInP2S6 Induced by Ferrielectric to Ferroelectric Crossover**
Vitalii Liubachko{3}, Anton Kohutych{3}, Ruslan Yevych{3}, Konstantin Glukhov{3}, Mykola Medulych{3}, Viacheslav Hryts{3}, Artem Pogodin{3}, Svitlana Kopyl{2}, Andrei Kholkin{1}, Yulian Vysochanskii{3}
{1}Institute of Solid State Physics, University of Latvia, Latvia; {2}University of Aveiro, Portugal; {3}Uzhhorod National University, Ukraine

ISAF: Calorics (Fundamentals & Materials) 2/2
16:00 - 17:30
HS 15.03
Chair: Anna Grünebohm, Ruhruniversität Bochum, Germany

16:00
3270: (Invited Talk) **Multicaloric Effects in Lead Scandium Tantalate Under Simultaneous Application of Pressure and Electric Field**
Pol Lloveras{3}, Ming Zeng{3}, Hana Uršič{1}, María Barrio{3}, Michela Romanini{3}, Alejandro Salvatori{3}, Ivana Goričan{1}, Claudio Cazorla{3}, Silvo Drnovšek{1}, Sophie Loehle{2}, Nicolas Obrecht{2}, Àlvar Torelló{3}, Josep Lluís Tamarit{3}
{1}Jožef Stefan Institute, Slovenia; {2}Total Energies, France; {3}Universitat Politècnica de Catalunya, China; {3}Universitat Politècnica de Catalunya, Argentina; {3}Universitat Politècnica de Catalunya, Italy; {3}Universitat Politècnica de Catalunya, Spain

16:30
3084: **Tailoring Polar High Entropy Ferroelectrics Enhances Electrocaloric Effect in Polymers and Ceramics**
Xiaoshi Qian
Shanghai Jiao Tong University, China

16:45
3069: **Enhanced Electrocaloric Performance and Thermal Conductivity of Interface-Engineered Nanocomposites**
Donglin Han
Shanghai Jiao Tong University, China

17:00
3287: (Invited Talk) **Polyvinylidene Fluoride-Based Polymers – on the Way to Lead-Free Electrocalorics**
Uros Prah{3}, Veronika Kovacova{2}, Youri Nouchokgwe{2}, Juliette Cardoletti{4}, Asmaa El Moul{2}, Torsten Granzow{3}, Xavier Chevalier{1}, Fabrice Domingues Dos Santos{1}, Emmanuel Defay{2}
{1}Arkema-Piezotech, France; {2}Luxembourg Institute of Science and Technology, Luxembourg; {3}Luxembourg Institute of Science and Technology / Jožef Stefan Institute, Luxembourg; {4}Technische Universität Darmstadt / Luxembourg Institute of Science and Technology, Luxembourg

ISAF: Textured Piezoelectrics & Crystals 1/2
16:00 - 17:30
HS 15.14
Chair: Chun-Ming Wang, Shandong University, China

16:00
3482: (Invited Talk) **Intriguing Phase Transitions and Effects of Domain Engineering in Relaxor-Based Piezocrystals**
Zuo-Guang Ye, Alexei A Bokov, Haiyan Guo
Simon Fraser University, Canada
16:30
3378: **Domain Evolution and High Piezoelectricity of Pb(Zn1/3Nb2/3)O3-PbTiO3 Crystals Grown by the Flux-Bridgman Method**
Jiayue Xu, Jiasheng Huang, Yexi Huang, Tian Tian, Hui Shen
Shanghai Institute of Technology, China

16:45
3006: **Suppressing Phase Transformation-Induced Depolarization in PMN-PT Single Crystals Through High-Temperature AC Poling**
Jeong-Woo Sun{4}, Temesgen Tadeyos Zate{3}, Woo-Jin Choi{4}, Sang Goo{1}, Jong Eun Ryu{2}, Wook Jo{4}
{1}iBULe Photonics Inc, Korea; {2}North Carolina State University, United States; {3}Technical University of Denmark, Denmark; {4}Ulsan National Institute of Science and Technology, Korea

17:00
3057: **Enhancement of Bulk Photovoltaic Effect in Pb(Mg1/3Nb2/3)O3-PbTiO3 Single Crystals After Domain Structure Manipulation via AC Poling**
Yang Bai, Vasilii Balanov, Jani Peräntie, Jaakko Palosaari, Suhas Yadav
University of Oulu, Finland

17:15
3016: **Textured Ferroelectric Ceramics with High Electromechanical Coupling Factors Over a Broad Temperature Range**
Shuai Yang, Jinglei Li, Mingwen Wang, Jie Wu, Chunchun Li, Xiangyu Gao, Fei Li
Xi'an Jiaotong University, China

Banquet Dinner
19:00 - 23:00
MESSECONGRESS SOUTH

ICE: Proton Conductors
9:00 - 10:45
HS 15.12
Chair: H. Martin R. Wilkening, TU Graz, Austria

9:00
3404: (Invited Talk) **Screening Proton Surface Exchange Kinetics of Thin-Film Triple Conductors for Efficient Protonic Ceramic Electrolysis Cells**
Nicola Perry
University of Illinois Urbana-Champaign, United States

9:30
3402: **Proton-Lithium Dynamics in $Li_6La_3ZrTaO_{12}$: Toward High Proton Diffusivity and Transport at Low Temperatures**
Florian Stainer{2}, Maria Gombotz{2}, Junji Akimoto{1}, H. Martin R. Wilkening{2}
{1}National Institute for Materials Science, Japan; {2}Technische Universität Graz, Austria

9:45
3163: **Electronic Structure, Phase Formation, and Defect Distribution of Self-Generated Ba(Ce,Fe,Acc)O3-δ Composites**
Werner Sitte{4}, Rotraut Merkle{3}, Andrew Chesnokov{1}, Denis Gryaznov{1}, Christina Nader{4}, Andreas Egger{4}, Edith Bucher{4}, Eugene Kotomin{3}, Joachim Maier{2}
{1}Institute of Solid State Physics, University of Latvia, Latvia; {2}Max Planck Institute for Solid State Research, Germany; {3}Max Planck Institute for Solid State Research, Stuttgart, Germany; {4}Montanuniversität Leoben, Austria

10:00
3110: **Influence of Grain Boundary Engineering Over Protonic Conductivity in Solid Oxide Proton Conductive Ceramic Electrolyte BaZr0.9-xCexY0.1O3-δ**
Pablo Castellani{2}, Moritz Lukas Weber{3}, Clement Nicollet{5}, Olivier Joubert{1}, Annie Le Gal La Salle{1}, Harry L. Tuller{4}, Kazunari Sasaki{2}
{1}Institut des Matériaux de Nantes Jean Rouxel, CNRS, France; {2}Kyushu University, Japan; {3}Kyushu University & Massachusetts Institute of Technology, Japan; {4}Massachusetts Institute of Technology, United States; {5}Nantes Université, CNRS, Institut des Matériaux de Nantes Jean Rouxel, IMN, France

10:15
3411: **Proton Migration in Mixed Conducting Oxides for Fast Conductivity Modulation in Neuromorphic Devices**
Matthäus Siebenhofer{2}, Pjotrs Zguns{1}, Bilge Yildiz{1}
{1}Massachusetts Institute of Technology, United States; {2}Technische Universität Wien, Austria

10:30
3551: **Proton Uptake in Ceria and its Doped Derivatives: Correlating Conductivity, Raman and FTIR in Nanoscale**
Ya-Ru Wang{1}, Jennifer L.M. Rupp{2}
{1}Technische Universität München, Germany; {2}Technische Universität München & TUM International Energy, Germany

ISAF/ICE: Calorics & Related Applications
9:00 - 10:45
HS 15.03
Chair: Pol Lloveras, Universitat Politècnica de Catalunya, Spain

9:00
3013: (Featured Industry Talk) **Recent Advances in Electrocaloric Multilayer Ceramic Capacitors for Energy-Efficient Cooling Technologies**
Sakyo Hirose{1}, Xavier Moya{2}, Neil Mathur{2}
{1}Murata Manufacturing Co., Ltd., Japan; {2}University of Cambridge, United Kingdom

9:30
3262: **Electrocaloric Polymer Multilayers for Heat Pump Application**
Daniel Pinkal, Michael Wegener
Fraunhofer Institute for Applied Polymer Research IAP, Germany

9:45
3124: **Calcium Doping Unlocks Antiferroelectricity in Lead Scandium Tantalate**
Youri Nouchokgwe{2}, Natalya S. Fedorova{2}, Pranab Biswas{5}, Veronika Kovacova{2}, Ivana Goričan{1}, Silvo Drmovsek{1}, Uros Prah{3}, Torsten Granzow{3}, Mael Guennou{2}, Hana Uršič{1}, Jorge Íñiguez-González{4}, Emmanuel Defay{2}
{1}Jožef Stefan Institute, Slovenia; {2}Luxembourg Institute of Science and Technology, Luxembourg; {3}Luxembourg Institute of Science and Technology / Jožef Stefan Institute, Slovenia; {3}Luxembourg Institute of Science and Technology / Jožef Stefan Institute, Luxembourg; {4}Luxembourg Institute of Science and Technology and University of Luxembourg, Luxembourg; {5}University of Luxembourg, Luxembourg

10:00
3173: **New Frontiers in Electrocaloric Cooling**
Veronika Kovacova{1}, Junning Li{1}, Longfei Song{1}, Youri Nouchokgwe{1}, Torsten Granzow{2}, Sakyo Hirose{3}, Emmanuel Defay{1}
{1}Luxembourg Institute of Science and Technology, Luxembourg; {2}Luxembourg Institute of Science and Technology / Jožef Stefan Institute, Luxembourg; {3}Murata Manufacturing Co., Ltd., Japan

10:15
3295: **Fabrication of Digital Microfluidic Thermal Switches for Caloric Cooling Applications**
Blaž Velkavrh{1}, Urban Tomc{2}, Matej Šadl{1}, Victor Regis de Moraes{1}, Maja Koblar{1}, Urška Erjavec Nagode{2}, Bianka Colarič{2}, Andrej Kitanovski{2}, Hana Uršič{1}
{1}Jožef Stefan Institute, Slovenia; {2}University of Ljubljana, Slovenia

10:30
3444: **Transverse Thermoelectric Generators from Thermoelectric Oxides**
Ahmed Ibrahim, Romy Löhnert, Arne Bochmann, Jörg Töpfer
Ernst-Abbe-Hochschule Jena, Germany

ISAF/ICE: Textured Piezoceramics & Crystals 2/2
9:00 - 10:45
HS 15.14
Chair: Kriti Batra, TU Graz, Austria

9:00
3536: (Invited Talk) **Superior Piezoelectric Performance in Textured High-TC CaBi2Nb2O9 Ferroelectric Ceramics Through Rare-Earth Ion Doping and Spark Plasma Sintering**
Chun-Ming Wang, Juan-Nan Chen, Qian Wang, Xuan-Zhe Pei, Xiang-Yu Chen, Le-Le Jia, Fan Zhang, Yuan-Kai Yang
Shandong University, China

9:30
3151: **Continuous Crystal Growth of 2-Inch Ca3TaGa3Si2O14 Piezoelectric Single Crystal with Congruent Composition**
Yuui Yokota{2}, Yuji Ohashi{2}, Yasuhiro Shoji{1}, Akira Yoshikawa{2}
{1}C&A Corporation, Japan; {2}Tohoku University, Japan

9:45
3317: **Fabrication and Characterization of Textured PMN-PZ-PT Composition and its 1-3 Piezocomposite Applications**
Muhammet Boz{1}, Maral Kervancı{1}, Ayşe Berksoy Yavuz{2}, Sedat Alkoy{1}
{1}Gebze Technical University, Turkey; {2}İstanbul Gedik University, Turkey

10:00
3429: (Video Presentation) **High Piezoelectric Voltage Constants g33 of Relaxor-PbTiO3 Single Crystals and Textured Ceramics After Different Poling Process**
Hiroshi Maiwa, Yohachi Yamashita
Shonan Institute of Technology, Japan

10:15
3384: **Template-Induced Na0.5Bi0.5TiO3-K0.5Bi0.5TiO3-BaTiO3 Textured Ceramics with Enhanced Electromechanical Properties**
Zerui Zhang, Hang Xie, Linjing Liu, Rui Lv, Jian Dai, Zhenhao Fan, Yunfei Chang
Key Laboratory of Intelligent Materials and instruments, Harbin Institute of Technology, China

ISAF/ISIF: Hafnia 6/6
9:00 - 10:45
HS 15.13
Chair: Sebastjan Glinšek, Luxembourg Institute of Science and Technology, Luxembourg

9:00
3498: (Featured Industry Talk) **Benchmarking Recent Progress on HfO2-Based FeRAM**
Tony Schenk
Ferroelectric Memory GmbH, Germany

9:30
3062: **Plasma-Driven Texture Control for Low-Voltage (~0.8 V) Operation in Sub-5 nm Ferroelectric Hf0.5Zr0.5O2 Capacitors**
Geun Hyeong Park{2}, Sanghyun Jo{1}, Yong Hyeon Cho{2}, Dong Hyun Lee{2}, Se Hyun Kim{2}, Ho Jun Kim{1}, Geun Hyeong Park{2}
{1}Hanyang University, Korea; {2}Seoul National University, Korea

9:45
3454: **The Coupling of Polarization and Oxygen Vacancy Migration in Ferroelectric Hf0.5Zr0.5O2 Thin Films Enables Electrically Controlled Thermal Memories Above Room Temperature**
Dídac Barneo{2}, Rafael Ramos{3}, Hugo Romero{1}, Víctor Leborán{3}, Noa Varela-Domínguez{3}, José Ángel Pardo{1}, Francisco Rivadulla{3}, Eric Langenberg{2}
{1}Instituto de Nanociencia y Materiales de Aragón, CSIC-Universidad de Zaragoza, Spain; {2}Universitat de Barcelona, Spain; {3}University of Santiago de Compostela, Spain

10:00
3147: **Voltage and Temperature Acceleration of the Field-Induced Crystallization of Ferroelectric Hafnium Zirconium Oxide**
Maximilian Lederer, Sukhrob Abdulazhanov, Yasser Najeeb, Peter Reinig, David Lehninger
Fraunhofer Institute for Photonic Microsystems IPMS, Germany

10:15
3051: **Enhanced Reliability of Zrxhf1-Xo2-Based MIM Capacitors Through Interfacial Engineering with Niobium Oxide and Scandium Oxide**
Pramoda Vishnumurthy{2}, Ruben Alcala{2}, Luis Azevedo Antunes{1}, Tom Iung{3}, Lucía Pérez Ramírez{3}, Nick Barrett{3}, Thomas Mikolajick{2}, Uwe Schröder{2}
{1}Hochschule Munich, Germany; {2}NaMLab gGmbH, Germany; {3}SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France

10:30
3044: (Video Presentation)3187 **TiN/HZO/TiN Ferroelectric Capacitors with TiO2 Insets: Influence of Top and Bottom Interface Modification on the Reliability Properties**
Aleksandra Koroleva{2}, Ivan Zabrosaev{1}, Nikita Sizykh{1}, Anna Chernikova{1}
{1}Moscow Institute of Physics and Technology, Russia; {2}Université Grenoble Alpes, France

ISAF/PFM/ISIF: Epitaxial Films, Heterostructures & Superlattices 3/3
9:00 - 10:45
HS 15.04
Chair: Zijian Hong, Zhejiang University, China

9:00
3055: (Invited Talk) **Emergence of Polar Domains in Epitaxial WO3 Films**
Martin Sarott{2}, Ewout van der Veer{2}, Stijn Feringa{2}, Jack Eckstein{1}, Dennis van der Veen{2}, Majid Ahmadi{2}, Bart Kooi{2}, Michael Carpenter{1}, Ekhard Salje{1}, Beatriz Noheda{2}
{1}University of Cambridge, United Kingdom; {2}University of Groningen, Netherlands

9:30
3497: **Controllable Periodic Domains and Dielectric Anisotropy in BaTiO3 Thin Films**
Liyan Wu{1}, John Carroll{1}, Yichen Guo{2}, Joshua Agar{1}, Jonathan Spanier{1}
{1}Drexel University, United States; {2}Lehigh University, United States

9:45
3261: **Piezoelectric and Photostrictive Behavior of Cantilevers Made of Epitaxially Grown PZT on Nanosheets-Covered Silicon Substrate**
Alexandre Zing{2}, Thomas Maroutian{2}, Valérie Demange{1}, Guillaume Agnus{2}, Philippe Lecoeur{2}, Sylvia Matzen{2}
{1}Université de Rennes, CNRS, Institut des Sciences Chimiques de Rennes, France; {2}Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies, France

10:00
3341: **Giant Photostriction in Lead-Free Ferroelectric Stemming from Photo-Excited Thermalized Carriers**
Gaëlle Vitali-Derrien{1}, Thomas Antoni{1}, Houssny Bouyanfif{2}, Mouna Khiari{2}, Sylvia Matzen{3}, Pierre-Eymeric Janolin{1}, Charles Paillard{4}
{1}CentraleSupélec, Université Paris-Saclay, CNRS, Laboratoire SPMS, France; {2}Université de Picardie Jules Verne, Laboratoire de Physique de la Matière Condensée, France; {3}Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies, France; {4}University of Arkansas, United States

10:15
3141: **Predicting Domain Structures in KNN Epitaxial Thin Films with Phase-Field Simulations: Polydomains, Superdomains, and Flux-Closure Domains**
Bo Wang{1}, Long-Qing Chen{2}
{1}Lawrence Livermore National Laboratory, United States; {2}Pennsylvania State University, United States

10:30
3487: **BaTiO3 Thin Films on MgO Substrate Tuned by Buffer Layer**
Alexey Mikheykin{1}, Alexey Konstantinov{1}, Ekaterina Linnik{1}, Vladimir Shirokov{2}, Nikolay Lyanguzov{1}, Anna Razumnaya{1}
{1}Southern Federal University, Russia; {2}Southern Scientific Center RAS, Russia

ISAF/PFM: Biomaterials & Biological Applications
9:00 - 10:45
HS 15.05
Chair: Julia Glaum, Norwegian University of Science and Technology (NTNU), Norway

9:00
3364: (Invited Talk) **Piezoelectric Ceramics in Aqueous Media: A Tale of Stability and Functionality**
Marcus Hoseth Bentzen{1}, Vojtěch Lindauer{2}, Pavel Mokrý{2}, Mohsen Sadeqi Moqadam{1}, Ragnhild E. Aune{1}, Julia Glaum{1}
{1}Norwegian University of Science and Technology, Norway; {2}Technical University of Liberec, Czech Rep.

9:30
3439: **Electrochemical Phenomena on the Ferroelectric-Electrolyte Interface**
Vojtěch Lindauer, Pavel Mokrý
Technical University of Liberec, Czech Rep.

9:45
3447: **Designing Functional (K,Na)NbO3-Based Bioceramics: Local and Bulk Effects**
Caitlin Guzzo{1}, Susanne Stählke{2}, Brian J. Rodriguez{3}, Julia Glaum{1}
{1}Norwegian University of Science and Technology, Norway; {2}Rostock University Medical Centre, Germany; {3}University College Dublin, Ireland

10:00
3211: **Investigating the Electromechanical Properties of Nuclei in Living Cells at the Interface of 180° Ferroelectric Domain Walls**
Alexis Borowiak, Takeshi Shimi, Yohei Kono, Takeshi Fukuma
Kanazawa University, NanoLSI, Japan

10:15
3407: (Invited Talk) **Functionally Graded Piezoelectric Composites for Biological Applications**
Hamideh Khanbareh, Vlad Jarkov, Zois Michail Tsikriteas
University of Bath, United Kingdom

Coffee Break
10:45 - 11:15
RESOWI Foyer

Plenary 7
11:15 - 12:00
Location Heizhaus
Chair: Martin Wilkening, Technische Universität Graz, Austria

Unifying Perspectives on Perovskite Oxides: From PZT and STO to LSF and LSM
Jürgen Fleig
Technische Universität Wien, Austria

Plenary 8
12:00 - 12:45
Location Heizhaus
Chair: Marco Deluca, Silicon Austria Labs GmbH, Austria

Thermodynamics and Phase-Field Method of Ferroelectric Phase Transitions, Domains, and Defect Reactions in the Presence of Strain and Electric Field
Long-Qing Chen
Pennsylvania State University, United States

Student Awards & Closing
12:45 - 13:20
Location Heizhaus

Lunch on own or for purchase
13:20 - 14:30
RESOWI Foyer