IUS Short Courses

1A: 8:30–12:30 **North Hall**	**Medical Ultrasound Transducers** Instructors: **Douglas G. Wildes, L. Scott Smith**, GE Global Research
1B: 8:30–12:30 **Meeting Hall 4-1**	**Hydrophone-based Measurement of Ultrasonic Fields for Biomedical, Non-Destructive Testing, and Regulatory (US FDA) Applications** Instructors: **Keith A. Wear,** US Food and Drug Administration, **Andrew M. Hurrell,** PrecisionAcoustics Ltd, **Peter A. Lewin,** Drexel University, **Volker Wilkens,** Physikalisch–Technische Bundesanstalt, **Bajram Zeqiri,** National Physical Laboratory
1C: 8:30–12:30 **Terrace 2**	**Signal Processing and System-on-Chip Designs for Ultrasonic Imaging, Detection and Estimation Application** Instructors: **Jafar Saniie**, Department of Electrical and Computer Engineering at Illinois Institute of Technology, **Ramazan Demirli**, Center for Advanced Communications, Villanova University, **Erdal Oruklu**, Department of Electrical and Computer Engineering, Illinois Institute of Technology
1D: 8:30–12:30 **Meeting Hall 4-2**	**Nondestructive Materials Characterization by Ultrasonic Techniques** Instructors: **Walter Arnold,** Saarland University
1E: 8:30–12:30 **Meeting Hall 5**	**High Frequency Transducers and Their Applications** Instructors: **Jeffrey C. Bamber**, Institute of Cancer Research and Royal Marsden Hospital, **Timothy Button**, University of Birmingham, **Christine Demore**, Dundee University
1F: 8:30–12:30 **Terrace 1**	**Biomedical Photoacoustics: From Bench to Bedside** Instructors: **Stanislav Emelianov**, **Richard Bouchard**, University of Texas
2A: 1:30–6:00 **North Hall**	**Acoustic Tweezing: Modeling, Implementation and Applications** Instructors: **Bruce W Drinkwater,** Department of Mechanical Engineering, University of Bristol, **Martyn Hill**, Sounthampton University, **Sandy Cochran**, Dundee University
2B: 1:30–6:00 **Meeting Hall 4-1**	**Materials for ultrasound transducers** Instructors: **Susan Trolier–McKinstry** Materials Research Lab, Penn State University, **Sandy Cochran**, Dundee University
2C: 1:30–6:00 **Terrace 2**	**Ultrasonic Characterization of Advanced Materials** Instructors: **Michal Landa, Hanuš Seiner, Petr Sedlák**, Institute of Thermomechanics, Academy of Sciences of the Czech Republic
2D: 1:30–6:00 **Meeting Hall 4-2**	**Quantitative Acoustic Microscope – Measurement, Analysis, Biological and Materials Science Application** Instructors: **Naohiro Hozumi,** Toyohashi University of Technology**, Kazuto Kobayashi**, Honda Electronics, **Sachiko Yoshida**, Toyohashi University of Technology, **Roman Gr. Maev,** Institute for Diagnostic Imaging Research, **Fedar Seviaryn**, University of Windsor
2E: 1:30–6:00 **Meeting Hall 5**	**Plane Wave Imaging and Applications for Ultrafast Doppler, Elastography, and Contrast** Instructors: **Mathias Fink, Mickael Tanter,** Langevin Institute, ESPCI ParisTech
2F: 1:30–6:00 **Terrace 1**	**Ultrasound Contrast Agents: Theory and Experiment** Instructors: **Nico de Jong**, Erasmus MC, **Michel Versluis**, University of Twente

ISAF-PFM Short Courses

***Club D*--Basic Principles of Ferroelectricity and Piezo Force Microscopy**

1A: 8:00 am–10:00 am, Fundamentals of Ferroelectrics and Piezoelectrics
Instructor: David Cann

1B: 10:30 am–12:30 pm, Principles and Applications of Piezoresponse Force Microscopy
Instructor: Alexei Gruverman

***Club E*--Theory and Modeling**

2A: 8:00 am–10:00 am, *First principles methods*
Instructor: Craig Fennie

2B: 10:30 am – 12:30 pm, *Phenomenology of ferroelectrics*
Instructor: George Rossetti

***Club D*--Advanced PFM Techniques**

1C: 1:30 pm – 3:30 pm, Advanced Piezoresponse Force Microscopy Modes including acoustic and ultrasonic applications
Instructor: Sergei Kalinin

1D: 4:00 pm – 6:00 pm, Visualization and Manipulation of Electric Polarization and Charges using Atomic Force Microscopy
Instructor: Seungbum Hong

***Club E*--Piezo MEMS**

2C: 1:30 pm – 3:30 pm, Piezoelectric thin films
Instructor: Isaku Kanno

2D: 4:00 pm – 6:00 pm, Piezoelectric materials for MEMS applications
Instructor: Paul Muralt

IFCS-EFTF Short Courses

Track 1 (Club A)

1.1 8:00–10.00 **Timing for GNSS and GNSS for Timing**
Pascale Defraigne, Royal Observatory of Belgium, Belgium

1.2 10.30 -12.30 **Statistical Characterization of Clocks for Timekeeping and Navigation Applications**
Patrizia Tavella, Instituto Nazionale di Ricerca Metrologica, Italy

1.3 1:30–3.30 **Fabrication Methods for MEMS-Based Frequency Control Devices**
Clark T.-C. Nguyen, Berkeley, USA

1.4 4:00–6:00 **Fundamentals of Crystal Resonators and Oscillators**
John Vig, USA

Track 2 (Club B)

2.1 8:00–10:00 **Femtosecond Laser-based Optical frequency combs for frequency metrology**
Yann Le Coq, LNE-SYRTE, Observatoire de Paris, CNRS, UPMC, France

2.2 10:30–12.30 **Lasers for Optical Frequency Standards**
Stephen Webster, M SQUARED LASERS LTD, UK

2.3 1:30–3.30 **Frequency & Time Transfer using Optical Fibers**
Gesine Grosche, PTB, Germany

2.4 4:00–6:00 **Compact Atomic Clocks**
Gaetano Mileti, Laboratoire Temps – Fréquence, Université de Neuchâtel, Switzerland

Track 3 (Club C)

3.1 8:00–10:00 **Crystal Oscillator Design, Analysis, Simulation and Verification**
M. Michael. Driscoll, USA

3.2 10:30–12:30 **The Pound Drever Hall Frequency Control Loop, Theory and Application**
E. Rubiola, FEMTO-ST Institute, France

3.3 1:30–3:30 **Optical Oscillators**
Lute Maleki, OEWaves, USA

3.4 4:00–6:00 **Phase and Amplitude Noise: Theory & Measurement**
Craig Nelson, NIST, Boulder USA