

Commission B, Fields and Waves
Activity report
March 2010–July 2010

1 PIERS 2010 in Xi'an

The 27th PIERS (Progress In Electromagnetics Research Symposium) in Xi'an

PIERS provides an international forum for reporting progress and recent advances in all aspects of electromagnetics. Spectra range from statics to RF, microwave, photonics, and beyond. Topics include radiation, propagation, diffraction, scattering, guidance, resonance, power, energy and force issues, and all applications and modern developments.

1.1 Statistics

Date: 22–26 March, 2010

Location: Xi'an, China

Web page: <http://piers.mit.edu/piers2010xian/> Number of oral presentations: 511

Number of poster presentations: 264

Oral Contributions from Japan: 36

Poster Contributions from Japan: 11

1.2 Technical sessions

- Advanced Interferometric SAR Techniques and Their Engineering and Geophysical Applications
- Fields Coupling and Integrated Design of Electromagnetics, Temperature and Structure for Antennas and Electronic Equipments
- Electromagnetic Modeling, Inversion, and Applications
- X-Ray Sources, X-Ray Optics and Applications of Focused X-Ray Probes
- Electromagnetic Theory
- Electromagnetic Detectors of Gravitational Waves
- Remote Sensing, GPR, and SAR
- Vectorial Properties and Physical Effects of Finite Light Beams and Their Applications in Optical Trapping and Manipulation
- Metamaterial, Properties, and Applications
- Computational Electromagnetics
- Recent Progresses in Time Domain Electromagnetics
- Extended/Unconventional Electromagnetic Theory, EHD (Electro-hydrodynamics)/ EMHD (Electromagneto-hydrodynamics), and Electro-biology
- Education of Electromagnetic Theory
- Electromagnetic Wave Applications in Material Processing and Characterization
- Scattering and Guiding Characteristics in Periodic Structures
- Electromagnetic Seismic Fluid Geophysical and Geological Exploration
- Biomedical Electromagnetic Instruments and Electromagnetic Condense Materials and Imaging
- Plasmonic Nanophotonics
- Transformation Optics and Metamaterials
- Advances in Numerical Techniques
- Microstrip and Printed Antennas, Phase Array Antennas
- RF Safety Issues
- Scattering, Diffraction, and Inverse Scattering

- Electromagnetic Wave in the Materials and Dispersion Simulation for Cloak Metamaterials and Photonic Crystals
- Optics, Photonics and Nano-photonics
- Electromagnetic Nondestructive Evaluation and Modeling
- Advances in Microwave Imaging
- Mobile Antennas and Antenna with Metamaterials
- Materials, Devices, Processes and Characterizations for Organic Electronics
- Microwave Innovative Techniques and Systems in Exploring Planetary Bodies
- Rough Surface Scattering and Volume Scattering
- Scattering and Rough Surface Scattering
- Microwave/Terahertz Photonics Technologies and Their Applications
- Wave Propagation and Wave Interaction with Media
- Advanced CEM Methods for Electrically Large Problems
- Antenna Theory, Radiation, Microstrip and Printed Antennas
- Remote Sensing of the Earth, Ocean, and Atmosphere
- EM Scattering Models and Applications
- Wireless Sensor Network and Applications
- Passive Optical Waveguide Theory and Numerical Modelling
- Nonlinear Photonics in Disordered Structures and Metamaterials
- Physiological Effects of Static Magnetic Fields
- Systems and Components, Electromagnetic Compatibility
- Microstrip, Printed Antenna and Array antennas
- Modeling and Simulations in Materials Science
- Microwave Remote Sensing of Land Surface
- EMC and EM protection
- Optics, Fiber, Lasers and Optical Sensors
- Metamaterial and Electromagnetic Cloak
- Micro/Nanomanufacturing of Metamaterials and Photonic Structures
- Novel Mathematical Methods in Electromagnetics
- Biological Effects of Electromagnetic Fields
- Applicators for Medical and Industrial Applications of EM Field
- Matter, Signals and Waves
- Remote Sensing of Water Cycle Related Components
- Synthetic Aperture Radars: Systems and Applications
- Satellite Land Products, Validation, and Applications
- Optical and Quantum Tweezers for Atom/Molecule Trapping and Transportation
- Theory and Application of Biisotropic and Anisotropic Metamaterials
- High Frequency Properties of Materials and Their Applications
- Integrated RF Passives
- Microwave and Millimeter Wave Circuits and Devices

2 EuCAP2010

The 4th European Conference on Antennas and Propagation

Following the success of previous editions, the European Association on Antennas and Propagation (EurAAP) organized the 4th European Conference on Antennas and Propagation, EuCAP 2010, held in Barcelona, Spain, on 12-16 April 2010.

EuCAP 2010, supported by the top level Associations in Antennas & Propagation, provides, through its presentations and exhibition, the ideal place for the exchange of scientific and technical information, both at academic and industrial levels, and fosters collaboration and cooperation in the Antenna &

Propagation domain both at European and global levels.

2.1 Statistics

Date: 12–16 April, 2010

Location: Barcelona, Spain

Web page: <http://www.eucap2010.org/>

Number of oral presentations: 643

Number of poster presentations: 355

Oral Contributions from Japan: 28

Poster Contributions from Japan: 18

2.2 Technical sessions

- Antenna engineering: today and tomorrow
- Metamaterials Applications
- Sensors
- New frontier in RFID technology
- Small antennas
- Antenna Measurements
- Satellite Propagation
- Frequency-reconfigurable antennas
- MIMO Performance Evaluation
- New algorithms for antenna diagnosis technique
- Transformation electromagnetics and its applications
- Millimeter wave integrated/reconfigurable antennas, devices and systems
- Diffuse scattering in mobile propagation
- Array design
- Integral Methods
- Medical applications
- Propagation and Scattering in Vegetation
- Antenna Measurements
- Effects of Terrain and Wind Turbines on Propagation
- Satellite navigation channel modelling focusing on multipath and interference
- Electromagnetic theory and numerical techniques
- Terahertz antennas
- UWB Propagation
- Cellular and Mobile Measurements
- Lens and reflector antennas
- Fast solvers and method of moments matrix compression techniques
- Array synthesis
- Antennas for satellite applications
- Antennas for remote sensing and radio astronomy
- Recent development of antennas and propagation for body-centric wireless communications
- Integral equation techniques for large and multiscale challenging problems
- Nano-photonic antennas
- Reconfigurable antennas
- Antenna front-ends for radar applications
- Antennas and propagation aspects for multi-gigabit communication in the mm- and submm-waverange
- Active and integrated antennas
- Millimeter wave antennas

- Metamaterials and plasmonic antennas
- Antenna Design and Measurements
- Multiband and Wideband Antennas
- Portable and body-worn antennas
- Measurement Imaging, Algorithms and Processing
- MM&SM Propagation
- Antenna development in Latin America
- MIMO Systems
- Other antenna topics
- Ultrawideband sensors for biomedical applications
- Metamaterials in military antenna systems
- Terahertz antennas and systems
- Fast and asymptotic methods for large antennas and scatterers
- Wearable antennas
- Metamaterial
- New waveguides for millimeter wave based on metamaterials
- Research projects on EM biointeraction
- Propagation for Mobile Services
- Conformal antennas
- Space applications
- MIMO Antennas
- Near-Far Field Measurements
- Electromagnetic exposure
- Beamforming
- Propagation aspects in MIMO
- Automotive antennas
- RFID
- Multidisciplinary design for wireless systems
- New perspectives for electromagnetic fields in medicine
- Reflector and lens antennas
- Innovative antenna measurements techniques
- Radiowave propagation at low elevation angle
- Analysis and synthesis of large conformal arrays on complex structures
- Finite difference models for radio coverage prediction
- Numerical Methods
- UWB antennas
- Research projects in satellite applications
- Numerical Techniques
- Mobile Antennas
- Reconfigurable arrays
- Small antennas and sensors in COST IC063
- MM-wave/quasi-optical Measurements
- Reflectarray
- New materials
- EBG
- Field and Chamber Measurements

3 PIERS 2010 in Cambridge

The 28th PIERS (Progress In Electromagnetics Research Symposium) in Cambridge

PIERS provides an international forum for reporting progress and recent advances in all aspects of electromagnetics. Spectra range from statics to RF, microwave, photonics, and beyond. Topics include radiation, propagation, diffraction, scattering, guidance, resonance, power, energy and force issues, and all applications and modern developments.

3.1 Statistics

Date: 5–8 July, 2010

Location: Cambridge, USA

Web page: <http://piers.mit.edu/piers2010Cambridge/>

Number of oral presentations: 493

Number of poster presentations: 121

Oral Contributions from Japan: 23

Poster Contributions from Japan: 12

3.2 Technical sessions

- Electromagnetic Modeling, Inversion and Applications
- Remote Sensing and Polarimetry, SAR, GPR, Imaging
- RF and Wireless Communication
- Robust and Efficient Electromagnetic Solutions for Large-scale Problems
- Recent Advances in Numerical Methods for Maxwell 's Equations
- Optical Properties of Semiconductors and Nanostructures
- Magnetic Based Composite Materials
- Scattering, Diffraction and Rough Surface Scattering
- Static Magnetic Fields – Biological Effects
- Applicators for Medical and Industrial Applications of EM Field
- Microwaves and Magnonics: Metamaterials, Antennas, Near-field Structures
- EM Modeling and Inversion for Well Logging Applications
- Microspheres and Waves
- Power Electronics
- Antennas and Array: Theory and Design
- Electromagnetic Theory
- Phase-Space Optics
- Photonic Crystals and Metamaterials
- Modeling and Inversion for Geophysical EM Applications
- Electromagnetic Remote Sensing for Defense and Homeland Security
- Microstrip, Printed Antennas and Phase Array
- Computational Electromagnetics
- Theory and Modelling of Active Photonic Materials
- Stochastic versus Deterministic Geophysical Inversions
- Radar Target Detection
- Microelectronic Packaging
- Generation, Propagation and Applications for Special Laser Beams
- Electromagnetic Science and Design on The Optical Dispersive Metamaterials, Invisible Cloak and Photonic Crystals
- Optics and Photonics
- Microwave Non-destructive Evaluation

- Remote Sensing of the Earth, Ocean, and Atmosphere
- Antenna Array Synthesis – Theory, Algorithms, and Applications
- Approaches to Electromagnetic Simulation and Modeling for 2D and 3D Chips in the Nanometer Domain
- Microwave Devices, Propagation
- Biomedical Electromagnetic Instruments, Electromagnetic Condensed Materials and Imaging
- Inverse Scattering Problems: Open Problems and New Challenges
- Nonlinear Inversion Approaches for Microwave Biomedical Applications
- Forward and Inverse Algorithms for Microwave Remote Sensing of Soil Moisture with SMAP
- Novel Mathematical Methods in Electromagnetics
- New Horizons in Electromagnetic Compatibility and Personal Health Protection
- Extended/Unconventional Electromagnetic Theory, EHD (Electro-hydrodynamics)/EMHD (Electromagneto-hydrodynamics), and Electro-biology
- Homogenization and Constitutive Parameter Extraction of Metamaterials
- Dimensionality Reduction of Large Scale forward and Inverse EM Problems
- Optics, Fiber and Optical Waveguide
- RF Biological Effect, Bioelectromagnetics
- Circuits and Devices, CAD
- Propagation of Millimetre and Sub-millimetre Waves
- Micro-/Nanoscale Metamaterials, Plasmonics and Other Hybrid Structures for Superresolution Imaging, Slow-light and Cloaking

4 2010 IEEE AP-S & USNC/URSI

The 2010 IEEE International Symposium on Antennas and Propagation and CNC-USNC/URSI

Radio Science meeting was held jointly on July 11-17, 2010, at the Sheraton Centre Toronto Hotel in Toronto, ON, Canada. The symposium and meeting are co-sponsored by the IEEE Antennas and Propagation Society (AP-S), the U.S. National Committee of the International Union of Radio Science (USNC/URSI) Commissions A, B, C, D, E, F, H and K and all Canadian National Commissions of the International Union of Radio Science (CNC/URSI). The technical sessions, workshops, and short courses were coordinated between the two groups. This meeting is intended to provide an international forum for the exchange of information on state-of-the-art research in antennas, propagation, electromagnetic engineering and radio science. Technical sessions were held over five days from July 12 to 16, with workshops and short courses on July 11 and July 17, 2010.

4.1 Statistics

Date: 11–17 July, 2010

Location: Toronto, Ontario, Canada

Web page: <http://www.apsursi2010.org/>

Number of oral presentations: 1342

Number of poster presentations: 213

Oral Contributions from Japan: 76

Poster Contributions from Japan: 7

4.2 Technical sessions

- Antennas and Propagation for Secure and Robust Communications
- Nano-particles and Nano-structures for RF Applications
- Metamaterial-inspired antennas

- Topics in Metamaterials
- Microstrip Antennas
- Frequency Agile Antennas
- Multiband and Wideband Antennas
- Advances in Low Profile and Printed Antenna Design
- Military Applications
- Numerical Methods
- Human exposure to EM fields: dosimetry and therapy
- Antenna Arrays and Elements
- Design and Validation of Antenna Systems and Components
- To Honor Two Canadian Scholars and Educators: Professors Keith Balmain and Robert MacPhie
- Experimental Validations of Metamaterial Phenomena
- Multiband and wideband planar antennas and circuits
- UWB Arrays and Closely-Spaced Antennas
- Antenna arrays
- Finite-Difference Methods
- Antennas for 60 GHz Applications
- Antenna Theory and Design
- Adaptive and Smart Antennas
- Research directions for future radar systems: perspectives from the DoD R&D community
- Therapeutic and Rehabilitative Applications of Electromagnetic Fields
- Inverse Problems and Imaging
- Ultra-Wideband Antennas and System Applications
- Periodic Structures
- Biological Effects, Dosimetry, and Assessment of EM Exposure
- Body Implanted Antennas: Challenges and Opportunities
- Memorial Session for the Late Professor Robert S. Elliott
- Metamaterials and Meta-surfaces
- Tunable and active metamaterials
- Compact Low Profile Antennas
- Antennas and Components for RFID
- Hybrid Methods
- Phased Array Feeding and Impedance Matching
- Microstrip Antenna Arrays
- Wideband Arrays
- Waves in Random and Complex Media
- Direction of Arrival Estimation
- Radiopropagation Measurements and Models
- Advances in Time Domain Finite Element Techniques
- Domain Decomposition Techniques in FEM
- Advances in Frequency Domain Finite Element Method
- Fast Methods and Preconditioning for Integral Equations
- Discretization of Integral Equations
- Integral Equation Modelling and Validation
- Fast Integral Equation Solution Schemes
- Transformation Electromagnetics and Cloaking
- Reconfigurable Antenna Arrays
- Topics in ionospheric propagation and monitoring
- Analysis of Ultra-Wideband Systems
- In Memory of Professor Benedikt Munk

- Parallelization of fast integral equation solvers on CPU and GPU hardware architectures
- Metamaterial Structures
- Metamaterial-inspired devices
- Wireless Communications
- Array Beamforming
- Device and Material Characterization
- Propagation Phenomena and Effects
- EM approaches to breast cancer detection and imaging
- Modeling and Compensation of Mutual Coupling
- Band-Notched and Diversity UWB Antennas
- Electromagnetic Education
- Imaging, Inverse Scattering and Remote Sensing
- Planar/Compact UWB Antennas
- Stochastic Computational Electromagnetics
- Antennas for Wireless Sensors and Sensor Networks
- Homogenization of Metasurfaces and Bulk Metamaterials at Microwaves, THz, and Optical Frequencies
- Dipole, loop and Slot Antennas
- Patch and Slot Antennas
- Numerical Modeling and Design of Radiating Systems
- Finite Difference Time Domain Methods
- Optimization Methodologies for Antennas
- Reflectarrays and Other Space Fed Arrays
- Broadbanding Techniques
- Propagation over Terrain and Sea Surfaces
- Assessment of implanted and body-worn devices
- Antennas for Mobile Applications
- Mobile Handset Antennas
- Human Body - Antenna Interactions
- Radar Imagery
- Radar Imaging and Sensing
- Substrate Integrated Waveguide (SIW) Antennas and Circuits
- Wireless Propagation in Indoor/Outdoor Environments
- Topics in Electromagnetics
- Antennas for Software Defined Radio
- Miniaturized Antennas for Next Generation Biomedical Devices
- Metamaterial Phenomena and Devices
- Microstrip and Planar Antenna Arrays
- Antenna Measurements
- Pattern Reconfigurable Antennas
- Guided Waves and Wave-Guiding Structures
- Remote Sensing
- Optimization Methods for Electromagnetic Applications
- Broadband Spiral, Helix, and Log-Periodic Antennas
- High-Frequency Techniques
- Frequency-Domain Methods and Optimization Techniques
- Antenna-Channel Interactions in Practical MIMO Implementations
- Electromagnetic Bandgap Structures: Analysis, Design and Applications
- Indoor and urban propagation models
- FDTD Applications

- Electromagnetic Imaging and Sensing Applications
- EMI modeling, interference and coupling
- Broadband and UWB Printed Antennas
- Advanced Integral Equation Methods
- Sparse and Sub-Wavelength Arrays
- RF/Microwave Components for Antennas
- New Characteristics of Dielectric Resonator Antennas
- New Applications of Dielectric Resonator Antennas
- EM Measurements
- High Frequency and Asymptotic Methods
- Devices and circuits for UHF to THz Applications
- Millimeter-Wave Phased Array Antennas
- Leaky Wave and Fabry Perot Resonator Antennas
- Advanced Antennas for Space and Ground Applications
- Multi-Antenna Design and Simulation for Vehicular Communication and Reception Systems
- RFID, DTV and GPS Antennas
- Nano-electromagnetics: Analysis, Design and Characterization
- Time Domain Methods
- Analytical Methods in Electromagnetics
- Phased Array Synthesis and Scanning Techniques
- Applications of EM fields in medicine
- Broadband Monopole, Dipole and Horn Antennas
- Scattering from Complex Surfaces and Targets
- Compact Antennas for Wireless Applications
- Microwave Imaging 's Practical Issues
- MIMO Antennas and Diversity
- Application of EBG and Artificial Structures to Antenna Design
- Electromagnetic characterization of metamaterials
- Integral-Equation Methods
- Numerical Methods in Time Domain
- Printed Antennas and Arrays
- Vehicular Antennas
- Compact Antennas
- Broadband Slot Antennas
- Design of Antennas and Antenna System Components
- Reflector Antennas: Analysis, Design and Feeds
- Propagation Environment Effects - Measurement and Mitigation
- Frequency selective surface analysis methods
- Frequency selective surfaces applications
- Frequency selective surface designs
- Multiband Antennas for Wireless Connectivity
- Multiband Printed and Monopole Antennas
- Manufacturing techniques
- Random Media and Rough Surfaces
- Analysis of Electromagnetic Wireless Systems for Solar Power Transmission
- Electrically Small Antennas
- Advanced Numerical Methods
- Metamaterial-inspired low profile antennas
- Transmission line metamaterial antennas
- Scattering and Diffraction

- Vehicular Electromagnetics and Antenna Performance
- Broadband Arrays
- Ultra-Wideband Systems
- On-chip antennas and RFICs
- Imaging and Measurements in Biological Environments
- Electromagnetic Properties of Materials

5 Future Conferences

5.1 EMTS2010

2010 International Symposium on Electromagnetic Theory

Date: 16–19 August, 2010

Venue: Berlin Steigenberger, Berlin, Germany

Web page: <http://www.emts2010.de/>

5.2 Japanese EMT Symposium 2010

The 39th Japanese EMT Symposium

Date: 11–13 November, 2011

Venue: Hotel Listel-Inawashiro, Fukushima, Japan

Web page: <http://www.ieice.or.jp/es/emt/jpn/EMT10/emt-11-emt-sympo.pdf>

5.3 ISAP2010

Date: 23–26 November, 2010

Venue: The Venetian Macao-Resort-Hotel, Macao, China

Web page: <http://www.isap2010.org/>

5.4 PIERS2011, Morocco

The 29th PIERS 2011 in Marrakesh, Morocco

Date: 20–23 March, 2011

Venue: Mansour Eddahbi Hotel & Conference Center, Marrakesh, Morocco

Web page: <http://piers.mit.edu/piers2011Marrakesh/>

5.5 EuCAP2011

The 5th European Conference on Antennas and Propagation

Date: 11–15 April, 2011

Venue: EUR Congressi in Rome, Italy

Web page: <http://www.eucap2011.org/>

5.6 APS/URSI2011

The 2011 IEEE International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting

Date: 2–6 July, 2011

Venue: The Spokane Convention Center, Spokane, Washington, U.S.A.

Web page: <http://www.apsursi2011.org/>