

Advance Program
4th Asia-Pacific Engineering Research Forum
on Microwaves and Electromagnetic Theory

November 16–17, 2002
Venture Business Laboratory
Kyushu University, Fukuoka, Japan

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INVITED SPEAKERS

Chan, Chi Hou	City University of Hong Kong, China
Chen, Kun Shan	National Central University, Taiwan
Cho, Young Ki	Kyungpook National University, Korea
Feng, Zhenghe	Tsinghua University, China
Fujimoto, Takafumi	Nagasaki University, Japan
Hasanuddin, Zulfajri B.	Kyushu University, Japan
Hu, Weiwei	Peking University, China
Jia, Hongting	Kyushu University, Japan
John, M. Shelly	Nanyang Technological University, Singapore
Kim, Dong II	Korea Maritime University, Korea
Kusunoki, Atsushi	Oita University, Japan
Li, Le-Wei	National University of Singapore, Singapore
Luk, Kwai-man	City University of Hong Kong, China
Matsuoka, Tsuyoshi	Kyushu University, Japan
Miyamoto, Tokuo	Fukuoka University, Japan
Meng, Zhi Qi	Fukuoka University, Japan
Naka, Yoshihiro	Kumamoto University, Japan
Nishimoto, Masahiko	Kumamoto University, Japan
Park, Dong Chul	Chungnam National University, Korea
Park, Wee Sang	Pohang University of Science and Technology, Korea
Shimoda, Michinari	Kumamoto National College of Technology, Japan
Uchida, Kazunori	Fukuoka Institute of Technology, Japan
Watanabe, Koki	Fukuoka Institute of Technology, Japan
Yasumoto, Kiyotoshi	Kyushu University, Japan
Yokota, Mitsuhiro	Miyazaki University, Japan
Zhu, Lei	Nanyang Technological University, Singapore

TECHNICAL SESSIONS

November 16 (Saturday)

9:00–9:10 **Opening Remarks**

Session 1: Communications and Radars

9:10—9:40

Characteristics of Ku-Band Rain Attenuation along Earth-Satellite Path at Three Different Locations in Kyushu Island, Japan **1**

Zulfajri Basri Hasanuddin¹, Kiyotaka Fujisaki¹, Kenichi Ishida², and Mitsuo Tateiba¹
(¹Kyushu University, Japan, ²Kyushu Sangyo University, Japan)

9:40—10:10

Radio-on-Fiber Techniques on Source Generation and Photonic Down Conversion for Broadband Millimeter-Wave Communications **9**

Weiwei Hu¹ and Keizo Inagaki²
(¹Peking University, China, ²ATR Adaptive Communications Research Laboratories, Japan)

10:10–10:40

Target Identification from Multi-Aspect High-Range-Resolution Radar Signatures Using Hidden Markov Model **19**

Masahiko Nishimoto¹, Xuejun Liao², and Lawrence Carin²
(¹Kumamoto University, Japan, ²Duke University, USA)

10:40–11:00 **Coffee break**

Session 2: Time Domain Techniques

11:00–11:30

Shielded Membrane Microstrip Line Analysis Using New FDTD Equations **28**

Yun Kwon Nam and Dong Chul Park
(Chungnam National University, Korea)

11:30–12:00

Transient Analysis of Electromagnetic Waves by Time-Dependent Resistive Screen in Waveguide **36**

Michinari Shimoda¹, Ryuichi Iwaki¹, Masazumi Miyoshi¹, and Oleg A. Tretyakov²
(¹Kumamoto National College of Technology, Japan, ²Kharkov State University, Ukraine)

12:00–12:30

A New Approach to the Time-Domain Inverse Scattering Problem with Cross-Borehole Radar Data **46**

Hongting Jia¹, Takashi Takenka², and Toshiyuki Tanaka²
(¹Kyushu University, Japan, ²Nagasaki University, Japan)

12:30–13:50 **Lunch**

Session 3: Antennas

- 13:50–14:20
Development of Dual-Polarized Base Station Antennas **56**
K. M. Luk and K. L. Lau
(City University of Hong Kong, China)
- 14:20–14:50
Design of Microstrip Stacked, Conformal, Patch Array Antennas **66**
Youngju Lee, Han Cheol Ryu, Sang Hwa Lee, Sung Jun Lee, Jung Soo Lee,
Chang Hee Lee, Sung Hun Jeong, and Wee Sang Park
(Pohang University of Science and Technology, Korea)
- 14:50–15:20
Comparison of Electric Currents on Upper and Lower Surfaces of Patch Conductor of
Microstrip Antenna **74**
Takafumi Fujimoto, Kazumasa Tanaka, and Mitsuo Taguchi
(Nagasaki University, Japan)
- 15:20–15:50
The Radiation of Waveguide Slots Antenna **82**
Jian-Ying Li¹ and Le-Wei Li^{1,2}
(¹High Performance Computation for Engineered Systems Programme, Singapore,
²National University of Singapore, Singapore)
- 15:50–16:10 **Coffee break**

Session 4: Scattering and Diffraction

- 16:10–16:40
Approximation for Multi-Wedges Diffraction **90**
Kazunori Uchida and Chang-Kwon Lee
(Fukuoka Institute of Technology, Japan)
- 16:40–17:10
A Study on a Shape of Ferrite Electromagnetic Wave Absorber for an Anechoic
Chamber **100**
Dong II Kim
(Korea Maritime University, Korea)
- 17:10–17:40
Design Procedure for a Polarization-Transformation Filter with a Multilayered Chiral
Slab **110**
Atsushi Kusunoki and Mitsuru Tanaka
(Oita University, Japan)

November 17 (Sunday)

Session 5: Photonics

9:00–9:30

Lightwave Propagation in Optical Waveguide by Multigrid Method **118**

M. Yokota
(Miyazaki University, Japan)

9:30–10:00

Fiber Optic Sensors: Applications in Chemical Sensing **126**

M. Shelly John
(Nanyang Technological University, Singapore)

10:00–10:30

Numerical Analysis for 3-Dimensional Optical Periodic Waveguides with Rectangular Cross-Section **136**

Tokuo Miyamoto¹, Michiko Momoda¹, and Kiyotoshi Yasumoto²
(¹Fukuoka University, Japan, ²Kyushu University, Japan)

10:30–10:50 **Coffee break**

Session 6: Radom Media and Rough Surfaces

10:50–11:20

Numerical Analysis of Bistatic Cross-Section of a Concave-Convex Conducting Cylinder in a Continuous Random Medium **145**

Mitsuo Tateiba¹, Zhi Qi Meng², and Masao Nakashima³
(¹Kyushu University, Japan, ²Fukuoka University, Japan, ³Mitsubishi Electric Corporation, Japan)

11:20–11:50

Microwave Emission of Rough Surfaces: Modeling and Numerical Simulations **153**

K. S. Chen¹, T. D. Wu², L. Tsang³, Qin Li⁴, and J. C. Shi⁵
(¹National Central University, Taiwan, ²National Science Council, Taiwan,
³City University of Hong Kong ⁴University of Washington, USA, and
⁵University of California, USA)

11:50–12:20

Numerical Analysis of Wave Scattering from Three Layers of Random Medium for the Estimation of Moisture in Soil by Microwaves **163**

Tsuyoshi Matsuoka, and Mitsuo Tateiba
(Kyushu University)

12:20-13:40 **Lunch**

Session 7: Microwave Integrated Circuits

13:40–14:10

A Generalized Short-Open Calibration Technique for Accurate De-Embedding
Microstrip Integrated Circuits from Fullwave MoM Simulation **173**

Lei Zhu
(Nanyang Technological University, Singapore)

14:10–14:40

Studies of Compact Microstrip Resonant Cells with Applications in Active Circuits **181**

Q. Xue, Y. F. Liu, K. M. Shum, and C. H. Chan
(City University of Hong Kong, China)

14:40–15:10

Novel Techniques Based on PEEC Method and Their Applications in Modeling of
RF-MEMS Spiral Inductors **191**

Long Haibo, Feng Zhenghe, and Zhang Yaojiang
(Tsinghua University, China)

15:10–15:40

Electromagnetic Coupling Mechanism to a Nearby Conducting Strip through Narrow
and Wide Slits in a Parallel-Plate Waveguide **199**

Young Ki Cho
(Kyungpook National University, Korea)

15:40–16:00 **Coffee break**

Session 8: Periodic Structures

16:00–16:30

Analysis of Characteristics of Optical Waveguide Devices Constructed by
Two-Dimensional Air-Hole Type Photonic Crystal **209**

Yoshihiro Naka and Hiroyoshi Ikuno
(Kumamoto University, Japan)

16:30–17:00

Numerical Techniques of the Differential Method for Surface-Relief Gratings Made of
Anisotropic and Conducting Materials **219**

Koki Watanabe
(Fukuoka Institute of Technology, Japan)

17:00–17:30

Formulation of Electromagnetic Scattering from Multilayered Crossed Periodic Arrays
of Circular Cylinders **229**

Kiyotoshi Yasumoto and Hongting Jia
(Kyushu University, Japan)

17:30–17:40 **Closing Remarks**

BANQUET

All of the guests are invited to participate in a banquet to be held at the Faculty Restaurant in the evening of November 16. The banquet will start at 18:00 and end at 20:00.