

ICEAA – IEEE APWC 2011 Report: Special Sessions
organized by Georgi N. Georgiev and Mariana N. Georgieva-Grosse

International Conference on Electromagnetics in Advanced Applications ICEAA 2011 and
IEEE-APS Topical Conference on Antennas and Propagation in Wireless Communications
IEEE APWC, Torino, Italy, September 12-16, 2011,
Special Sessions

**“FUTURE CHALLENGES IN MATHEMATICAL AND COMPUTATIONAL
ELECTROMAGNETICS AND ITS APPLICATIONS”,**

**organized by Georgi N. Georgiev and Mariana N. Georgieva-Grosse,
chaired by Georgi N. Georgiev and Mariana N. Georgieva-Grosse**

and

“ADVANCES IN WIRELESS COMMUNICATIONS AND THEIR APPLICATIONS”,

**organized by Mariana N. Georgieva-Grosse and Georgi N. Georgiev,
chaired by Mariana N. Georgieva-Grosse and Georgi N. Georgiev**

REPORT

Special Session “Future Challenges in Mathematical and Computational Electromagnetics and Its Applications”, organized and chaired by Prof. Georgi N. Georgiev and Dr. Mariana N. Georgieva-Grosse (University of Veliko Tirnovo “St. St. Cyril and Methodius”, Veliko Tirnovo, Bulgaria). The Special Session contained 14 papers. Representatives of 16 countries took part in it. In the opening address Prof. Georgi N. Georgiev thanked Prof. Piergiorgio L. Uslenghi for his kind invitation to organize the Session. In his honour the organizers have put the flag of the United States of America. The flags of Italy (the host country), Bulgaria (the country of the organizers) and the flags of the countries of the participants have also been brought. Dr. Mariana N. Georgieva-Grosse presented each of the speakers before his talk. This included the scientific degrees of the person, where and when they have been received, his current affiliation, research interests, main scientific contributions (where and when they were published: titles of books, book chapters and of the most representative papers), awards, prizes and achievements (obtained on individual or collaborative basis), positions as a Member of Technical Programme Committees or an Organizer of International Conferences or Symposia, as a Leader of national and international projects or teams, and administrative functions. Facts of significance in connection with the lecturer were enumerated. Photos, illustrating important moments in his carrier (receipt of awards or prizes; giving a talk at a scientific forum; the author or the author with his collaborators during his work) were also shown. Then, an announcement of the topic of teach paper and a brief summary of the latter were made. The names and the affiliations of the co-authors of the work (if any) were mentioned, as well. The participants in the Special Session were scientists of remarkable carrier, many of them Doctors of sciences: Mariana N. Georgieva-Grosse with degrees from Sofia, Bulgaria, a Program Manager in Stuttgart, Germany, responsible for the software development of complex systems for innovation products based on video-sensor technology, one of which – the driver assistant system “Night Vision” was nominated for the “Award of the Future” of the Federal President of the Federal Republic of Germany as one of the four most sophisticated technological achievements in the country in 2006; Prof. Georgi N. Georgiev with degrees from Sofia, Bulgaria, Associated Editor of a scientific journal, awarded by the Minister of Education of Bulgaria and recipient of the Golden medal of the University of Veliko Tirnovo, Bulgaria, Member of the Technical Programme Committees of the European Conferences on Antennas and Propagation Series EuCAP and of PIERS 2012 in Moscow, Russia; Prof. Elman Hasanoglu (Hasanov) with degrees from Baku, Azerbaijan and Moscow, Russia, Editor of a scientific journal, Member of the Editorial Boards of two others and author of three books with an international award from Ukraine; Prof. Valery Yakhno with degrees from Novosibirsk, Russia and a prize from the S. Sobolev

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Institute of Mathematics of the Russian Academy of Sciences, Prof. Seil Sautbekov with Degrees from Almaty, Kazakhstan and Moscow, Russia, Prof. Eduard Gevorkyan with degrees from Moscow and honors from Russia and Mongolia; Prof. Börje Nilsson – a Vice-Rector for 6 years of the Linnaeus University, Växjö, Sweden with contributions for the acoustic design of fans and silencers for the Euro tunnel between England and France; Prof. António Topa – organizer of three international conferences in Lisbon, Portugal; Prof. Christophe Craeye – Associated Editor of IEEE Transactions of Antennas and Propagation, with an outstanding experience from NASA, ESA and from leading Universities in Europe; Dr. Mykhaylo I. Andriychuk, Lviv, Ukraine – recipient of the award for a best IEEE Chapter (2002); outstanding lecturers as Prof. Francisco Mesa, Sevilla, Spain; Prof. Giorgos A. Kyriacou, Xanthi, Greece; Prof. Ondrej Franek, Aalborg, Denmark and Dr. Ahmed Al-Jarro, Nottingham, United Kingdom.



On the photo are from left to the right as follows: Eduard Gevorkyan (Russia); Piergiorgio L.E. Uslenghi (USA); Mariana N. Georgieva-Grosse (Bulgaria); Mykhaylo I. Andriychuk (Ukraine); Roberto D. Graglia (Italy) and Georgi N. Georgiev (Bulgaria).



Georgi N. Georgiev (Bulgaria)

The scientific programme of the Session started with two Invited papers, presented by the organizers. In them they outlined the fundamentals of two directions of a new field of the theory of numbers (introduced as the class of L numbers and the classes of the A , B , C ones, resp.) and its employment to waveguide propagation. Prof. Valery Yakhno and Prof. Tatyana Yakhno from the Dokuz Eylül University and the Izmir University, Izmir, Turkey reported theoretical and computational results for bi-anisotropic materials in a symmetric hyperbolic system. The simulation of electrodynamic pulses in waveguides at large distances was highlighted by Prof. Börje Nilsson (Linnaeus University, Växjö, Sweden). The team that accomplished this study consisted of Prof. S. Nordebo from the Linnaeus University, Växjö, Sweden, Prof. A. Karlsson from the Lund University, Lund, Sweden and Prof. G. Çınar from the Gebze Institute of Technology, Gebze, Turkey, as well. Dr. Mykhaylo I. Andriychuk (Pidstyhach Institute for Applied Problems in Mechanics and Mathematics, Lviv, Ukraine) in co-authorship with Prof. Alexander G. Ramm (Kansas State University, KS, USA) gave a talk on the numerical implementation of the electromagnetic wave scattering by small bodies. An equivalent circuit-model description of the scattering of plane waves by frequency selective surfaces has been advanced by Prof. Francisco Mesa (Universidad de Sevilla, Sevilla, Spain). The work has been done together with Prof. F. Medina and Prof. R. Rodriguez-Berral (Universidad de Sevilla, Sevilla, Spain), Dr. M. Garcia-Vigueras and Dr. J. L. Gomez-Tornero (Universidad Politecnica de Cartagena, Cartagena, Spain). Prof. Elman Hasanoglu (Hasanov) (Işık University, Istanbul, Turkey) acquainted the audience with the Beam tracing theory in Minkowski space. How to determine the natural absorption and radiation modes of lossy periodic structures, using energy absorption interferometry has been shown by Prof. Christophe Craeye (Université catholique de Louvain, Louvain-la-Neuve, Belgium). This investigation has been carried out with Prof. S. Withington and Prof. C.N. Thomas from the University of Cambridge, Cambridge, United Kingdom. A detailed review on recent results on the eigenanalysis of arbitrarily shaped 2-D and 3-D closed and open-radiating structures was performed by Prof. Giorgos A. Kyriacou (Democritus University of Thrace, Xanthi, Greece) who outlined his joint work with Dr. C.L. Zekios, Dr. S. Lavdas, Dr. A. Aitidis, Dr. C.S. Lavranos and Dr. P.C. Allilomes. Prof. Seil Sautbekov from the Eurasian National University, Astana, Kazakhstan delivered a lecture on the classical electrodynamics of uncharged particles, prepared with Prof. G. Alkina from the same University. The losses of the electromagnetic energy in the time of interaction of counter-propagating waves in the absorbing plate, placed in a waveguide have been treated by Prof. Eduard A. Gevorkyan (Moscow State University of Economics, Statistics and Informatics, Moscow, Russia). Prof. António L. Topa from the Instituto de Telecomunicações, Instituto Superior Técnico, Lisbon, Portugal related about the full-wave analytical methods for the electromagnetic characterization of metamaterial waveguides. The possibility to reduce the specific absorption rate in the head of the radiation of a metamaterial antenna has been discussed by Prof. Ondrej Franek, based on a study done at the Aalborg University, Aalborg, Denmark by a group of scientists, including also I.B. Bonev, Prof. S.C.D. Barrio and Prof. G.F. Pedersen. Dr. Ahmed Al-Jarro from the University of Nottingham, Nottingham, United Kingdom put the end of the Special Session, by debating on the explicit solution of the Volterra integral equation for transient fields on inhomogeneous arbitrary shaped dielectric bodies, obtained in co-operation with Prof. H. Bağcı (King Abdullah University of Science and Technology, Thuwal, Saudi Arabia), Prof. Trevor Benson, Prof. P. Sewell and Prof. A. Vukovic (University of Nottingham, Nottingham, United Kingdom).



On the photo are from left to the right as follows: Michael Saville (USA); Ondrej Franek (Denmark); Valery Yakhno (Turkey); Tatyana Yakhno (Turkey); Mykhaylo I. Andriychuk (Ukraine); Mariana N. Georgieva-Grosse (Bulgaria); Christophe Craeye (Belgium); Eduard Gevorkyan (Russia); Georgi N. Georgiev (Bulgaria); Ahmed Al-Jarro (United Kingdom/Saudi Arabia) and Francisco Mesa (Spain).

**“ADVANCES IN WIRELESS COMMUNICATIONS AND THEIR APPLICATIONS”,
organized by Mariana N. Georgieva-Grosse and Georgi N. Georgiev,
chaired by Mariana N. Georgieva-Grosse and Georgi N. Georgiev**

Special Session **“Advances in Wireless Communications and Their Applications”**, **organized and chaired by Dr. Mariana N. Georgieva-Grosse and Prof. Georgi N. Georgiev** (University of Veliko Tirnovo “St. St. Cyril and Methodius”, Veliko Tirnovo, Bulgaria). The Special Session contained 5 papers by scientists of 6 countries. It passed in a similar way as the Special Session “Future Challenges in Mathematical and Computational Electromagnetics and Its Applications”. An Invited paper, presenting a review of recent results on the transmission properties of the circular waveguides completely or partially filled with azimuthally magnetized ferrite has been reported by the organizers. The modeling of the radiation characteristics of a plane waveguide array, using the variational approach was the object of the talk by Dr. Mykhaylo I. Andriychuk (Pidstyhach Institute for Applied Problems in Mechanics and Mathematics, Lviv, Ukraine) in a joint work with Dr. Victor P. Tkachuk (Lviv Direction of USEPC-Ukrpost, Lviv, Ukraine). Prof. Ondrej Franek (Aalborg University, Aalborg, Denmark), gave two lectures on the investigation of multi-antenna mobile terminals in terms of hearing aids compatibility and on a novel solution for decoupling of two closely spaced antennas at low frequencies. They described his common investigations with I.B. Bonev and Prof. G.F. Pedersen from the same University. Dr. Mariana N. Georgieva-Grosse debated on the three-dimensional radio coverage in urban environments, using physical optics and physical theory of diffraction. This was an outcome of the work of an international research team, guided by Prof. P. Frangos and including also Dr. I. Zorbas, Dr. A. Chrisostomou and Dr. E. Papkelis (all from the National Technical University of Athens, Athens, Greece).

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On the photo are from left to the right as follows: Georgi N. Georgiev (Bulgaria); Börje Nilsson (Sweden); Mariana N. Georgieva-Grosse (Bulgaria); Prof. Seil Sautbekov (Kazakhstan); Mykhaylo I. Andriyчук (Ukraine) and Valery Yakhno (Turkey).



Ondrej Franek (Denmark) and Mariana N. Georgieva-Grosse (Bulgaria);

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Seil Sautbekov (Kazakhstan) and Mariana N. Georgieva-Grosse (Bulgaria);



On the photo are from left to the right as follows: Georgi N. Georgiev (Bulgaria);
P.H. Pathak (USA) and Mariana N. Georgieva-Grosse (Bulgaria).