2004 URSI EMTS

International Symposium on Electromagnetic Theory

Pisa, Italy
Palazzo dei Congressi
May 23-27 2004

Symposium website

http://www.ing.unipi.it/URSI-B2004

Cover image:
Giuseppe Bezzuoli, Galileo performs the experiment on falling bodies.
Affresco, Tribuna di Galileo, Museo Zoologico "La Specola"

Contents

Organization

The triennial International Symposium on Electromagnetic Theory is organized by:

- Commission B (Fields and Wave) of the International Union of Radio Science (URSI)
- The electromagnetic Group of the Department of Information of the University of Pisa, Pisa, Italy
- The Italian Electromagnetic Society (SIEM)

The 2004 Symposium is the 18th EMT Symposium organized by URSI and it will be held from Sunday 23 to Thursday 27 May 2004 in Pisa, Italy. The Symposium will cover a variety of topics such as basic electromagnetic theory, mathematical modeling of EM problems, solutions to canonical problems, non-linear phenomena, scattering and diffraction, high-frequency methods, inverse scattering and imaging, random, inhomogeneous, nonlinear and complex media, propagation and scattering in layered structures, random media and rough surfaces, complex media, beam and pulse propagation and scattering in lossy and/or dispersive media, computational techniques, numerical methods for integral and differential equations, hybrid methods, transient fields, time domain methods, radiation, scattering and reception of transient fields and/or wide band signals, guided waves, interaction of EM waves with biological tissues, modeling techniques for EMC/EMI, antenna arrays, planar and conformal, smart antennas, UWB antennas, EM theory and applications for radio systems, antennas and propagation for communication systems: mobile, LAN, antennas, switches and circuits using RF MEMS, artificial magnetic, soft and hard surfaces and other complex surfaces, ground penetrating radars: EM modeling, antennas, imaging and inversion, homogenization of electromagnetic material parameters, hybrid techniques for large problems, metamaterials, radiation and leakage effects in open planar structures, RF aspects of MIMO antenna systems, the role of electromagnetism in micro- and nano-technologies, time-reversal methods, UWB radio systems. The Symposium features 423 oral and poster presentations.

Conference Secretariat

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L. Shafai (Canada, Vice-chair)
S. Strom (Sweden, Past-chair)
B. Arbesser-Rastburg (The Netherlands)
J. Arnold (United Kingdom)
M. Beach (United Kingdom)
O. M. Bucci (Italy)
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N. Engheta (USA)
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S. Maci (Italy)
G. Manara (Italy, Chair-LOC)
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R. Sorrentino (Italy)
M. Tateiba (Japan)
R. Tiberio (Italy)
A. Tijhuis (The Netherlands)
P. L. E. Uslenghi (USA)
J. L. Volakis (USA)
W. Wiesbeck (Germany)
A. G. Yarovoy (The Netherlands)
R. Ziolkowski (USA)

Local Organizing Committee

Giuliano Manara, (*Chairman*)

Agostino Monorchio

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Paolo Grassi

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Previous Venues for the URSI Symposium on Electromagnetic Theory

1st	Toronto, *Canada* (called Symposium on Microwave Optics)	1953
2nd	Michigan, *USA*	1955
3rd	Toronto, *Canada*	1959
4th	Copenhagen, *Denmark* (called Symposium on EM Theory & Antennas)	1962
5th	Delft, *Netherlands*	1965
6th	Stresa, *Italy*	1968
7th	Tbilisi, *USSR*	1971
8th	London, *England*	1974
9th	Stanford, *USA*	1977
10th	Munich, *Germany*	1980
11th	Santiago de Compostella, *Spain*	1983
12th	Budapest, *Hungary*	1986
13th	Stockholm, *Sweden*	1989
14th	Sydney, *Australia*	1992
15th	St. Petersburg, *Russia*	1995
16th	Thessaloniki, *Greece*	1998
17th	Victoria, *Canada*	2001

Acknowledgements

The 2004 EMT Symposium Local Organizing Committee is pleased to acknowledge the financial support of the following institutions and companies to the organization of the Symposium.

The International Union of Radio Science (URSI)
www.ursi.org

Università di Pisa
www.unipi.it

SIEM - Società Italiana di Elettromagnetismo
www.elettromagnetismo.org

Opera Primaziale **Comune di Pisa** **Provincia di Pisa**

AgesCom, Gruppo Nodalis Telecomunicazioni
www.agescom.com

AMS - Alenia Marconi Systems
www.amsjv.com

ANSOFT corporation
www.ansoft.com

C.I.S.A.M - Centro Interforze Studi per le Applicazioni Militari
Via della Bigattiera, 10, San Piero a Grado, I-56010, Pisa, Italy
Phone: +39 050 964111

I.D.S. - Ingegneria dei Sistemi
www.ids-spa.it

Istituto per le Telecomunicazioni e l'Elettronica "Giancarlo Vallauri"
MARITELERADAR
Viale Italia, 72, I-57126, Livorno, Italy
Phone: +39 0586 238136

PMM competent body
www.pmm.it

EXHIBITORS

CST - Computer Simulation Technology
www.cst.com

I.D.S. - Ingegneria dei Sistemi
www.ids-spa.it

POLAB - Laboratorio Elettromagnetico
www.polotecnologico.it

RTW - Ride The Wave
www.rtw.it

URSI Commision B Chair's Welcome

On behalf of the Commission B of International Union of Radio Science (URSI) and Technical Program Committee, it is my pleasure to invite you to attend the 2004 URSI International Symposium on Electromagnetic Theory (EMT-S), which will be held in Pisa, Italy, May 23-27, 2004. It is hosted by the Italian Member Committee of URSI and is organized by a Local Organizing Committee (LOC) at the University of Pisa, in collaboration with the Italian Electromagnetic Society (SIEm).

This triennial event is one of the major activities of URSI Commission B and is the 18th in the long history since the 1st in Toronto 1953. The most recent past Symposia in this series were held in Victoria, Canada (2001) and Thessaloniki, Greece (1998). The preparation of the 2004 EMT-S in Pisa was initiated upon the decision in the business meeting at the 2002 URSI General Assembly. Thanks to the intensive collaboration from the Italian National Committee of URSI and the Local Organizing Committee (LOC) chaired by Prof. G. Manara, we have been completing preparations for a very attractive and rich symposium in a much shorter period than usual.

The scope of the Symposium covers all areas of electromagnetic theory and its applications. A total of 26 topics convened by 50 authorities worldwide as well as 37 regular ones were prepared in the call for papers. As a result, we have received 464 submissions and the Technical Program Committee, consisting of 40 members from 16 countries, have reviewed them and selected 421 papers. We have put together a rich set of sessions, that is, 62 oral sessions with 6 papers, 4 plenary sessions and 1 poster session.

These include progress in traditional topics such as electromagnetic theory, guided waves, scattering and diffraction and the latest topics such as metamaterials, ultra wide band signals and practical aspects of ground penetrating radars, etc.

One of the key features of the Symposium is a series of plenary sessions held every morning entitled: "Perspectives into the History and Development of Electromagnetics - Past, Present, and Future", which has always been a special characteristic of EMT-S.

With an interesting scientific program arranged by TPC, with an excellent conference organization and with support from the Italian National Committee and LOC, I invite all radio scientists together in Pisa, the historic city of Italy.

Makoto Ando, Chair, Technical Program Committee

Local Organizing Committee Chair's Welcome

It is a privilege and pleasure, on behalf of the whole Local Organizing Committee, to express to each of you my warmest welcome to the 2004 URSI Electromagnetic Theory Symposium in Pisa, Italy.

The Conference is organized by the University of Pisa, one of the oldest universities in Italy, in collaboration with the URSI Commission B and the Italian Electromagnetic Society (SIEm).

The Symposium will be held at the University Conference Centre, in downtown Pisa. The city is located near the Tyrrhenian Sea (11 Km) in north-western Tuscany, along the banks of the Arno river, and approximately 80 Km west of Florence. Known worldwide for the extraordinary monument of the Leaning Tower, Pisa is a place of artistic treasures, a heritage of its millenary history whose point of highest splendor dates back to the age of Maritime Republics (12^{th} century). The visitor to this eminent University city will discover not only art, culture and history, but also an evocative environment (natural parks, sea coast, and mountains), folklore, excellent restaurants, and fancy shops.

I wish to express my gratitude to Prof. Makoto Ando, Chairman of URSI Commission B, to Prof. Lotfollah Shafai, Vice-Chairman of the same Commission, to all the members of the Technical Program Committee and of the Local Organizing Committee for their active support. Their work, together with that of session convenors, authors, and reviewers has contributed to make up this edition of the Electromagnetic Theory Symposium, that I hope will be not less successful than the previous ones.

I am looking forward to seeing you and greeting here in May. Have a pleasant trip!

Giuliano Manara, Chair, Local Organizing Committee

Guidelines for presentations

ORAL PRESENTATIONS

Please, meet the Session Chair 10 minutes before the start of your session and provide him the name of the presenting author.

Duration
The time available for the presentation and discussion of every paper is 20 minutes. Due to the high density of the programme, presenting authors are strictly required to prepare a **15 minutes** talk. For papers assigned with 30minutes on the Program, presentation time is 25 minutes. Session chairs will take care that the schedule is followed.
Please speak slowly and clearly; practice your presentation several times in order to make sure it lasts the right time.

Equipment
A stationary PC and a overhead projector for transparencies will be available in every conference room.

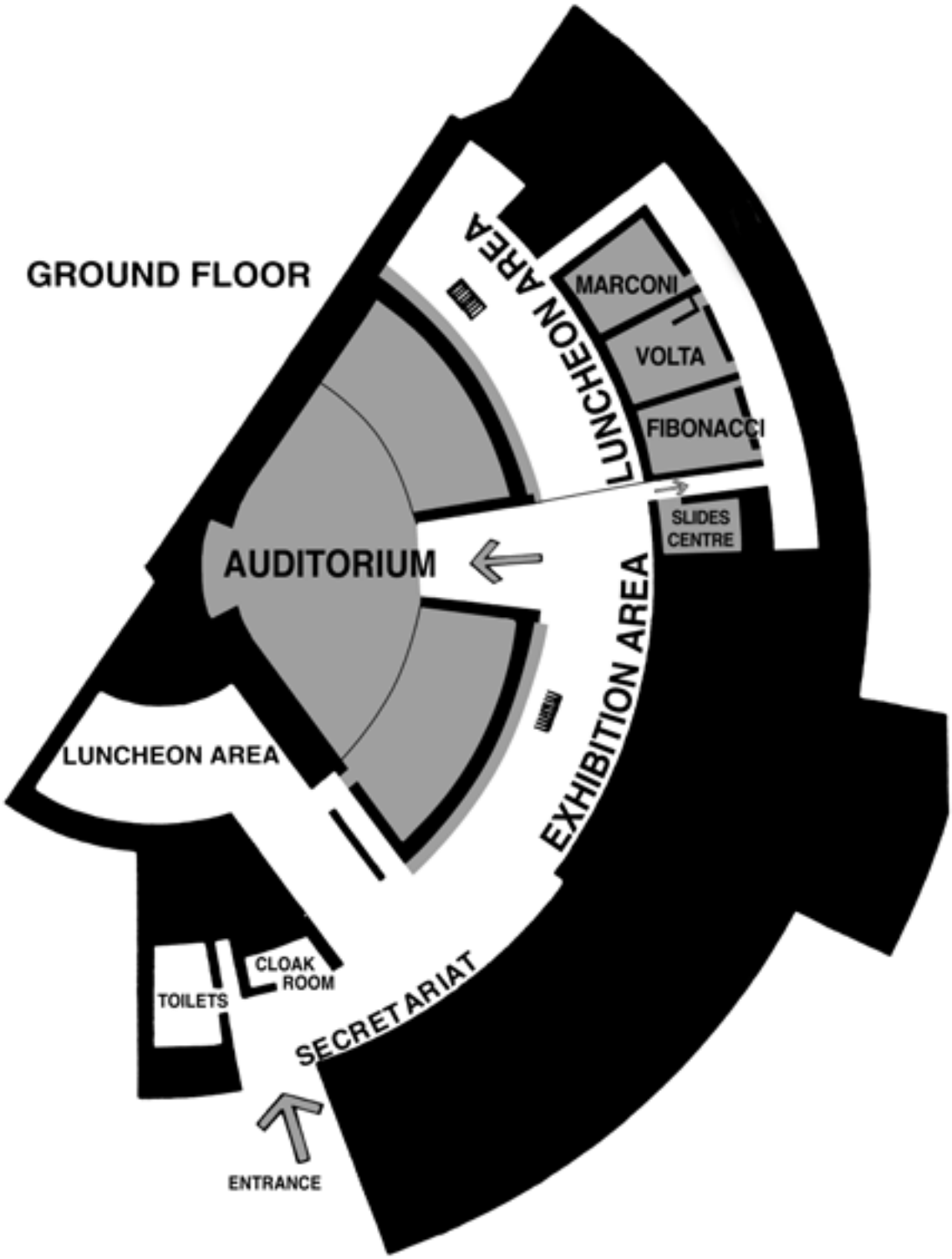
PC presentation
To guarantee their PC presentation **speakers must load and test their presentation at the "Slide Centre Room"** at their first convenience but **no later than half-day before the session**.
A CD-Rom, floppy disk or USB flash memory can be used to transfer the presentation files (PowerPoint, Acrobat Reader, Quick Time or Windows Media Player and other main support available) into the central PC server.
The technician personnel in the room will assist you and copy the files to the correct conference stationary PC that will be used locally by the authors at the time of their presentation.
This solution will eliminate problems due to incompatibilities between plugs of laptop computers and the available projectors (sometimes non-standard ones).

POSTER PRESENTATIONS

Duration
Presenters are kindly requested to stand by their posters during their session (16:45-18:45). Before the poster session and 16:00-16:45, each author can make the short oral presentation using OHP sheets.

Format
Posters size must not exceed 98 cm width and 136 height including title, authors, names and affiliation(s). Please contact secretariat desk in case you might need two panels instead of one. The poster board will be identified by the corresponding abstract number shown at the top of the board. English-written tables, figures and texts should be legible at about one metre distance and will be mounted with special tape, provided by the poster assistants.

Time
Poster presenters are encouraged to put their posters on display as soon as possible, and remove them at the end of the session.


GROUND FLOOR
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MARCONI
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SLIDES CENTRE
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CLOAK ROOM
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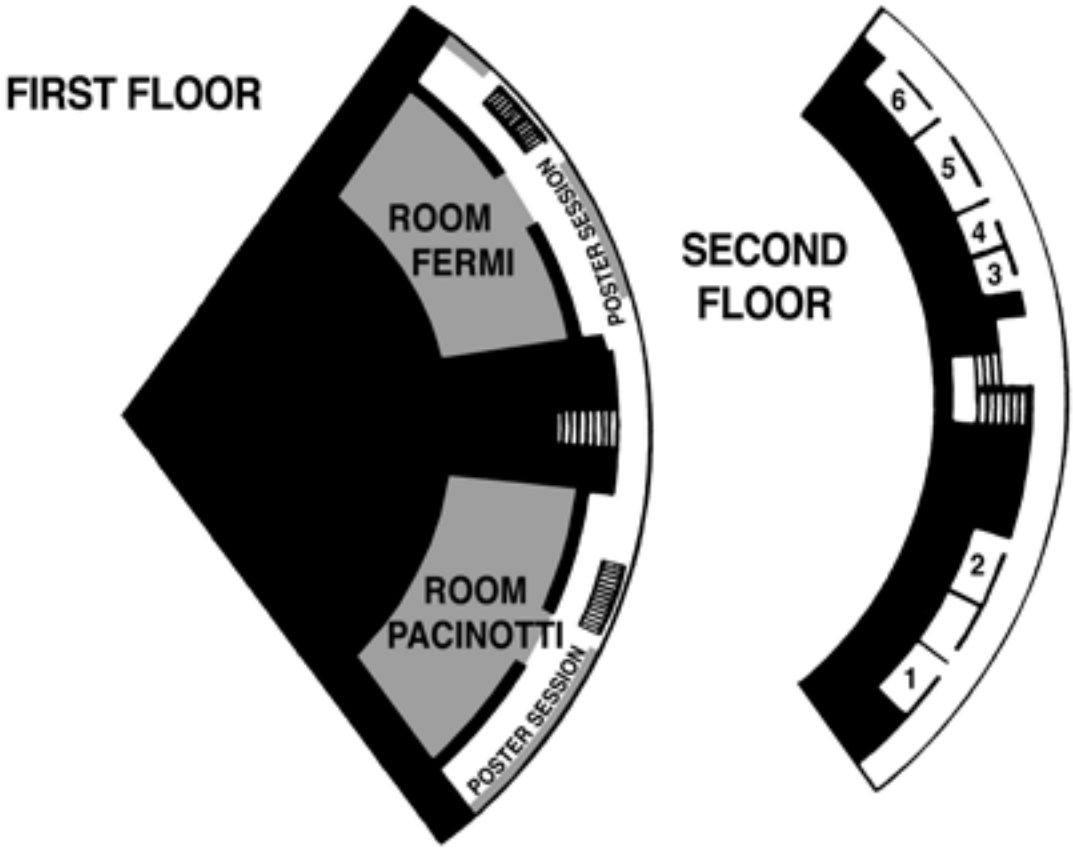
ENTRANCE

Palazzo dei congressi di Pisa



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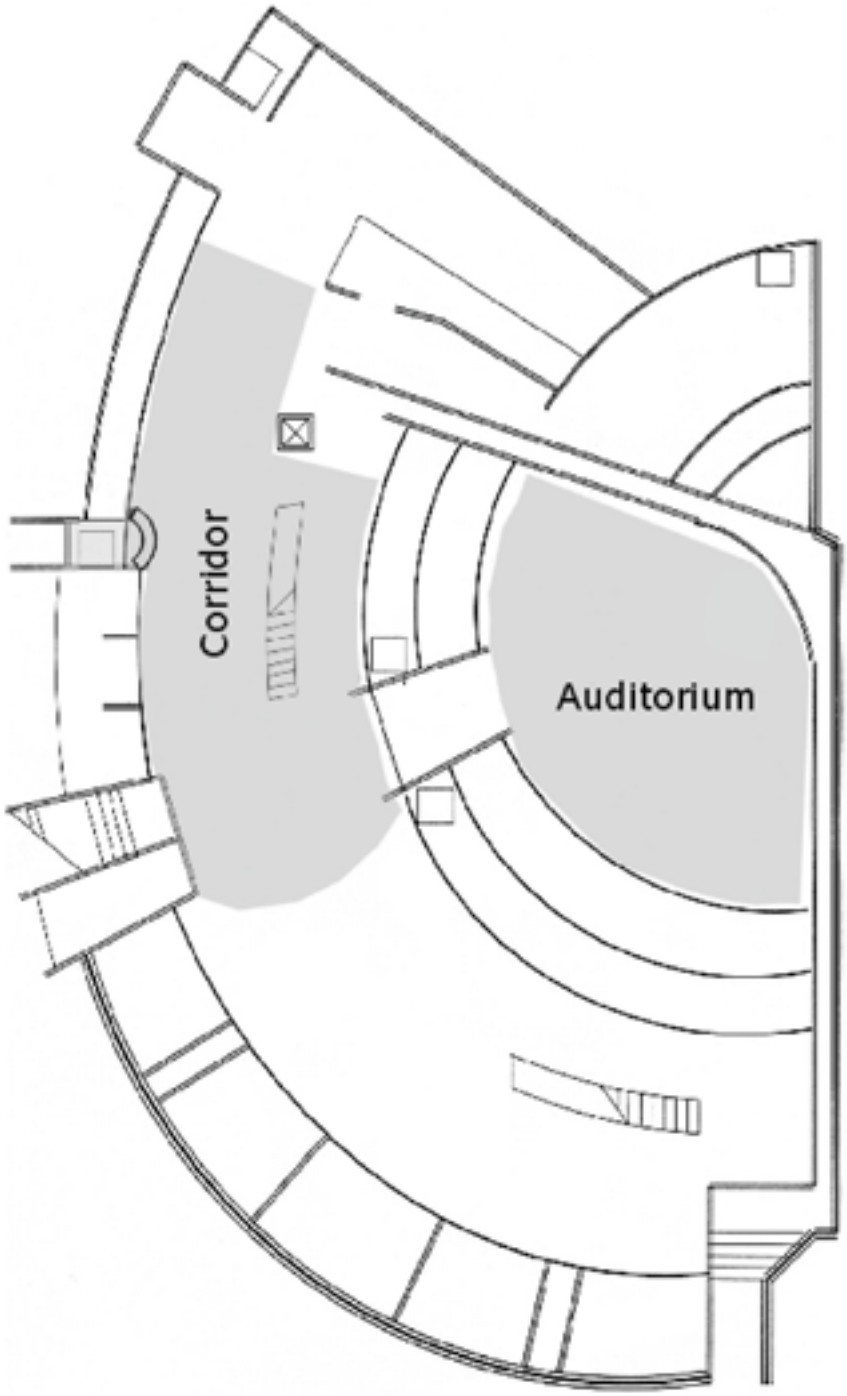

General Information

Meeting site

The congress will be held from Monday, 24th May to Thursday, 27th May 2004 at the
Palazzo dei Congressi di Pisa
Tel: +39 050 598203 – 050 598139
Fax: +39 050 598112
(TO BE USED ONLY DURING THE CONGRESS)

The Palazzo dei Congressi is located in a pleasant area of the city on the right bank of the Arno amongst the thick foliage leading to Viale delle Piagge, an avenue typical of this part of the Lungarno.
The Congress Centre is located within walking distance of restaurants, shopping areas, and hotels. It is 10 minutes walk from the centre and can also be reached by public transport, bus number 9 or 14, from the railway station (towards Cisanello - Pisanova), 9 or 13 from the conference site to the railway station (towards stazione) or number 13 from the centre (Lungarno Pacinotti or Mediceo). Tickets are not sold on-board, and must be purchased beforehand from the vending machines or tobacconists or some news-stand (each ticket costs 0,80 Euro and can be used for 60 minutes from the time franked with any combination of buses). The ordinary ticket should be franked using the red/orange machine as soon as you get on bus.
Taxi service from the airport to the conference site is approximately 10 Euro, one way and from the conference site to the centre is approximately 8 Euro, one way.

Registration and Secretariat Desk
Advance registration is highly recommended in order to be able to expedite admission at the congress site and to help the organisation of tours and social events.
The registration desk (counters are in alphabetical order) will open on Sunday, 23rd May, from 16.00 to 20.00 p.m., and then during programme hours. Staff will be available throughout the congress at the registration desk.
All participants are invited to collect meeting kits, name tags, proceedings, etc., at this desk. Participants are kindly requested to wear their name tags for the duration of the events. Participants' accounts may be balanced, and pending payments, if any, may be settled at this desk.
A certificate of attendance may be obtained here on request before leaving.

Fees
Participants registration fees include admission to congress sessions, refreshment breaks, working lunches, opening reception, and congress materials. The accompanying person is intended for those who generally will not attend the scientific sessions but would like a name tag to attend the opening reception; it also includes a get-acquainted meeting and tour of Pisa as well as the conference banquet.
Photocopy your registration form to record the items/events you order.

Cancellations
Cancellations received by written application prior to April 15 will be entitled to a full refund minus 30% plus bank charges. Refund will take approximately eight to ten weeks. Participants with confirmed registration who fail to attend or notify the conference registration of cancellation before the refund date are subject to the full fee.

Working lunches
Morning session will end approximately at 13.00 and there will be a break. Working lunches will be served in the two luncheon areas as specified on the map of the congress site (see page 12 on the programme).
Coffee breaks will take place in the exhibition area. Furthermore, there will be a bar open throughout the Conference for drinks, coffee, etc. (only cash accepted; local currency: euro).

Exhibits
Commercial exhibits will be open during programme hours.

Facilities
Overhead and video equipment (connected to a local PC), necklace microphone and laser pointer will be available for all speakers. Speakers are kindly requested to load and test their presentations at the slide centre at least half day before they are due to speak and presenting authors of 24th Monday should contact the slide centre on 23rd Sunday.

Internet Point
An internet point will be available for participants in the secretariat/exhibition area and also a wi-fi access point will be provided by Nodalis Telecomunicazioni (see map).

SOCIAL PROGRAMME

Sunday, 23rd May - Opening reception **18:30 – 19:30**

All registered participants and their guests may enjoy free refreshments featuring regional cuisine while greeting old friends and meeting new colleagues. Hours are 18.30 to 19.30 on Sunday, 23rd May in the Congress site.

Monday, 24th May – Concert **21:30**

A concert of the Chorus and Orchestra "Coro dell'Università di Pisa - Orchestra Giovanile Universitaria" from Pisa will take place in the Cathedral of Pisa.

Tuesday, 25th May– Pizza party **21:00**

Price: € 25,00

This dinner is free for young scientists. It will be held in the pizzeria "La Draga", Piazza Minzoni n° 5, Pisa

Wednesday, 26th May - Conference Banquet **20:30 – 23.30**

Price: € 50,00

The local organising committee will host a conference banquet in a typical location of the surrounding area. Stazione Leopolda, one of the first railway stations built in Italy by Grand Duke Leopoldo II in 1841. Now restructured it is a very characteristic place out of the usual touristic itinerary in the city
On-site purchase of tickets will be limited and on a space-available basis at the cost of 50 Euro.

Tours

Congress participants and their registered accompanying parties will have the opportunity to enjoy a bus tour of the surrounding areas

24th May	Guided tour of Pisa included in the accompanying fee from 14:30 to 17:00
25th May	Excursion to San Gimignano and Volterra from 9:00 to 19:00
26th May	Excursion to Lucca from 9:00 to 18:00
27th May	Excursion to Siena from 9:00 to 19:00

The excursions will depart from and return to the "Palazzo dei Congressi", and will be back in time to allow participation to the social events.
Tours are accompanied by multilingual guides but the explanation will be done in English.
Booking should be done in advance excursions may be cancelled due to lack of interest and participants will be refunded.

GUIDED TOUR OF PISA AND PIAZZA DEI MIRACOLI

The square popularly called Piazza dei Miracoli, represents one of the most breathtaking sites in all Europe for the extraordinary harmony which unifies its array of magnificents monuments as the Cathedral, the Baptistry and the Leaning Tower. The Tower of Pisa is the bell tower of the Cathedral. Its construction began in the august of 1173 and continued for about two hundred years.

Both because of its inclination and its beauty from 1173 up to the present the Tower has been the object of very special attention. During its construction efforts were made to halt the incipient inclination trough the use of special construction devices. Today interventions are being carried out within the sub-soil in order to significantly reduce the inclination and to make sure that Tower will have a long life.

Included in the accompanying fee.

EXCURSION TO LUCCA

Lucca was and indipendent republic until the 19th century, an intriguing old city, still preserving its mediaeval glamour. The tour will include the 12th century Basilicas of St. Michael and St. Frediano; the Cathedral, with the famous burial monument of Ilaria del Carretto, by Iacopo della Quercia (15th century); the old market square, formerly a Roman amphitheatre (2nd century). Visit of Villa Lenzi famous for its ecologically-produced olive-oil and wine including a guided tasting of olive oils and wines, and typical Tuscany dishes served in the hall of the villa. The tour will also include a visit to Villa Torrigiani, in the rococo style, and the 16th century Villa Mansi, both surrounded by beautiful gardens and woods.

Price: € 75,00

Includes: bus transportation, hostess assistance, guided tour, lunch and admission to the villas.

EXCURSION TO VOLTERRA AND SAN GIMIGNANO

One of the twelve Etruscan states, Volterra was originally called Velathri. The town, isolated on top of a hill, still preserves its mediaeval character intact. The trip will include a visit to the museum where many remnants of Etruscan civilization are on display: the Acropolis and the Necropolis, Piazza dei Priori, market place since the 9C, which is one of the most interesting medieval squares in Italy, the Roman Theatre which dates back to the Augustan Age, etc.

San Gimignano rises on a hill, dominating the Elsa valley with the outline of its towers. Seat of a small Etruscan village of the Ellenist period, its history started around the 10th century. The construction of the towers dates back to the 12th and 13th centuries. The tour will include the visit of Piazza della Cisterna ,where it is possible to admire the monumental well built in 1271, Piazza del Duomo with its Palazzo del Vecchio Podestà, the Palazzo del Popolo and the Palazzo Nuovo del Podestà which is presently the Town Hall.

Price: € 75,00

Includes: bus transportation, hostess assistance, guided tour, lunch, admission to the museum.

EXCURSION TO SIENA

A drive through the Chianti area amidst lovely, ever changing scenary of wine-clad hills and olive groves to Siena, an old mediaeval town humped into three hills between the Arbia and Elsa rivers, birth-place of St. Catherine and many famous artists. To visit the Cathedral, the Town Hall where you can see many masterpieces of Italian painting and sculpture, St. Dominic's, St. Francis and specimens of fine mediaeval architecture.

Price: € 90,00

Includes: bus transportation, hostess assistance, guided tour, lunch, admission to the museum.

	Time	Room: FERMI	Room: AUDITORIUM	Room: MARCONI	Room: VOLTA	Room: PACINOTTI	Room: FIBONACCI
	08:30-09:00	**Opening Ceremony**					
Monday, May 24th	9:00-11:00	**Plenary Session 1 (AUDITORIUM): Perspectives into the History and Development of Electromagnetics – Past, Present and Future** Convenors: O.M. Bucci, R. Mittra, G. Pelosi *Chair(s): R. Mittra, T.B.A. Senior*					
	11:00-11:20	Coffee Break					
	11:20-12:40	**Smart Antennas** Convenors: S.E. El-Khamy, T.K. Sarkar *Chair(s): S. El-Khamy, T. Sarkar*	**The Role of Electromagnetism in Micro- and Nano-Technology (1)** Convenor: P. L. E. Uslenghi *Chair(s): R. Sorrentino, R.J. Trew*		**Field Analysis by Physical Optics** *Chair(s): A. Altintas, R.J. Burkholder*	**Innovative Approaches to Solving Large Antenna and Scattering Problems (1)** Convenors: R. Mittra, G. Vecchi *Chair(s): R. Mittra, G. Vecchi*	**Radiation and Leakage Effects in Open Planar Structures (1)** Convenors: J. Machac, J. Zehentner *Chair(s): J. Machac, A.A. Oliner*
	12:40-13:40	Lunch Break					
	13:40-15:40	**RF Aspects of MIMO Antenna Systems (1)** Convenors: F. Arndt, W. Wiesbeck *Chair(s): C. Waldschmicdt, W. Wiesbeck*	**Materials (1)** Convenors: P. de Maagt, N. Engheta, A. Sihvola, R.W. Ziolkowski *Chair(s): A. Ishimaru, R.W. Ziolkowski*	**Ground Penetrating Radars: EM Modeling, Antennas, Imaging and Inversion (1)** Convenors: I.J. Craddock, M. Sato *Chair(s): M. Iskander, M. Sato*	**Canonical Problems** *Chair(s): G. Gerosa, F. Olyslager*	**Innovative Approaches to Solving Large Antenna and Scattering Problems (2)** Convenors: R. Mittra, G. Vecchi *Chair(s): Y. Rahmat-Samii, G. Vecchi*	**Radiation and Leakage Effects in Open Planar Structures (2)** Convenors: J. Machac, J. Zehentner *Chair(s): J. Machac, J. Zehentner*
	15:40-16:00	Coffee Break					
	16:00-18:00	**RF Aspects of MIMO Antenna Systems (2)** Convenors: F. Arndt, W. Wiesbeck *Chair(s): F. Arndt, M. Jensen*	**Materials (2)** Convenors: P. de Maagt, N. Engheta, A. Sihvola, R. W. Ziolkowski *Chair(s): L.R. Arnaut, P. de Maagt*	**Ground Penetrating Radars: EM Modeling, Antennas, Imaging and Inversion (2)** Convenors: I.J. Craddock, M. Sato *Chair(s): I.J. Craddock, M. Sato*	**Time-Reversal Methods** Convenor: M.Cheney *Chair(s): M. Gustafsson, M. Saillard*	**Electromagnetic Theory** *Chair(s): O. Kilic, I. Lindell*	**Guided Waves** *Chair(s): P. Lampariello, M. Tsuji*

	Time	Room: FERMI	Room: AUDITORIUM	Room: MARCONI	Room: VOLTA	Room: PACINOTTI	Room: FIBONACCI
Tuesday, May 25th	8:30-10:30	**Plenary Session 2 (AUDITORIUM): Perspectives into the History and Development of Electromagnetics – Past, Present and Future** Convenors: O.M. Bucci, R. Mittra, G. Pelosi *Chair(s): O.M. Bucci, C. Butler*					
	10:30-10:50	Coffee Break					
	10:50-12:50		**Artificial Magnetic, Soft and Hard Surfaces and Other Complex Surfaces (1)** Convenors: P.-S.Kildal, A.Kishk, S.Maci *Chair(s): A. Kishk, S. Maci*	**Theoretical Issues for EMI/EMC** Convenors: B.L.Michielsen, A.Tijhuis *Chair(s): B. Michielsen, A. Tijhuis*	**Space Solar Power System** Convenors: T.Itoh, N.Shinohara *Chair(s): T. Itoh, N. Shinohara*	**Hybrid and Other Innovative Approaches for Solving Large-Body Scattering Problems (1)** Convenors: R.Mittra, A.Monorchio *Chair(s): R. Mittra, A. Monorchio*	**Beam Summation, Local Spectrum and Propagation Analysis (1)** Convenors: E.Heyman, P.H.Pathak *Chair(s): E. Heyman, H. Shirai*
	12:50-13:40	Lunch Break					
	13:40-15:40	**Emitter Localization in Wireless Systems** Convenors: W.Wasylkiwskyj, A.I.Zaghloul *Chair(s): W. Wasylkiwskyj, A. I. Zaghloul*	**Materials (3)** Convenors: P. de Maagt, N.Engheta, A.Sihvola, R.W.Ziolkowski *Chair(s): N. Engheta, R. Marques*	**Electromagnetic Techniques for Non-Destructive Testing and Evaluation** Convenors: S.Caorsi, M. Pastorino *Chair(s): S. Caorsi, J. Pavo*	**Scattering and Diffraction** *Chair(s): L. Carin, Q.-H. liu*	**Hybrid and Other Innovative Approaches for Solving Large-Body Scattering Problems (2)** Convenors: R.Mittra, A.Monorchio *Chair(s): S. Maci, M. Tateiba*	**Beam Summation, Local Spectrum and Propagation Analysis (2)** Convenors: E.Heyman, P.H.Pathak *Chair(s): J. Arnold, P. H. Pathak*
	15:40-16:00	Coffee Break					
	16:00-16:45	**Poster Short Presentation (1): Time Domain Methods – Interaction of EM Waves with Biological Tissues** *Chair(s): K. Ito, F. Olyslager*	**Poster Short Presentation (2): EMC/EMI – Numerical Methods: General Aspects – Other Topics** *Chair(s): J. Hirokawa, J. Volakis*	**Poster Short Presentation (3): EM, Antennas and Components** *Chair(s): J. Bornemann, L. Shafai*	**Poster Short Presentation (3): Complex Media – Materials – Guided Waves – Statistical Electromagnetics** *Chair(s): N. Engheta, R. W. Ziolkowski*		
	16:45-18:45	**Corridor: Poster Session**					

	Time	Room: FERMI	Room: AUDITORIUM	Room: MARCONI	Room: VOLTA	Room: PACINOTTI	Room: FIBONACCI
Wednesday, May 26th	8:30-9:50	**Plenary Session 3 (AUDITORIUM): Recent Developments and Future Prospects in Electromagnetics** Convenors: O.M. Bucci, R. Mittra, G. Pelosi *Chair(s): A. Ishimaru, L. Shafai*					
	9:50-10:10	Coffee Break					
	10:10-12:10	**Antenna Design Methods** *Chair(s): A. Petosa, H. Nakano*	**The Role of Electromagnetism in Micro- and Nano-Technology (2)** Convenor: P.L.E. Uslenghi *Chair(s): O.M. Bucci, R.J. Trew*	**Iterative Nonlinear Inverse Scattering Techniques (1)** Convenors: S.Caorsi, A.Massa, C.Pichot *Chair(s): A. Massa; C. Pichot*	**UWB Radio Systems** Convenors: M.Beach, I.J.Craddock *Chair(s): I. Craddock, A. Yarovoy*	**Numerical Methods (1)** Convenors: R.D. Graglia, D.R. Wilton *Chair(s): R. Graglia, D.R. Wilton*	**Electromagnetic Crystal Structures** *Chair(s): C. A. Balanis, D.R. Jackson*
	12:10-13:40	Lunch Break					
	13:40-15:40	**Special Antennas** *Chair(s): G. James; M. Martinez-Vazquez*	**Propagation and Scattering in Layered Structures** *Chair(s): C. M. Rappaport, P.M. van den Berg*	**Iterative Nonlinear Inverse Scattering Techniques (2)** Convenors: S.Caorsi, A.Massa, C.Pichot *Chair(s): S. Caorsi, C. Pichot*	**Modeling Techniques for EMI / EMC** Convenors: C.M.Butler, J.L. Volakis *Chair(s): C. Butler, J.L. Volakis*	**Numerical Methods (2)** Convenors: R.D. Graglia, D.R. Wilton *Chair(s): R. Graglia, L. W. Li*	**High-Frequency / Short-Pulse Parameterizations: Honored Session to Prof. Leo Felsen (1)** Convenors: F. Capolino, V. Galdi, E. Heyman *Chair(s): V. Galdi, R. Tiberio*
	15:40-16:00	Coffee Break					
	16:00-18:00	**Active and Miniaturized Antennas** Convenors: P.S. Hall, T. Hori *Chair(s): P.S. Hall, R.J. Pogorzelski*	**Materials (4)** Convenors: P. de Maagt, N. Engheta, A. Sihvola, R.W. Ziolkowski *Chair(s): A.H. Sihvola, A.D. Yaghjian*	**Iterative Nonlinear Inverse Scattering Techniques (3)** Convenors: S. Caorsi, A. Massa, C. Pichot *Chair(s): T. Isernia, M. Tateiba*		**Numerical Methods (3)** *Chair(s): F. Catedra, T. Sarkar*	**High-Frequency / Short-Pulse Parameterizations: Honored Session to Prof. Leo Felsen (2)** Convenors: F. Capolino, V. Galdi, E. Heyman *Chair(s): F. Capolino, E. Heyman*

	Time	Room: FERMI	Room: AUDITORIUM	Room: MARCONI	Room: VOLTA	Room: PACINOTTI	Room: FIBONACCI
Thursday, May 27th	8:30-9:50	**Plenary Session 4 (AUDITORIUM): Perspectives into the History and Development of Electromagnetics – Past, Present and Future** Convenors: O.M. Bucci, R. Mittra, G. Pelosi *Chair(s): S. Strom, P.L.E. Uslenghi*					
	9:50-10:10	Coffee Break					
	10:10-12:10	**Antenna Arrays** *Chair(s): J. Hirokawa, S. R. Rengarajan*	**Homogenization of Electromagnetic Material Parameters** Convenors: G. Kristensson, B.Z. Steinberg *Chair(s): G. Kristensson, B.Z. Steinberg*		**Diffraction from Gratings** *Chair(s): O. Breinbjerg, P. Nepa*	**Mathematical Modeling of EM Problems** *Chair(s): A. Heldring, P.D. Smith*	**High-Frequency and Hybrid Methods (1)** Convenors: P.H. Pathak, R. Tiberio *Chair(s): A.V. Osipov, P.H. Pathak*
	12:10-13:40	Lunch Break					
	13:40-15:40	**Reflectors and Reflectarrays** *Chair(s): T.S. Bird, G. Di Massa*	**Random Media and Rough Surfaces** *Chair(s): J.F. Lee, A. Yarovoy*	**Radio Frequency / Microwave Tomography and Applications (1)** Convenors: K. Langerberg, R. Pierri *Chair(s): K. Langerberg, R. Pierri*	**Interaction of EM Waves with Biological Tissues (1)** Convenors: K. Ito, Y. Rahmat-Samii *Chair(s): M. Okoniewski, Y. Rahmat-Samii*	**Numerical Methods for Integral and Differential Equations (1)** *Chair(s): M. Salazar-Palma, F. Bardati*	**High-Frequency and Hybrid Methods (2)** Convenors: P.H. Pathak, R. Tiberio *Chair(s): R. Tiberio, P.L.E. Uslenghi*
	15:40-16:00	Coffee Break					
	16:00-18:00	**Wideband Antennas for Wireless Communications** *Chair(s): M. Orefice, L.W. Li*	**Artificial Magnetic, Soft and Hard Surfaces and Other Complex Surfaces 2** Convenors: P-S. Kildal, A. Kishk, S. Maci *Chair(s): A. Kishk, S. Skobelev*	**Radio Frequency / Microwave Tomography and Applications (2)** Convenors: K.J. Langerberg, R.Pierri *Chair(s): K.J. Langenberg, R. Pierri*	**Interaction of EM Waves with Biological Tissues (2)** Convenors: K.Ito, Y.Rahmat-Samii *Chair(s): K. Ito, M. Okoniewski*	**Numerical Methods for Integral and Differential Equations 2** *Chairs: M. Salazar-Palma T. Yamasaki*	**Time Domain Analysis and Applications** *Chair(s): L.B. Felsen, G. Leone*
	18:00-18:15	**Closing Ceremony**					

PROGRAMME

2004 URSI EMTS

International Symposium on Electromagnetic Theory

MONDAY

24 MAY

7:30 Opening Secretariat Desk/Registrations

AUDITORIUM

8:30-9:00 **Opening ceremony**

9:00-11:00 **Plenary Session 1: Perspectives into the History and Development of Electromagnetics – Past, Present and Future**
Convenors: O.M. Bucci, R. Mittra, G. Pelosi
Chair(s): R. Mittra, T.B.A. Senior

9:00 Evolution of Electromagnetics in the 19th Century (*Invited*)
I. V. Lindell, Helsinki University of Technology, Finland

9:40 The Origins of Wireless Telecommunications: a New Brave World (*Invited*)
S. Leschiutta, Politecnico di Torino, Italy

10:20 Post-World-War II Microwave Electrodynamics: a Personalized Retrospective (*Invited*)
L.B. Felsen, Boston University, USA

11:00-11:20 Coffee Break

Room: FERMI

11:20-12:40 **Smart Antennas**
Convenors: S.E. El-Khamy, T.K. Sarkar
Chair(s): S. El-Khamy, T. Sarkar

11:20 A Maxwellian Perspective of a Smart Antenna (*Invited*)
T. K. Sarkar, Syracuse University, USA; M. Salazar-Palma, Universidad Politecnica de Madrid; Spain S. E. El-Khamy, Alexandria University, Egypt*

11:40 Estimation of DOA Using an Array of Yagi Antennas in the UHF Band Using an Interpolation Technique (*Invited*)
R. Fernandez-Recio, Universidad de Alcala, Spain; M. Yuan, T. K. Sarkar, Syracuse University, USA; M. Salazar-Palma, Universidad Politecnica de Madrid, Spain*

12:00 Wavelet Domain Processing of Generalized Sidelobe Canceller for Wideband Smart Arrays (*Invited*)
S.E. El-Khamy, A.F. El-Keyi, Alexandria University, Egypt*

12:20 A Novel Adaptive Antenna Array with Tapped Delay Line Using Wavelet-Based Frequency Subband Decomposition
K. Ichige, D. Mase, H. Arai, Yokohama National University, Japan*

Room: AUDITORIUM

11:20-12:40 **The Role of Electromagnetism in Micro- and Nano-Technology (1)**
Convenor: P. L. E. Uslenghi
Chair(s): R. Sorrentino, R.J. Trew

11:20 Nanotechnology, Next Generation Electronics, and the Role of Electromagnetics (*Invited*) Part 1
R. J. Trew, North Carolina State University, USA*

11:40 Nanotechnology, Next Generation Electronics, and the Role of Electromagnetics (*Invited*) Part 2
R. J. Trew, North Carolina State University, USA*

12:00 Polarizabilities and Effective Parameters for Collection of Spherical Nano-Particles Containing Concentric Double-Negative or Single- Negative Shells (*Invited*)
A. Alù, University of Roma Tre, Italy; N. Engheta, University of Pennsylvania, USA*

12:20 FDTD Modelling of Gaussian Beam Interactions with Metallic and Dielectric Nano-Structures (*Invited*)
R.W. Ziolkowski, University of Arizona, USA*

Room: MARCONI

ROOM: VOLTA

11:20-12:40 **Field Analysis by Physical Optics**
Chair(s): A. Altintas, R.J. Burkholder

11:20 Visualization of Physical Optics for Interpretation of High Frequency Phenomena
T. Shijo, T. Itoh, M. Ando, Tokyo Institute of Technology, Japan*

11:40 On Near-Field Computations Using Physical Optics
S. R. Legault, Defence R&D Canada, Canada*

12:00 Multilevel Fast Physical Optics Algorithm for Radiation from Non-Planar Apertures
A. Boag, Tel Aviv University, Israel; C. Letrou, INT/GET, France*

12:20 Fast Multilayer Radome Computation with Gaussian Beams
A. Chabory, ONERA, France; J. Sokoloff, UPS/AD2M, France; S. Bolioli, ONERA, France; P. F. Combes, UPS/AD2M, France*

ROOM: PACINOTTI

11:20-12:40 **Innovative Approaches to Solving Large Antenna and Scattering Problems (1)**
Convenors: R. Mittra, G. Vecchi
Chair(s): R. Mittra, G. Vecchi

11:20 Electromagnetic Modeling of Composite Finite Structures by Embedding (*Invited*)
A.M. van de Water, B.P. de Hon, M.C. van Beurden, A.G. Tijhuis, Eindhoven University of Technology, The Netherlands; P. de Maagt, ESA/ESTEC, The Netherlands*

11:40 Fast Hybrid Mode-Matching / Integral Equation Methods for the Analysis of Slot Arrays (*Invited*)
F. Arndt, I. Rullhusen, V. Catina, University of Bremen, Germany; J. Brandt, W. Wessel, Mig Microwave Innovation Group, Germany*

12:00 Optimisation of Antenna Locations for Wireless Incar Communication (*Invited*)
T. Kayser, J. von Hagen, W. Wiesbeck, Universitaet Karlsruhe, Germany*

12:20 Macroscale Floquet-Wave Matched Basis Functions for Large Printed Arrays (*Invited*)
A. Cucini, S. Maci, University of Siena, Italy*

ROOM: FIBONACCI

11:10-12:40 **Radiation and Leakage Effects in Open Planar Structures (1)**
Convenors: J. Machac, J. Zehentner
Chair(s): J. Machac, A.A. Oliner

11:10 High-Frequency Radiation and Leakage Effects on Planar Transmission Lines (*Invited*)
D.R. Jackson, University of Houston, USA; A.A. Oliner, Polytechnic University, USA; F. Mesa, University of Seville, Spain; J.T. Williams, University of Houston, USA*

11:40 Analytical Investigation on the Continuous Spectrum in the Spectral Gap of the Dominant Leaky Mode for Open and Covered Microstrip Lines (*Invited*)
P. Baccarelli, P. Burghignoli, F. Frezza, A. Galli, G. Lovat, S. Paulotto, La Sapienza, University of Rome, Italy*

12:00 Leakage Effect of the Printed-Circuit Transmission Lines with Multilayered Dielectric Substrate (*Invited*)
M. Tsuji, H. Shigesawa, Doshisha University, Japan*

12:20 Study of Leakage in Microstrip Lines with Semiinfinite Superstrate (*Invited*)
R. Rodriguez-Berral, F. Mesa, F. Medina, University of Seville, Spain*

12:40-13:40 Lunch Break

ROOM: FERMI

13:40-15:40 **RF Aspects of MIMO Antenna Systems (1)**
Convenors: F. Arndt, W. Wiesbeck
Chair(s): C. Waldschmicdt, W. Wiesbeck

13:40 Multiple Antennas in Mobile Communications: Concepts and Algorithms (*Invited*)
V. Kühn, K. D. Kammeyer, Universitaet Bremen, Germany*

14:00 Investigation of Array Performance for MIMO Channel Characterisation (*Invited*)
I.J. Craddock, D.L. Paul, C.M. Tan, S.E. Foo, M.A. Beach, C.J. Railton, University of Bristol, UK*

14:20 MIMO Signaling for Low Rank Channels (*Invited*)
A. Wittneben, B. Rankov, ETH Zurich, Switzerland*

14:40 An Improved Network Model for Mutually Coupled MIMO Antennas (*Invited*)
M.L. Morris, M.A. Jensen, Brigham Young University, USA*

15:00 Compact Antenna Arrays for MIMO Systems (*Invited*)
Y. Wang, T. Itoh, UCLA, USA*

15:20 MIMO Handheld Performance in the Presence of a Person (*Invited*)
C. Waldschmidt, C. Kuhnert, S. Schulteis, W. Wiesbeck, Univeristy of Karlsruhe, Germany*

ROOM: AUDITORIUM

13:40-15:40 **Materials (1)**
Convenors: P. de Maagt, N. Engheta, A. Sihvola, R.W. Ziolkowski
Chair(s): A. Ishimaru, R.W. Ziolkowski

13:40 On the Three Different Denotations of Handedness in Wave-Material Interaction (*Invited*)
A. Sihvola, I.V. Lindell, Helsinki University of Technology, Finland*

14:00 Fundamentals of Linear, Homogeneous, Isotropic, Lossless Media with Negative Permeability and Permittivity (*Invited*) - *A.D. Yaghjian*, A.J. Devaney Associates, USA*

14:20 Tunneling and "Growing Evanescent Envelopes" in a Pair of Cascaded Sets of Frequency-Selective Surfaces in Their Band Gaps (*Invited*)
A. Alù, University of Roma Tre, Italy; N. Engheta, University of Pennsylvania, USA*

14:40 Some Comments on "Perfect Imaging" in the Presence of Materials having Negative Permittivity and Negative Permeability (*Invited*)
B.K. Minhas, S.R. Brueck, K.J. Malloy, J.S. Tyo, University of New Mexico, USA*

15:00 Enhancement of the Goos-Hänchen Effect and Temporal Beam Dynamics at the Reflection from Double Negative Metamaterials - *I.V. Shadrivov*, Y.S. Kivshar, Australian National University, Australia; A.A. Zharov, Russian Academy of Sciences, Russia; R.W. Ziolkowski, University of Arizona, USA*

15:20 The Influence of Complex Material Coverings on the Bandwidth of Antennas (*Invited*)
S.I. Maslovski, S.A. Tretyakov, Helsinki Univ. of Tech., Finland; A.A. Sochava, St. Petersburg State Tech. Univ., Russia; C.R. Simovski, Institute of Fine Mechanics and Optics, Russia*

ROOM: MARCONI

13:40-16:00 **Ground Penetrating Radars: EM Modeling, Antennas, Imaging and Inversion (1)**
Convenors: I.J. Craddock, M. Sato
Chair(s): M. Iskander, M. Sato

13:40 Reconstruction of 3-D Objects Buried Under a Rough Surface Using Inverse Scattering Method
H. Zhou, T. Takenaka, T. Tanaka, Nagasaki University, Japan*

14:00 Planar Near-Field Measurements of Ground Penetrating Radar Antennas
P. Meincke, Technical University of Denmark, Denmark; T. B. Hansen, Witten Technologies, USA*

14:20 Theoretical and Experimental Analysis of GPR Antennas
A.G. Yarovoy, L.P. Ligthart, Delft University of Technology, The Netherlands

14:40 Detection of Water Leaks in Supply Pipes with Active Microwave GPR Sensors and Electromagnetic Modelling
D. G. Lymperopoulos, M. Bimpas, Y. Stratakos, N. Paraskevopoulos, D. I. Kaklamani, N. K. Uzunoglu, National Technical University of Athens, Greece*

15:00 Polarization Diversity Study Using UWB Antennas for Detecting Pipes (*Invited*)
E. Le Brusq, J. Y. Dauvignac, LEAT, France; C. Pichot, X. Dérobert, P. Côte, LCPC, France*

15:30 Breast Cancer Tumour Detection Using Microwave Radar Techniques (*Invited*)
R. Nilavalan, I. J. Craddock, A. Preece, J. Leendertz, University of Bristol, UK; R. Benjamin, 13 Bellhouse Walk, Bristol, UK*

ROOM: VOLTA

13:40-15:20 **Canonical Problems**
Chair(s): G. Gerosa, F. Olyslager

13:40 Exact Scattering from a Cylindrically-Capped Metallic Wedge Edge- Capped with Anisotropic Material: Line Source Incidence
D. Erricolo, P.L.E. Uslenghi, University of Illinois at Chicago, USA*

14:00 Scattering by a Half-Plane: a New Modal Approach
L. Klinkenbusch, University of Kiel, Germany*

14:20 Eigenfunction Solutions of Radiation and Scattering from a Prolate Spheroid with Anisotropic Surface Impedance
Q. Tan, D. Erricolo, P. L. E. Uslenghi, University of Illinois at Chicago, USA*

14:40 Diffraction by an Anisotropic Impedance Half Plane
T. B. Senior, University of Michigan, USA; E. Topsakal, University of Mississippi, USA*

15:00 Electromagnetic Scattering of a Dipole Exicited Wedge with Anisotropic Impedance and PEC Faces
K. Yegin, Delphi Fuba, USA*

ROOM: PACINOTTI

13:40-15:40 **Innovative Approaches to Solving Large Antenna and Scattering Problems (2)**
Convenors: R. Mittra, G. Vecchi
Chair(s): Y. Rahmat-Samii, G. Vecchi

13:40 Solution of EMI/EMC Problems Involving Large Aperture Antennas Mounted on Complex Platforms (*Invited*)
R. Mittra, Penn State University, USA*

14:00 Degrees of Freedom and Synthetic Functions in the Analysis of Large Antennas (*Invited*)
L. Matekovits, G. Vecchi, V.A. Laza, Politecnico Di Torino, Italy*

14:20 Computational Complexity in the Analysis of Large Antennas (*Invited*)
O.M. Bucci, University of Naples Federico II, Italy*

14:40 MoM Solutions for Large Planar Arrays of Three-Dimensional Elements: a Faster AIM Method (*Invited*)
B.J. Fasenfest, University of Houston, USA; F. Capolino, University of Siena, Italy; D.R. Wilton, D.R. Jackson, University of Houston, USA; N. Champagne, Lawrence Livermore National Lab., USA*

15:00 Solving Large Electromagnetic Problems in Small Computers: a Review of our Work at UPC
J.M. Rius, A. Heldring, E. Úbeda, Universitat Politècnica de Catalunya (UPC), Spain; J. Parrón, Universitat Autònoma de Barcelona (UAB), Spain*

15:20 A Multilevel Fast Multipole Method with Spherical Harmonics Expansion of the k-Space Integrals
T.F. Eibert, FGAN-FHR, Germany*

ROOM: FIBONACCI

13:40-15:20 **Radiation and Leakage Effects in Open Planar Structures (2)**
Convenors: J. Machac, J. Zehentner
Chair(s): J. Machac, J. Zehentner

13:40 Leaky Wave Excitation on Three-Dimensional Printed Interconnects (*Invited*)
G.W. Hanson, University of Wisconsin-Milwaukee, USA; A.B. Yakovlev, W.E. Hutchcraft, The University of Mississippi, USA*

14:00 Leakage Phenomena from Negative Refractive Index Structures
C. Caloz, S. Lim, C. Allen, T. Itoh, University of California, Los Angeles, USA*

14:20 Full-Wave Analysis of Radiation Properties of Microstrip Leaky- Wave Arrays (*Invited*)
P. Baccarelli, P. Burghignoli, F. Frezza, A. Galli, P. Lampariello, G. Lovat, S. Paulotto, La Sapienza, University of Rome, Italy*

14:40 Radiation from the Conductor-Backed Slotline (*Invited*)
J. Machac, J. Zehentner, Czech Technical University, Czech Republic*

15:00 Frequency-Domain Analysis of Coupled Lines in the Presence of External RF Fields
K. Rambabu, J. Bornemann, University of Victoria, Canada*

15:40-16:00 Coffee Break

ROOM: FERMI

16:00-18:00 **RF Aspects of MIMO Antenna Systems (2)**
Convenors: F. Arndt, W. Wiesbeck
Chair(s): F. Arndt, M. Jensen

16:00 A Double-Directional Channel Model for Multiuser MIMO Systems (*Invited*)
T. Fügen, J. Maurer, C. Waldschmidt, C. Kuhnert, W. Wiesbeck, University of Karlsruhe, IHE, Germany*

16:20 Field Trial Results for a MIMO System (*Invited*)
S. Nakao, Y. Doi, Sanyo Electric Co., Ltd., Japan; T. Ohgane, Y. Ogawa, Hokkaido University, Japan*

16:40 Impact of Smart Antenna Characteristics on Network Capacity
C.A. Balanis, Arizona State University, USA*

17:00 On the Spectral Efficiency of a Volume
M. Gustafsson, Lund University, Sweden; S. Nordebo, Vaxjo University, Sweden*

17:20 Tolerance Study for a Range Limited Sensor Utilizing the Extended Near-Field of a Circular Array
W.K. Kahn, The George Washington University, USA*

17:40 Optimization Approaches for Wireless Network Planning
L. Brunetta, University of Padova, Italy; B. Di Chiara, University of Lecce, Italy; F. Mori, University of Padova, Italy; M. Nonato, University of Ferrara, Italy; R. Sorrentino, M. Strappini, University of Perugia, Italy; L. Tarricone, University of Lecce, Italy*

ROOM: AUDITORIUM

16:00-18:00 **Materials (2)**
Convenors: P. de Maagt, N. Engheta, A. Sihvola, R. W. Ziolkowski
Chair(s): L.R. Arnaut, P. de Maagt

16:00 Automating the Design of a Band-Pass Spectral Filter with Frequency Selective Surfaces on Inhomogeneous Substrates (*Invited*)
G. Kiziltas, University of Michigan, USA; J.L. Volakis, Ohio State University, USA*

16:20 A Metamaterial Description of a Volumetric Artificial Magnetic Conductor (*Invited*)
R.W. Ziolkowski, A. Erentok, University of Arizona, USA*

16:40 Engineered Meta-Substrates for Antenna Miniaturization (*Invited*)
H. Mosallaei, K. Sarabandi, University of Michigan, USA*

17:00 Waves in Layered Negative Index Media Excited by a Space-Time Localized Source (*Invited*)
A. Ishimaru, J.R. Thomas, University of Washington, USA*

17:20 The Nature of the Field Excited by a Source over a Half-Space of 2D EBG Material Made of Impedance Layers (*Invited*)
F. Capolino, University of Siena, Italy; D.R. Jackson, D.R. Wilton, University of Houston, USA*

17:40 Miniaturisation of Electromagnetic Band Gap Structures for Mobile Applications (*Invited*)
G. Goussetis, A.P. Feresidis, J.C. Vardaxoglou, Loughborough University, UK*

ROOM: MARCONI

16:00-18:00 **Ground Penetrating Radars: EM Modeling, Antennas, Imaging and Inversion (2)**
Convenors: I.J. Craddock, M. Sato
Chair(s): I.J. Craddock, M. Sato

16:00 Simulation of a Ground Penetrating Radar Using an ADI- FDTD/MoMTD Hybrid Method
R. Gómez Martin, R. Godoy Rubio, S. González Garcia, M. Fernández Pantoja, A. Rubio Bretones, University of Granada, Spain*

16:20 Efficient Ultra Wide Band Ground Penetrating Radar: Electromagnetical Modelling Using Asymptotical Approximations
P. Millot, ONERA, France;E. Bachelier, NOVELTIS, France; G.-E. Michel, THALES, France*

16:40 Optimisation Methods to Detect Buried Objects in Arbitrary Media
M. Combarieu, X. Ferrieres, P. Millot, ONERA, France ; M. Masmoudi, Universite Paul Sabatier, France*

17:00 Detection of Shallowly Buried Landmines from Ground Penetrating Radar Signals
M. Nishimoto, K. Shimo, H. Ikuno, Kumamoto University, Japan*

17:20 Imaging of Buried Landmines by SAR-GPR
M. Sato, Tohoku Univesity, Japan; T. Kobayashi, JST, Japan;X. Feng, Tohoku Univesity, Japan*

17:40 Shape Reconstruction of Underground Voids
A. Liseno, R. Pierri, Seconda Università di Napoli, Italy; F. Soldovieri, IREA-CNR, Italy; G. Leone, R. Solvimene, Università Mediterranea di Reggio Calabria, Italy*

ROOM: VOLTA

16:00-17:40 **Time-Reversal Methods**
Convenors: M. Cheney
Chair(s): M. Gustafsson, M. Saillard

16:00 Decomposition of the Time Reversal Operator in Ultrasound (*Invited*)
C. Prada, M. Fink, Laboratoire Ondes et Acoustique, France*

16:20 Iterative Time Reversal Retrofocusing of Electromagnetic Wave Fields (*Invited*)
M. Gustafsson, Lund University, Sweden; L. Jonsson, University of Toronto, Canada*

16:40 DORT Method and Time Reversal as Applied to Subsurface Electromagnetic Probing (*Invited*)
M. Saillard, G. Micolau, H. Tortel, P. Sabouroux, J. M. Geffrin, K. Belkebir, A. Dubois, Fresnel Institute, France*

17:00 MISO Time Reversal and Time Compression
P. Kyritsi, Stanford University, USA; P. Eggers, Aalborg University, Denmark; A. Oprea, Avendo Wireless, Canada*

17:20 Time Reversal of Electromagnetic Waves
G. Lerosey, J. de Rosny, A. Tourin, A. Derode, G. Montaldo, M. Fink, LOAESPCI, France*

ROOM: PACINOTTI

16:00-18:00 **Electromagnetic Theory**
Chair(s): O. Kilic, I. Lindell

16:00 Unique Multipole D and H Fields for Radiation
R.E. Raab, O.L. de Lange, University of Natal, South Africa*

16:20 Electromagnetic Source Equivalence in a Nonuniform Medium
N. K. Nikolova, Y. S. Rickard, Mcmaster University, Canada*

16:40 Exact Description of Electromagnetic Waves in Terms of Rays
M.A. Alonso, University of Rochester, USA*

17:00 Two Novel Designs for Fractal Tree Antenna Applications
B. Ozbakis, A. Kustepeli, Izmir Institute of Technology, Turkey*

17:20 Accuracy Analysis and Optimization of the Method of Auxiliary Sources (MAS) for Oblique Incidence Scattering by a Perfectly Conducting, Infinite Circular Cylinder
N.L. Tsitsas, E.G. Alivizatos, H.T. Anastassiu, D.I. Kaklamani, National Technical Univ. of Athens, Greece*

17:40 C Method for Complex Frequencies: Spectral Problem for Periodic Boundary
J. Chandezon, G. Granet, Universite Blaise Pascal, France; A. Ye. Poyedinchuk, Y. A. Tuchkin, N. P. Yashina, IRE NAS of Ukraine, Ukraine*

ROOM: FIBONACCI

16:00-18:00 **Guided Waves**
Chair(s): P. Lampariello, M. Tsuji

16:00 A Study of Asymmetrical Dielectric T-Junction
D. N. Chien, K. Tanaka, M. Tanaka, Gifu University, Japan*

16:20 Modeling of Waveguide Junctions with General Anisotropic Material by Using Orthogonal Propagating Waves
R. Pregla, L. Greda, University of Hagen, Germany*

16:40 Power Transfer between Cores in Waveguide Systems with Random Imperfections
A. Komiyama, Osaka Electro-Communication University, Japan*

17:00 Transmission Line Representations for Higher Order Modes in Lossy Waveguides
F. Olyslager, A. Franchois, Ghent University, Belgium*

17:20 High Performance Temperature Sensor
G. Caló, A. D'Orazio, M. De Sario, V. Petruzzelli, F. Prudenzano, Politecnico Di Bari, Italy; T. Del Rosso, S. Sottini, S. Trigari, IFAC-CNR, Italy; D. Grando, Università di Pavia, Italy*

17:40 Guided Modes on a Cylindrical Channel in a Lossy Gyrotropic Medium
A.V. Kudrin, M.Yu. Lyakh, University of Nizhny Novgorod, Russia*

TUESDAY

25 MAY

8:30-10:30	**Plenary Session 2: Perspectives into the History and Development of Electromagnetics – Past, Present and Future** Convenors: O.M. Bucci, R. Mittra, G. Pelosi *Chair(s): O.M. Bucci, C. Butler*
8:30	Antenna Theory and Technology: Some Achievements and Trends (*Invited*) *A. Roederer, European Space Agency, The Netherlands*
9:10	Hybrid Frequency Domain Methods: from Analysis to Design (*Invited*) *J. L. Volakis, The Ohio State University, USA*
9:50	Some Challenges in Computational Electromagnetics for Solving Large Problems and How We Might Meet Them (*Invited*) *R. Mittra, Penn State University, USA*

10:30-10:50 Coffee Break

ROOM: FERMI

ROOM: AUDITORIUM

10:50-12:30 **Artificial Magnetic, Soft and Hard Surfaces and Other Complex Surfaces (1)**
Convenors: P.-S.Kildal, A.Kishk, S.Maci
Chair(s): A. Kishk, S. Maci

10:50 Using Artificial Surfaces to Realize Monopole Type Radiation Patterns by a Low Profile Antenna (*Invited*)
F. Yang, A. Aminian, Y. Rahmat-Samii, UCLA, USA*

11:10 High-Impedance Peano Surfaces
J. Mcvay, Villanova University, USA; N. Engheta, University of Pennsylvania, USA; A. Hoorfar, Villanova University, USA*

11:30 Artificial Magnetic Conductor and Electromagnetic Band Gap Performance of Metallodielectric Arrays (*Invited*)
A. P. Feresidis, G. Goussetis, J. C. Vardaxoglou, Loughborough University, UK*

11:50 Hard and Soft Gangbuster Surfaces
S. Maci, University of Siena, Italy; P.-S. Kildal, Chalmers University of Technology, Sweden*

12:10 Asymptotic Corrugation Boundary Condition in the Finite Difference Time Domain Method
A. E. Simon, A. A. Kishk, University of Mississippi, USA*

ROOM: MARCONI

10:50-12:50 **Theoretical Issues for EMI/EMC**
Convenors: B.L.Michielsen, A.Tijhuis
Chair(s): B. Michielsen, A. Tijhuis

10:50 Statistical Modelling of Power Dissipation in Electronic Circuits Immersed in a Random Field (*Invited*)
L. R. Arnaut, National Physical Laboratory, UK*

11:20 Green Functions, Covariance Operators and Canonical Stochastic Fields (*Invited*)
B. Michielsen, ONERA, France; C. Fiachetti, ENSEEIHT, France*

11:50 Including Apertures and Cavities in the BLT Formalism (*Invited*)
C. E. Baum, Air Force Research Laboratory, USA*

12:10 Statistical Response of Devices Immersed in Electromagnetic Chaos
P. De Doncker, Universite Libre de Bruxelles, Belgium; O. Delangre; R.Meys; M. Helier, Universite Pierre Et Marie Curie, France; W. Tabbara, Supelec, France*

12:30 Topological Gradient Method Applied to Electromagnetic Shield Design (*Invited*)
X. Ferrieres, ONERA, France; J. Pommier, M. Masmoudi, UPS/MIP, France*

ROOM: VOLTA

10:50-12:30 **Space Solar Power Systems**
Convenors: T.Itoh, N.Shinohara
Chair(s): T. Itoh, N. Shinohara

10:50 (*Invited*) Power from Space: from Promise to Reality
F. E. Little, Texas A&M University, USA*

11:20 SSPS Research in Japan (*Invited*)
H. Matsumoto, N. Shinohara, Kyoto University, Japan*

11:50 Some Proposals for the SSPS Actualization from Innovative Component Technology Standpoint (*Invited*)
I. Mikami, T. Mizuno, H. Ikematsu, H. Satoh, Mitsubishi Electric Corp., Japan; N. Shinohara, K. Hashimoto, H. Matsumoto, Kyoto Univ., Japan*

12:10 SPS European Views: Environment and Health (*Invited*)
L. M. Summerer, ESA, The Netherlands; G. Pignolet, University of La Réunion, France*

ROOM: PACINOTTI

10:50-12:30 **Hybrid and Other Innovative Approaches for Solving Large-Body Scattering Problems (1)**
Convenors: R.Mittra, A.Monorchio
Chair(s): R. Mittra, A. Monorchio

10:50 Rigorous Multi-Resolution Time-Domain Analysis Using a Hybrid of Different Spatially Dependent Wavelet Bases (*Invited*)
L. Carin, N. Kovvali, W. Lin, Duke University, USA*

11:10 Iterative Physical Optics with Asymptotic Phasefront Extraction for Large Multi-Bounce Scattering Problems (*Invited*)
R. J. Burkholder, P. H. Pathak, The Ohio State University, USA*

11:30 Electromagnetic Scattering from Large Bodies Using an Extrapolation Technique (*Invited*)
R. Mittra, Penn State University, USA; T. Zhao; L. Ma*

11:50 Partition of Unity Methods for Electromagnetics (*Invited*)
C. Lu, B. Shanker, L. Kempel, Michigan State University, USA*

12:10 Modeling of Microstrip Reflectarrays Using the Characteristic Basis Function Approach (*Invited*)
K. F. Chan, K. W. Lam, C. H. Chan, City University of Hong Kong, China; R. Mittra, The Pennsylvania State University, USA*

ROOM: FIBONACCI

10:50-12:30 **Beam Summation, Local Spectrum and Propagation Analysis (1)**
Convenors: E.Heyman, P.H.Pathak
Chair(s): E. Heyman, H. Shirai

10:50 Gaussian Beam Method for Propagation of Wave Packets Modulated Both in Frequency and Amplitude (*Invited*)
M. M. Popov, Russian Academy of Sciences, Russia*

11:10 Pulsed Beam Summation Formulation for Short Pulse Radiation Based on Windowed Radon Transform Frames (*Invited*)
A. Shlivinski, Kassel University, Germany; E. Heyman, A. Boag, Tel-Aviv University, Israel*

11:30 Phase Space Construction of Diffraction Limited Fox-Li Resonator Modes (*Invited*)
J. M Arnold, University of Glasgow, UK*

11:50 Stable Aggregates of Flexible Elements: Making a Silk Purse from Sow's Ears (*Invited*)
M. A. Alonso, University of Rochester, USA; G. W. Forbes, QED Technologies, USA*

12:10 Summation of Gaussian Beams and Packets (*Invited*)
L. Klimes, K. Zacek, Charles University, Czech Republic*

12:40-13:40 Lunch Break

ROOM: FERMI

13:40-16:00 **Emitter Localization in Wireless Systems**
Convenors: W.Wasylkiwskyj, A.I.Zaghloul
Chair(s): W. Wasylkiwskyj, A. I. Zaghloul

13:40 Performance Evaluation of Root Based Direction Finding Algorithms Using Hardware Emulation of the Antenna Array (*Invited*)
I. Kopriva, W. Wasylkiwskyj, M. Doroslovacki, The George Washington University, USA; A. I. Zaghloul, Virginia Polytechnic Institute and State University, USA*

14:00 Worst-Case Performance Optimization-Based Robust Adaptive Beamformers: an Overview (*Invited*)
A. B. Gershman, Mcmaster University, Canada*

14:20 Estimation of the Two-Dimensional Direction of Arrival by the Diagonal Matrix Pencil Method (*Invited*)
S. Burintramart, T. K. Sarkar, Syracuse University, USA*

14:40 Location Coverage and Sensitivity with A-GPS (*Invited*) - *A. Kangas*, T. Wigren, Ericsson AB, Sweden*

15:00 Equalization of the Element Radiation Patterns for Root Based Direction Finding Algorithms (*Invited*)
W. Wasylkiwskyj, I. Kopriva, The George Washington University, USA*

15:20 Design of a Nonuniform Array for Joint Direction-of-Arrival and Range Estimation (*Invited*)
E. G. Larsson, M. Doroslovacki, George Washington University, USA*

15:40 Robust Multiple Emitter Localization and Interference Mitigation Using Adaptive Antenna Array (*Invited*)
M. L. Picciolo, G. N. Schoenig, M. A. Tinston, S. Goldstein, SAIC, USA*

ROOM: AUDITORIUM

13:40-15:40 **Materials (3)**
Convenors: P. de Maagt, N.Engheta, A.Sihvola, R.W.Ziolkowski
Chair(s): N. Engheta, R. Marques

13:40 Experimental Verification of Negative Index of Refraction by Lateral Beam Displacement (*Invited*)
S. Hrabar, Z. Sipus, J. Bartolic, University of Zagreb, Croatia*

14:00 Enhanced Tunneling and Amplification of Evanescent Waves in a Waveguide Environment (*Invited*)
R. Marques, J. D. Baena, F. Medina, Universidad de Sevilla, Spain*

14:20 New Dispersion Characteristics and Surface-Wave Suppression in Double-Negative Metamaterial Grounded Slabs (*Invited*)
P. Baccarelli, P. Burghignoli, F. Frezza, A. Galli, P. Lampariello, G. Lovat, S. Paulotto, "La Sapienza" University of Rome, Italy*

14:40 Merging and Crossing Modes in Double Negative Metamaterials
E. Prati, J. M. Ravazzola, MDM-INFM, Italy*

15:00 Nonlinear Left-Handed Metamaterials
I. V. Shadrivov, Australian National University, Australia; A. A. Zharov, Institute for Physics of Microstructures, Russia; Y. S. Kivshar, Australian National University, Australia*

15:20 Magnetically Tunable Metamaterial
M. Gorkunov, M. Lapine, University of Osnabrueck, Germany*

ROOM: MARCONI

13:40-15:40 **Electromagnetic Techniques for Non-Destructive Testing and Evaluation**
Convenors: S.Caorsi, M. Pastorino
Chair(s): S. Caorsi, J. Pavo

13:40 GPR Landmine Imaging: 2D Migration and 3D Inverse Scattering in Layered Media (*Invited*)
L.-P. Song, Q. H. Liu, F. Li, Z. Q. Zhang, Duke University, USA*

14:00 Microwave AFM Imaging of Embedded Nano Structures and Organelles in Cells and Advanced Materials (*Invited*) - *M. Tabib-Azar*, Case Western Reserve University, USA*

14:20 Electromagnetic Imaging for an Imperfectly Conducting Cylinder Buried in a Three-Layer Structure by the Genetic Algorithm (*Invited*) - *Y. S. Lin*, Y. S. Lee, C. C. Chiu, Tamkang University, Taiwan, R.O.C*

14:40 Application of Volumetric and Surface Defect Models for the Analysis of Eddy Current Nondestructive Testing Problems
J. Pavo, Budapest University of Technology and Economics, Hungary; D. Premel, CEA Saclay, France; D. Lesselier, (CNRS-SUPÉLEC-UPS, France*

15:00 An Electromagnetic Approach Based on Neural Networks for the GPR Subsurface Nondestructive Testing
S. Caorsi, G. Cevini, Dept. of Electronics, University of Pavia, Italy*

15:20 Fast and Accurate Detection of Homogeneous Buried Targets
U. Barile, DIET - University of Naples, Italy; I.Catapano, DAEIMI - University of Cassino, Italy; L. Crocco, IREA - CNR, Italy; T. Isernia, Università Mediterranea di Reggio Calabria, Italy*

ROOM: VOLTA

13:40-15:50 **Scattering and Diffraction**
Chair(s): L. Carin, Q.- H. Liu

13:40 New Tools and Series for Scattering Problems in Lossy Media
L. Crocco, IREA - CNR, Italy; M. D'urso, E. Mosca, DIET - University of Naples, Italy; T. Isernia, Università Mediterranea di Reggio Calabria, Italy*

14:00 Electromagnetic Diffraction from Spherical and Spheroidal Scatterers in Uniform Motion inside a Bounded Half-Space
P. De Cupis, G. Gerosa, La Sapienza University of Rome, Italy*

14:20 Diffraction of the Plane Electromagnetic Wave on Two Cylinders with Axial Periodicity, When One of Them is Located in the Geometrical Shadow of Another
G. S. Kevanishvili, G. V. Jandieri, G. V. Kekelia, Georgian Technical University, Georgia; K. Yasumoto, Kyushu University, Japan*

14:40 Inverse Problem for Determination of Microwave Parameters of Isotropic Mediums by Using an Open Spherical Resonator
V. N. Derkach, Y. F. Filipov, A. S. Plevako, Y. V. Prokopenko, T. A. Smirnova, IRE NAS of Ukraine, Ukraine*

15:00 Radar Cross Section (RCS) Prediction Techniques: from High-Frequency Asymptotics to Numerical Simulations
C. Uluisik, Levent Sevgi, Dogus University, Turkey*

15:20 Probabilistic Approach to Wave Propagation (*Invited*) - *B. V. Budaev*, D. B. Bogy, UC Berkeley, USA*

ROOM: PACINOTTI

13:40-15:40 **Hybrid and Other Innovative Approaches for Solving Large-Body Scattering Problems (2)**
Convenors: R.Mittra, A.Monorchio
Chair(s): S. Maci, M. Tateiba

13:40 Hybrid FEBI, as a Domain Decomposition Method, for Solving Large Electromagnetic Scattering Problems (*Invited*) - *S.-M. Seo*, M. Vouvakis, S.-C. Lee, J.-F. Lee, OSU, USA*

14:00 Hybrid FDTD and Single Scattering Theory for Simulation of Scattering from Hard Targets Camouflaged under Forest Canopy (*Invited*) - *K. Sarabandi*, I.-S. Koh, H. Mosallaei, The Univ. of Michigan at Ann Arbor, USA*

14:20 A High-Frequency Integral Equation Method for Solving EM Scattering Problems Involving Large Faceted Bodies (*Invited*) - *A. Monorchio*, G. Tiberi, S. Rosace; G. Manara, University of Pisa, Italy; R. Mittra, Penn State University, USA*

14:40 A New Hybrid Mom/FDTD Method for Antennas Located Off the Yee's Lattice
S. Mochizuki, Chuo University, Japan; S. Watanabe, Communications Research Laboratory, Japan; M. Taki, Tokyo Metropolitan University, Japan; Y. Yamanaka, Communications Research Laboratory, Japan; H. Shirai, Chuo University, Japan*

15:00 Generation of a Wideband Response Using Early Time and Low Frequency Data through the Discrete Laguerre Sequences - *M. Yuan, T. K. Sarkar*, Syracuse University, USA*

15:20 Application of the Generalized Method of Eigenoscillations and the R-Function Theory for Solving Diffraction Problems - *V. F. Kravchenko*, Institute of Radio Engineering and Electronics of the Russian Academy of Sciences, Russia; M. A. Basarab, Bauman Moscow State Technical Univ., Russia*

ROOM: FIBONACCI

13:40-15:20 **Beam Summation, Local Spectrum and Propagation Analysis (2)**
Convenors: E.Heyman, P.H.Pathak
Chair(s): J. Arnold, P. H. Pathak

13:40 A Gaussian Beam Based Numerical Approach for Analysis of EM Scattering by Large Multiple Plate Structures (*Invited*)
K. Tap, P. H. Pathak, R. J. Burkholder, T. Lertwiriyaprapa, The Ohio State University, USA*

14:00 Narrow-Waisted Gaussian Beam Algorithms for Aperture-Generated Scattering by Surfaces Described by Higher-Order Impedance Boundary Conditions (*Invited*)
V. Galdi, University of Sannio, Italy; L. B. Felsen, Boston University, USA; I. M. Pinto, University of Sannio, Italy*

14:20 Asymptotically Driven Local Basis Functions with Application to the Fast Multipole Method (*Invited*)
L. Carin, Z. Liu, Duke University, USA*

14:40 Corrections to Complex Source Point Beam Array Scattering by Local Sources (*Invited*)
H. D. Cheung, E. V. Jull, University of British Columbia, Canada*

15:00 Periodic Frame Based Decomposition of Fields Radiated from Cylindrical Sources (*Invited*)
C. Letrou, INT/GET, France; A. Boag, E. Heyman, Tel Aviv University, Israel*

15:40-16:00 Coffee Break

ROOM: FERMI

16:00-16:45 Poster Short Presentation (1): Time Domain Methods – Interaction of EM Waves with Biological Tissues
Chair(s): K. Ito, F. Olyslager

01 Enhancing the PML ABC for the Wave Equation
Y. S. Rickard, N. K. Nikolova, Mcmaster University, Canada*

02 Unified Analysis of Near Field Property Through Charging and Discharge Processes by the Spatial Network for Vector and Scalar Potentials
N. Yoshida, Hokkaido University, Japan*

03 Validation Tests for the Periodic Boundary Conditions in the FDTD for Waveguiding Structures
F. Akleman, Istanbul Technical University, Turkey; L. Sevgi, Dogus University, Turkey*

04 Implicit and Explicit Schemes for Wire Frame Time Domain Moment Method
G. Guarnieri, S. Selleri, G. Pelosi, DET - University of Florence, Italy; C. Dedeban, France Telecom RD, France; C. Pichot, LEAT – University de Nice-Sophia Antipolis, France*

05 Adaptive and Implicit Haar-Wavelet-Based Time-Domain Integral Equation Analysis of Straight Thin Wire Scatterer
Z. Zhou, J. S. Tyo, University of New Mexico, USA*

06 Replicating Sensor for Measurements of Transient Antenna Radiation in the Near-Field
A. G. Yarovoy, Delft University of Technology, The Netherlands*

07 Rigorous Processing Algorithm for Dielectric Parameters Study
G. P. Ermak, A. E. Poyedinchuk, N. P. Yashina, A. V. Varavin, Institute for Radiophysics and Electronics NAS of Ukraine, Ukraine*

08 Gaussian and Pulsed Beam Propagation in and Anisotropic Media
I. Tinkelman, T. Melamed, Ben Gurion University of the Negev, Israel*

09 Electromagnetic Probes for Living Tissue Cauterization
P. De Cupis, G. Gerosa, La Sapienza University of Rome, Italy*

10 Microwave Thermotherapy: Technical and Clinical Aspects
J. Vrba, L. Oppl, J. Cvek, Czech Technical Iniversity in Prague, Czech Republic; J. Kvech, J. Kubes, Institute of Radiation Oncology in Prague*

11 Investigating Effect of Temperature on Dielectric Response of Bound Water in Grain
S. Trabelsi, The University of Georgia, USA; S. O. Nelson, ARS-USDA, USA*

12 The Effects of Long Term Use of Mobile Phones on Human Health
K.Balikci, I. C. Ozcan, D. Turgut-Balik, H. H. Balik, University of Firat, Turkey*

13 Applicators for BPH Treatment: Theoretical Limits of the Effective Heating Depth
J. Vrba, R. Hlavac, R. Chovanec, J. Herza, Czech Technical University in Prague, Czech Republic; J.Kvech, J.Kubes, Institute of Radiation Oncology in Prague*

14 Compensation of Antenna Mutual Coupling Effect in the DOA Estimation for UWB Waves
A. Hirata, Z. Kawasaki, Osaka University, Japan*

16:00-16:45 Poster Short Presentation (2): EMC/EMI – Numerical Methods: General Aspects – Other Topics
Chair(s): J. Hirokawa, J. Volakis

15 MUSIC Localization of Low-Frequency Electromagnetic Sources
S. Yagitani, K. Ishibana, I. Nagano, Y. Nishi, Kanazawa University, Japan; Y. Yoshimura, Industrial Research Institute of Ishikawa, Japan; H. Hayakawa, K. Tsuruda, ISAS/JAXA, Japan*

16 Development of a Presumption System of Electric Parameters
T. Tosaka, I. Nagano, S. Yagitani, Kanazawa University, Japan; Y. Yoshimura, Industrial Research Institute of Ishikawa, Japan*

17 Three-Dimensional (FD)2TD Analysis of Light-Beam Scattering from Magneto-Optical Disk Models With Land/Groove Structures
T. Kojima, Kansai University, Japan; T. Sasai, Matushita Electric Industrial Co., Ltd., Japan; Y. He, Osaka Elecro-Communication University, Japan*

18 New O(N) Neighbor List Method for Molecular Dynamics
Z. Yao, National University of Singapore, Singapore; M. Cheng, Nanyang Technological University, Singapore; J.-S. Wang, National University of Singapore, Singapore*

19 Dogs Cancerous Mammary Glands Treated by DC Current: Part Mathematical Model
M. Tellò, G. A. Dias, F. Sonalio, PUCRS, Brazil; L. Oliveira, HCV UFRGS, Brazil; R. T. Oliveira, UFRGS, Brazil*

20 Adaptive Cavity for Complex Permittivity Measurement of Rock Materials
D. Vaccaneo, R. Tascone, R. Orta, Politecnico Torino, Italy*

21 An Application of Control Theory to Electromagnetic Obstacle Scattering
F. Zirilli, Universita Di Roma "La Sapienza", Italy*

22 Analysis of a Class of Asymptotic and Exact Solutions in the High-Frequency Planar Limit
D. Chatterjee, University of Missouri Kansas City (UMKC), USA*

23 New Perspectives for Computational Electromagnetics with Grid Computing
A. Esposito, L. Tarricone, L. Catarinucci, B. Di Chiara, University of Lecce, Italy; M. Strappini, University of Perugia, Italy*

24 Grid Computation via Javaspaces of The First Order Least Squares FEM
A. D. Hellicar, J. S. Kot, F. R. Cooray, H. C. Lovatt, CSIRO, Australia*

25 Analysis of Skin Effect High Speed Interconnects Response by Wavelet Convolution
S. Barmada, M. Raugi, Univeristy of Pisa, Italy*

26 An Unconditionally Stable FDTD Scheme with a Generalized Reflection-Free Domain Truncation
N. Homsup, Kasetsart University, Thailand*

27 Scattering of Whispering-Gallery Mode from Concave-Convex Boundary
A. P. Anyutin, V. I. Stasevich, Russian New University, Russia*

28 An Electromagentic Field of Linear Magnetic Current in an Irregular Plane Impedance Wavequide
L. A. Pazynin, Institute of Radiophysics and Electronics NASU, Ukraine*

29 Measurement and Statistical Modelling for Fixed Millimeter Wireless Access Systems in Urban Environments
J. Zhang, J. Richter, M. Al-Nuaimi, University of Glamorgan, UK; L. Ivrissimtzis, Agere Systems PLC., UK*

16:00-16:45 Poster Short Presentation (3): EM, Antennas and Components
Chair(s): J. Bornemann, L. Shafai

30 Near-Field Microwave Diagnostics of Biological Tissues
N. V. Yurasova, A. N. Reznik, Institute for Physics of Microstructures, Russia*

31 An Iterative Integral Equation Method to Model Large Complex Arrays
M. Bandinelli, R. Guidi, Ingegneria Dei Sistemi, Italy*

32 Teaching of Electromagnetics and Related Subjects in Iraq
M. K, Al-Shammri, University of Technology, Iraq*

33 Electromagnetic (EM) Prediction in Complex Scenarios: Advances in Percolative Modelling
M. Strappini, B. Di Chiara, L. Tarricone, R. Sorrentino, DIEI University of Perugia, Italy*

34 Quasi-Stationary Thermal Field and Near-Field Radiometry
A. N. Reznik, V. L. Vaks, N. V. Yurasova, Institute for Physics of Microstructures, Russia*

35 Novel Balanced Microstrip Coupled-Line Bandpass Filters
Y.-S. Lin, C. H. Chen, National Taiwan University, Taiwan*

36 CO 115,345 GHz Absorption Measurement by Vector Measurement and Fitting Spectrum Model for In-Situ Gas Sensors
Y. Teshima, Y. Isaka, T. Suzuki, T. Murakami, M. Ueno, Y. Watanabe, Nippon Institute of Technology, Japan*

37 External Aperture Admittance of a Slot in a Rectangular Waveguide
J. C. Young, J. Hirokawa, M. Ando, Tokyo Institute of Technology, Japan*

38 Bandwidth Enhancement Using Loading Technique and Comparison between Square Microstrip Antenna
S. V. Khobragade, S. N. Talbar, Dr. B. A. T.University, India*

39 Estimation of the Outside Data in the Bi-Polar Scanning
F. D'Agostino, F. Ferrara, C. Gennarelli, G. Riccio, University of Salerno, Italy; C. Savarese, University of Naples "Parthenope", Italy*

40 The Effect of Element Width on the Impedance Bandwidth and Mode for the Rectangular Monopole Antenna
M. J. Ammann, J. A. Evans, Dublin Institute of Technology, Ireland*

41 Weighting Windows Based on Atomic Functions in the Two-Stage Digital Signal Processing Scheme of SAR
V F. Kravchenko, Institute of Radioenginnering and Elecronics of the Russian Accademy of Scienzes, Moscow Russia; D.V.Smirnov, Bauman Moscov State Tecnical University Moscow Russia*

42 Errors of First-Order Probe Correction for Higher-Order Probes in Spherical Near-Field Antenna Measurements
T. A. Laitinen, J. M. Nielsen, S. N. Pivnenko, O. Breinbjerg, Technical University of Denmark, Denmark*

43 Polarization Agile Microstrip Patch Planar Array Antenna
A. Vallecchi, University of Florence, Italy*

44 Artificial Neural Networks for the Analysis of Inter-Element Coupling in Large Arrays
G. Pelosi, A. Pinto, C. Riminesi, S. Selleri, M. Tatini, DET - University of Florence, Italy*

45 Novel Dielectric EBG Antenna with Omnidirectional Pattern in Azimuth
L. Freytag, E. Pointereau, B. Jecko, IRCOM, France*

46 Application of Multiple Objective Particle Swarm Optimization to Analogue Filter Tuning
Y. Zhang, C. Ji, P. Yuan, G. Wang, Northeastern University, China*

16:00-16:45 **Poster Short Presentation (4): Complex Media – Materials – Guided Waves – Statistical Electromagnetics**
Chair(s): N. Engheta, R. W. Ziolkowski

47 Astigmatic Beam Tracing for Multipath Prediction in Urban Environment
E. Di Giampaolo, University of L'Aquila, Italy*

48 Paraxial Model of Pulse Propagation in Tunnels
N. Y. Zhu, F. M. Landstorfer, Universitaet Stuttgart, Germany*

49 RF MEMS Tunable Inductor
I. Zine-El-Abidine, M. Okoniewski, J. G. McRory, University of Calgary, Canada*

50 RF Exposure Compliance Boundary Determination for Elongated Antennas
J. E. Friden, Ericsson AB, Sweden*

51 FEM-BI Numerical Formulation for the Analysis of Cavity Antennas Loaded by Complex Media, Metamaterials and High Impedance Surfaces
F. Bilotti, L. Vegni, University of Roma Tre, Italy*

52 Strong Spatial Dispersion in Wire Media in the Very Large Wavelength Limit
P. A. Belov, C. R. Simovski, St. Petersburg Institute of Fine Mechanics and Optics, Russia; R. Marques, University of Sevilla, Spain; S. I. Maslovski, S. A. Tretyakov, Helsinki University of Technology, Finland; I. S. Nefedov, Russian Academy of Science, Russia; M. Silverinha, Instituto de Telecomunicacoes, Lisbon, Portugal*

53 Application of Genetic Algorithm to Optimal Design of a Polarization-Transformation Filter Using Left-Handed Metamaterials and Chiral Media
A. Kusunoki, M.Tanaka, Oita University, Japan*

54 Identification of Multipath Phenomena from Wide-Band Electromagnetic Interactions with Construction Materials - *F. Sagnard*, T. Quiniou, G. E. Zein, IETR-INSA, France; C. Vignat, UMLV, France*

55 Pulse Compression Using a Periodically Dielectric Loaded Dispersive Waveguide
E. C. Thirios, D. I. Kaklamani, N. K. Uzunoglu, National Technical University of Athens, Greece*

56 Analysis and Optimal Design of Metallic Reflector Grating in A Rectangular Waveguide
S. Kondoh, T. Muya, A.Hirata, T.Shiozawa, Osaka University, Japan*

57 A Simple Approach to Quasi-TEM Analysis of a Planar Multi-Conductor Structure Embedded in an Elliptically Stratified Environmen
M. K. Norgren, Alfven Laboratory, Sweden*

58 Coupling between the Whispering Gallery Mode in A Microring Laser and Fundamental Mode in an Elliptic Optical Fiber - *L. W. Pearson*, R. Baktur, J. M. Ballato, Clemson University, USA*

59 Intermodal Oscillation in Millimeter Wave Band Barrel-Shaped Open Resonator
R. V. Golovashchenko, V. N. Derkach, IRE NAS of Ukraine, Ukraine*

60 Microwave Resonant Systems Based on Chaotic Billiard Geometry
V. N. Derkach, K. A. Lukin, A. S. Plevako, E. V. Goroshko, IRE NAS of Ukraine, Ukraine*

61 Simulations of Connection of Optical Fiber Circuits by Optical Beam Self-Trapping in Photocurable Media
V. Grimalsky, E. Gutierrez, National Institute for Astrophysics, Optics, and Electronics, Mexico; S. Sarkisov, M. Curley, Alabama Agricultural and Mechanical University, USA; K. V. Jackson, NASA Marshall Space Flight Center, USA; S. Koshevaya, Autonomous University of Morelos, Mexico*

62 Propagation Characteristics of Finite Non-Reciprocal Magnetic Photonic Crystals
G. Mumcu, K. Sertel, J. L. Volakis, The Ohio State University, USA; A. Figotin, I. Vitebskiy, University of California at Irvine, USA*

63 Microwave Interaction in Nonlinear Metamaterial
M. Lapine, M. Gorkunov, University of Osnabrueck, Germany*

64 Analytical-Numerical Estimation of Effective Permittivity in Multi-Component Systems
T. P. Iglesias, N. Banerji, J. Peon-Fernandez, J. Martin-Herrero, Universidad de Vigo, Spain*

16:45-18:45 **Poster Session**

WEDNESDAY

26 MAY

8:30-9:50	**Plenary Session 3: Perspectives into the History and Development of Electromagnetics – Past, Present and Future** Convenors: O.M. Bucci, R. Mittra, G. Pelosi *Chair(s): A. Ishimaru, L. Shafai*
8:30	Smart Antennas in Future Mobile Communications (*Invited*) *Presented by: W. Wiesbeck, IHE University of Karlsruhe, Germany*
9:10	Microwave Remote Sensing (*Invited*) *Presented by: G. Franceschetti, Università "Federico II" di Napoli, Italy*

9.50-10:10 Coffee Break

ROOM: FERMI

10:10-12:10 **Antenna Design Methods**
Chair(s): A. Petosa, H. Nakano

10:10 Analysis of a Waveguide Round-Ended Wide Straight Slot by the Method of Moments Using Numerical-Eigenmode Basis Functions
M. Zhang, T. Hirano, J. Hirokawa, M. Ando, Tokyo Institute of Technology, Japan*

10:30 A Height Reduction Technique for Log-Periodic Zigzag Antenna Using a Quasi-Fractal Concept
S.K Sharma, L. Shafai, the University of Manitoba, Canada*

10:50 Spectral-Domain Moment-Method Analysis of Wideband Patch Antennas with Capacitive Probe Feeds
G. Mayhew-Ridgers, Vodacom (Pty) Ltd, South Africa; J.W. Odendaal, J. Joubert, University of Pretoria, South Africa*

11:10 Arrays Synthesis with the Fourier Relation Method
A.M. Casimiro, Algarve University, Portugal; J.A. Azevedo, Madeira University, Portugal*

11:30 Series Expansion Method for Phase-Only Shaped Beam Synthesis and Adaptive Nulling
L. Marcaccioli, R.V. Gatti, R. Sorrentino, University of Perugia, Italy*

11:50 Analysis of Waveguide Arrays with Protruding-Dielectric Elements by Using the Method of Volume Integral Equations
S.P. Skobelev, Radiophyzika Co., Russia*

ROOM: AUDITORIUM

10:10-11:50 **The Role of Electromagnetism in Micro- and Nano-Technology (2)**
Convenor: P.L.E. Uslenghi
Chair(s): O.M. Bucci, R.J. Trew

10:10 Electromagnetics of Nanolayered Transparent Metals (*Invited*)
M.S. Sarto, University of Rome "La Sapienza", Italy; F. Sarto, ENEA Research Center, Italy; M.C. Larciprete, C. Sibilia, University of Rome "La Sapienza", Italy*

10:30 Magnetic Ring Devices (Part 1) (*Invited*)
V. Metlushko, UIC, USA, U. Welp, V. Vlasko-Vlasov, G. Crabtree, M. Grimsditch, V. Novosad, J. Hiller, N. Zaluzec, P. Vavassori, B. Ilic, X. Zhu, P. Gruetter, A. Imre, G.H. Bernstein, W. Porod, J. Bekaert, V.V. Moshchalkov, Y. Bruynseraede*

10:50 Magnetic Ring Devices (Part 2) (*Invited*)
V. Metlushko, UIC, USA , U. Welp, V. Vlasko-Vlasov, G. Crabtree, M. Grimsditch, V. Novosad, J. Hiller, N. Zaluzec, P. Vavassori, B. Ilic, X. Zhu, P. Gruetter, A. Imre, G.H. Bernstein, W. Porod, J. Bekaert, V.V. Moshchalkov, Y. Bruynseraede*

11:10 KCA Elements in Electromagnetically Metamorphic Objects and Interfaces (*Invited*)
N.G. Alexopoulos, F. De Flaviis, Y. Liu, University of California Irvine, USA*

11:30 Electromagnetic Control of Micro- and Nano-Machines for Biotechnological Applications (*Invited*)
O.M. Bucci, University of Naples Federico II, Italy*

ROOM: MARCONI

10:10-11:30 **Iterative Nonlinear Inverse Scattering Techniques (1)**
Convenors: S.Caorsi, A.Massa, C.Pichot
Chair(s): A. Massa; C. Pichot

10:10 Intelligence and Strategies in the Solution of Nonlinear Inverse Scattering Problems (*Invited*)
O.M. Bucci, University of Naples Fedrico II, Italy; T. Isernia, Università Mediterranea di Reggio Calabria, Italy*

10:30 Recent Advances in Nonlinear Inverse Scattering (*Invited*)
W.C. Chew, G.L Wang, A.A. Aydiner, University of Illinois, USA; T.J. Cui, South East University, China*

10:50 Contrast Source Inversion of 3D Objects with Electric and Magnetic Contrast (*Invited*)
P.M. van den Berg, Delft University of Technology, The Netherlands; A. Abubakar, Schlumberger-Doll Research, USA*

11:10 Iterative Nonlinear Reconstruction of Isotropic and Anisotropic 2D Objects Using TE and TM Polarizations (*Invited*)
E. Le Brusq, I. Aliferis, J.Y. Dauvignac, C. Pichot, University of Nice Sophia-Antipolis / CNRS, France*

ROOM: VOLTA

10:10-12:10 **UWB Radio Systems**
Convenors: M.Beach, I.J.Craddock
Chair(s): I. Craddock, A. Yarovoy

10:10 Considerations Regarding the Correlation between UWB Antenna Transmit and Receive Responses
J. Kunisch, J. Pamp, IMST Gmbh, Germany*

10:30 Ultra-Wideband Real-Time Channel Sounder and Directional Channel Parameter Estimation
R. Zetik, R. Thomä, J. Sachs, TU Ilmenau, Germany*

10:50 A Novel Wireless Mapping and Positioning Technique for Impulse Radio Networks
W. Guo, N.P. Filer, S.K. Barton, University of Manchester, UK*

11:10 Optimization of Bow-Tie-Like Antennas for UWB Impulse Radio
A.G. Yarovoy, R. Pugliese, Delft University of Technology, The Netherlands*

11:30 Direct-Coupled Concentric Half-Loop Antenna - a Low Cost Option for High Speed Point-to-Point UWB Links
S. Krishnan, Institute for Infocomm Research, Singapore; L.W. Li, M.S. Leong, P.S. Kooi, National University of Singapore, Singapore*

11:50 Echo Domain Multiple Access (EDMA) - A New Multiple Access Technique for Impulse Radio in a Multipath Environment
H. Cao, K.M. Nasr, S.K. Barton, University of Manchester, UK*

ROOM: PACINOTTI

10:10-11:50 **Numerical Methods (1)**
Convenors: R.D. Graglia, D.R. Wilton
Chair(s): R. Graglia, D.R. Wilton

10:10 A Fast Mom Calculation Technique for Printed Wire Antennas (*Invited*)
H. Nakano, K. Hitosugi, J. Yamauchi, Hosei University, Japan*

10:30 Use of the Laguerre Polynomials in Solving the Time Domain EFIE without the Time Variable (*Invited*)
Z. Ji, M. Yuan, T.K. Sarkar, Syracuse University, USA, B.H. Jung, Y. Chung, M. Salazar-Palma*

10:50 Rigorous Analysis of Extremely Large Spherical Reflector Antennas(*Invited*)
P.D. Smith, Macquarie University, Australia; S.S. Vinogradov, E.D. Vinogradova, Dundee University, UK*

11:10 Numerical Methods for Analysis of EM Scattering from an Electronically Large Ocean Surface (*Invited*)
L. Carin, Z. Zhao, Duke University, USA*

11:30 Recent Advances in Computational Electromagnetics from the Very Low Frequency to Ultra Large Scale Problems (*Invited*)
W.C. Chew, University of Illinois, USA; M.L. Hastriter, Air Force Institue of Technology, USA; L.J. Jiang, Y.H. Chu, University of Illinois, USA, S. Velamparambil*

ROOM: FIBONACCI

10:10-12:10 **Electromagnetic Crystal Structures**
Chair(s): C. A. Balanis, D.R. Jackson

10:10 Rigorous Analysis of Two-Dimensional Photonic Crystal Waveguides
K. Yasumoto, H. Jia, S. Kai, Kyushu University, Japan*

10:30 Nonlinear Guided Waves and Solitons in Left-Handed Materials
I.V. Shadrivov, A.A. Sukhorukov, Y.S. Kivshar, Australian National University, Australia*

10:50 Optical Switching in Photonic Crystal Directional Coupler by Kerr Nonlinearity
H. Maeda, X. Li, Fukuoka Institute of Technology, Japan*

11:10 Analysis of Two-Dimensional Photonic Crystal Sharply Bent Waveguides
Y. Naka, H. Ikuno, Kumamoto University, Japan*

11:30 Efficient Simulation of 2D Electromagnetic Crystal Structures with the Multilevel Fast Multipole Algorithm
D. Pissoort, D.V. Ginste, F. Olyslager, Ghent University, Belgium; E. Michielssen, University of Illinois at Urbana-Champaign, USA*

11:50 Design of a Tunable Photonic Band Gap Notch Filter
V. Petruzzelli, A. D'Orazio, M. De Sario, V. Marrocco, F. Prudenzano, Politecnico Di Bari, Italy*

12:10-13:40 Lunch Break

ROOM: FERMI

13:40-15:40 **Special Antennas**
Chair(s): G. James; M. Martinez-Vazquez

13:40 Wavy-Walled Multimode Horn with Wide Bandwidth
H. Deguchi, M. Tsuji, H. Shigesawa, Doshisha University, Japan*

14:00 Modeling of a Radiating Via-Walled Laminated Waveguide
J. O. Litzenberger, Royal Military College of Canada, Canada; M. Clénet, G.A. Morin, DRDC Ottawa, Canada; Y.M.M. Antar, Royal Military College of Canada, Canada*

14:20 Stub Loaded Low Profile Loop Patch Antenna on a Finite Ground Plane
J. Thaysen, K.B. Jakobsen, Technical University of Denmark, Denmark*

14:40 Circularly Polarized Dielectric Resonator Antenna with a Slotted Ground Plane
C.Y. Huang, National Kaohsiung Normal University, Taiwan; M.H. Lin, Yung-Ta Institute of Technology, Taiwan; W.-C. Hsia, National Kaohsiung Normal University, Taiwan*

15:00 Design of a Tuneable UHF Conformal Antenna
P. Wahid, R. Ahmed, B.C. Deloach, Jr, University of Central Florida, USA*

15:20 Space and Leaky Wave Contributions to Green's Function of a Dielectric-Coated Circular Cylinder
A. Ye. Svezhentsev, National Academy of Sciences of Ukraine, Ukraine*

ROOM: AUDITORIUM

13:40-15:40 **Propagation and Scattering in Layered Structures**
Chair(s): C. M. Rappaport, P.M. van den Berg

13:40 Electromanetic Scattering from Periodic Arrays of Metallic Cylinders with Arbitrary Cross Section
H. Jia, K. Yasumoto, Kyushu University, Japan*

14:00 Integral Representation Based Models for Finite and Infinite Photonic Band Gap Materials
H. Roussel, W. Tabbara, L2S/DRE, France*

14:20 Combination of Classical Filter Theory and Spectral Domain Analysis for the Design of Multi-Layered Filters in the Submillimetre Wave Range
G. Wu, V. Hansen, University of Wuppertal, Germany; E. Kreysa, H.-P. Gemuend, Max Planck Institute for Radioastronomy, Germany*

14:40 Inhomogeneous Waves in Semiconducting Superlattice
O.V. Shramkova, A.A. Bulgakov, Institute of Radiophysics and Electronics of the NAS of Ukraine, Ukraine*

15:00 Numerical Synthesis of Periodic Multilayered Structures
J. Chandezon, G. Granet, Universite Blaise Pascal, France; A.Y. Poyedinchuk, Y.A. Tuchkin, N.P. Yashina, IRE NAS of Ukraine, Ukraine*

15:20 A Modified Microstrip-Line Typed Photonic Band-Gap (PBG) Structure Through Combination of Inductive and Capacitive Elements for S-Parameter Enhancement
M.S. Tong, M. Cheng, Y. Lu, L. Zhu, Nanyang Technological University, Singapore; Y. Chen, University of South Carolina, USA, K. Kagoshima*

ROOM: MARCONI

13:40-15:40 **Iterative Nonlinear Inverse Scattering Techniques (2)**
Convenors: S.Caorsi, A.Massa, C.Pichot
Chair(s): S. Caorsi, C. Pichot

13:40 Linear and Nonlinear Wavefield Inversion in Nondestructive Evaluation (NDE): Recent Advances and Future Challenges - *R. Marklein*, J. Miao, K.J. Langenberg, K. Mayer, University of Kassel, Germany; V. Schmitz, Fraunhofer-Institute for Nondestructive Testing, Germany*

14:00 A Hybrid Inverse Scattering Method to Reconstruct Two-Dimensional Targets in Limited Aspect Data Configuration - *A. Dubois, K. Belkebir*, M. Saillard, Institut Fresnel, France*

14:20 Inverse Imaging with Mixed Penalties
C. De Mol, Universite Libre de Bruxelles, Belgium; M. Defrise, Vrije Universiteit Brussel, Belgium*

14:40 Imaging from Real-Scattered Data Using a Nonlinear Iterative Multi-Scaling Approach (*Invited*)
A. Massa, D. Franceschini, M. Donelli University of Trento - DIT, Italy, S. Caorsi, University of Pavia, Italy, M. Pastorino, University of Genoa - DIBE, Italy*

15:00 Filtered Forward-Backward Time-Stepping Method Applied to Borehole Radar Imaging (*Invited*)
K. Hayashi, T. Tanaka, T. Takenaka, H. Zhou, Nagasaki University, Japan*

15:20 Two- and Three- Dimensional Non-Linear Inverse Scattering Algorithms Assissted by Analytical Tools for Mammography Application (*Invited*) - *C. Kechribaris, K. S. Nikita*, N. K. Uzunoglu, NTUA, Greece*

ROOM: VOLTA

13:40-15:40 **Modeling Techniques for EMI / EMC**
Convenors: C.M.Butler, J.L. Volakis
Chair(s): C. Butler, J.L. Volakis

13:40 A Generalized MoM-Spice Iterative Technique for Field Coupling to Multiconductor Transmission Lines in Presence of Complex Structures (*Invited*)
Y. Bayram, J.L. Volakis, The Ohio State University, USA*

14:00 Radiation from a Line Source inside a Trench in a Corner (*Invited*)
D. Erricolo, P.L.E. Uslenghi, University of Illinois at Chicago, USA*

14:20 EMI Coupling to a Device on a Printed Circuit Board Inside a Cavity from a Wire Penetrating an Aperture (*Invited*)
C. Lertsirimit, D.R. Jackson, D.R. Wilton, University of Houston, USA*

14:40 Study of the Effects of Microwave Interference on MOSFET Devices in CMOS Integrated Circuits(*Invited*)
A.A. Iliadis, K. Kim, V. Granatstein, University of Maryland, USA*

15:00 Statistical Correlation in an Overmoded 2D Lossless Cavity (*Invited*)
E. Laermans, D. De Zutter, D. Pissoort, Ghent University, Belgium*

15:20 Statistical Model for Scattering Matrices of Open Cavities
T.M. Antonsen, X. Zheng, E. Ott, S. Hammedy, S. Anlage, University of Maryland, USA*

ROOM: PACINOTTI

13:40-15:40 **Numerical Methods (2)**
Convenors: R.D. Graglia, D.R. Wilton
Chair(s): R. Graglia, L. W. Li

13:40 Evaluation of Singular and Hypersingular Integrals for 2D Geometries Using a Singularity Cancellation Technique (*Invited*)
D.R. Wilton, M.A. Khayat, University of Houston, USA*

14:00 Efficient Full-Kernel Evaluation in the Thin-Wire Electric Field Integral (*Invited*)
A. Heldring, J.M. Rius, UPC, Spain*

14:20 Hierarchical Singular Vector Bases for the FEM Solution of Wedge Problems (*Invited*)
R.D. Graglia, G. Lombardi, Politecnico di Torino, Italy*

14:40 Application of Adaptive Basis Functions/Diagonal Moment Matrix Technique to Arrays of Identical Elements
I.A. Eshrah, A.A. Kishk, University of Mississippi, USA*

15:00 Domain Decomposition Method with DP-FETI Technique for Solving Large Finite Antenna Arrays (*Invited*)
K. Zhao, M. Vouvakis, S.-C. Lee, J.-F. Lee, OSU, USA*

15:20 Scattering from Finite Periodic Surfaces: A Comparison between Integral Equation and Ray Techniques (*Invited*)
F. Bertoncini, University of Pisa, Italy; O.A. Civi, Middle East Tech. University, Turkey; V.B. Erturk, Bilkent University, Turkey; G. Manara, P. Nepa, University of Pisa, Italy*

ROOM: FIBONACCI

13:40-15:40 **High-Frequency / Short-Pulse Parameterizations: Honored Session to Prof. Leo Felsen (1)**
Convenors: F. Capolino, V. Galdi, E. Heyman
Chair(s): V. Galdi, R. Tiberio

13:40 High Frequency Asymptotics: a Toolbox for New Applications (*Invited*)
L.B. Felsen, Boston University, USA*

14:00 Three-Dimensional Modeling of a Short-Pulse Ground-Penetrating Radar System for Mine Detection (*Invited*)
L. Carin, X. Zhu, Duke University, USA*

14:20 Wideband Antenna Characteristics for UWB Radio Systems (*Invited*)
W. Wiesbeck, W. Soergel, University of Karlsruhe, Germany*

14:40 Network-Oriented Time Domain Green's Functions for Periodic Arrays and Waveguides with Arbitrary Cross Sections (*Invited*)
F. Capolino, University of Siena, Italy; L.B. Felsen, Boston University, USA*

15:00 High Frequency / Short Pulse Methods for Wave Propagation (*Invited*)
L. Sevgi, Dogus University., Turkey*

15:20 Ray-Mode Methods for Coupling at Junctions in Urban Street Canyons (*Invited*)
H.L. Bertoni, Polytechnic University, USA; J. Lee, Korea Intellectual Property Office, Korea*

15:40-16:00 Coffee Break

ROOM: FERMI

16:00-18:00 **Active and Miniaturized Antennas**
Convenors: P.S. Hall, T. Hori
Chair(s): P.S. Hall, R.J. Pogorzelski

16:00 Active Antennas for Commercial and Military Communications Satellites - A Review (*Invited*)
A.I. Zaghloul, Virginia Tech, USA; S. Weiss, O. Kilic, US Army Research Lab, USA*

16:20 Miniaturized Planar Antennas on LTCC Multilayer Technology for WLAN and V-Band Applications (*Invited*)
G. R Dejean, R.L. Li, M.M. Tentzeris, J. Laskar, Georgia Institute of Technology, USA*

16:40 Integrated Active Antenna Approach for RF Front-End Design (*Invited*)
K.M.K.H. Leong, J.-Y. Park, T. Itoh, UCLA, USA*

17:00 Modified E-Shaped PIFA Antenna for Wearable Systems
C. Cibin, P. Leuchtmann, M. Gimersky, R. Vahldieck, ETH Zurich, Switzerland; S. Moscibroda, Defense Procurement Agency, Switzerland*

17:20 An Exact Solution for Steady State Phase Distribution in an Array of Oscillators Coupled on a Hexagonal Lattice
R.J. Pogorzelski, Jet Propulsion Laboratory - Caltech, USA*

17:40 A Novel Fractal Rectangular Curve Printed Monopole Antenna for Portable Terminals
G. Tsachtsiris, M. Karaboikis, C. Soras, V. Makios, University of Patras, Greece*

ROOM: AUDITORIUM

16:00-18:00 **Materials (4)**
Convenors: P. de Maagt, N. Engheta, A. Sihvola, R.W. Ziolkowski
Chair(s): A.H. Sihvola, A.D. Yaghjian

16:00 Surface Impedance Characterizations Using Spectral FDTD Method: a Unified Approach to Analyze Arbitrary Artificial Complex Surfaces (*Invited*)
A. Aminian, F. Yang, Y. Rahmat-Samii, UCLA, USA*

16:20 Particular Effects in Composite Right-Left-Handed (CRLH) Materials: Losses, Finite Size, Varactors (*Invited*) *C. Caloz, T. Itoh*, UCLA, USA*

16:40 The Antenna of the CRLH TL Using Multilayers Substrate
A. Hirota, H. Arai, Yokohama National University, Japan; T. Itoh, University of California Los Angeles, USA*

17:00 Leaky-Wave Radiation from a Two-Dimensional Negative-Refractive-Index Transmission-Line Metamaterials (*Invited*)
A.K. Iyer, G.V. Eleftheriades, University of Toronto, Canada*

17:20 Network Synthesis of Artificial EBG Surfaces
M. Caiazzo, A. Cucini, M. Nannetti, S, Maci, Universiy of Siena, Italy*

17:40 The Influence of the Open Stopband on the Beaming of Light at Broadside Through a Subwavelength Hole (*Invited*)
A.A. Oliner, Brooklyn Polytechnic, USA; D. R. Jackson, University of Houston, USA; T. Zhao, Pennsylvania State University, USA; J.T. Williams, University of Houston, USA*

ROOM: MARCONI

16:00-18:00 **Iterative Nonlinear Inverse Scattering Techniques (3)**
Convenors: S. Caorsi, A. Massa, C. Pichot
Chair(s): T. Isernia, M. Tateiba

16:00 Clinical Microwave Breast Imaging: Early Results - Work in Progress
P.M. Meaney, Q. Fang, S.A. Pendergrass, M.W. Fanning, T. Raynolds, C.J. Fox, K.D. Paulsen, Dartmouth College, USA; S.P. Poplack, Dartmouth-Hitchcock Medical Center, USA*

16:20 Scatterers Localization in the Circular Scanning Geometry
O.M. Bucci, A. Capozzoli, G. D'Elia, M. Santojanni, Università di Napoli Federico II, Italy*

16:40 Numerically Efficient and Robust Iterative Algorithm for Microwave Imaging
T. Meyer, A. Jöestingmeier, A.S. Omar, University of Magdeburg, Germany*

17:00 A New Technique Finding the Convex Hull of a Scattering System: Performance Analysis and Application to Inhomogeneous Backgrounds"
O.M. Bucci, A. Capozzoli, G. D'elia, P. Vinetti, Università di Napoli Federico II, Italy*

17:20 An Approach to the Inverse Scattering Problem Using a Series Expansion of T-Operator
K. Ishida, Kyushu Sangyo University, Japan; M. Tateiba, Kyushu University, Japan*

17:40 Reconstruction of Buried Conducting Objects Through Point Source Method
I. Akduman, Istanbul Technical University, Turkey; R. Potthast, University of Goettingen, Germany*

16:00-17:40 **Numerical Methods (3)**
Chair(s): F. Catedra, T. Sarkar

16:00 Full-Wave Diakoptics For Fast Structure Optimization
M. Le Doze, M.M. Ney, S. Le Maguer, LEST, France*

16:20 Efficient Simulation of Photonic Crystals Using the Transmission Line Matrix Method
G. Romo, T.J. Smy, Carleton University, Canada*

16:40 An Analytical Method of Auxiliary Sources Solution for Plane Wave Scattering by Impedance Cylinders
N.V. Larsen, O. Breinbjerg, Technical University of Denmark, Denmark*

17:00 A Computationally Efficient Iterative Algorithm for the Analysis of Finite Arrays
A.C. Polycarpou, Intercollege, Cyprus*

17:20 Multigrid Formulation for the Helmholtz Operator with Open Boundaries
S. Gheorghe, L. Klinkenbusch, University of Kiel, Germany*

16:00-18:00 **High-Frequency / Short-Pulse Parameterizations: Honored Session to Prof. Leo Felsen (2)**
Convenors: F. Capolino, V. Galdi, E. Heyman
Chair(s): F. Capolino, E. Heyman

16:00 Phase-Space Beam Summation Formulations for Ultra Wideband (UWB) Radiation (*Invited*)
A. Shlivinski, Kassel University, Germany; E. Heyman, A. Boag, Tel-Aviv University, Israel; C. Letrou, I.N.T, France*

16:20 Multi-Resolution Homogenization of Multi-Scale Laminates: Scale-Dependent Parameterization (*Invited*)
B. Z. Steinberg, Tel-Aviv University, Israel*

16:40 Coupled Waves in Nonlinear Guided-Wave Optics: Spatial Temporal Davey-Stewartson Solitons in Second-Order Cascade (*Invited*)
J.M. Arnold, University of Glasgow, UK*

17:00 Matrix Compression Via Problem Matched Basis Functions for The Analysis of Large Arrays (*Invited*)
G. Vecchi, Politecnico Di Torino, Italy; S. Maci, University of Siena, Italy; A. Neto, TNO, the Netherland*

17:20 High-Frequency Wave Dynamics of Ray-Chaotic Scatterers (*Invited*)
G. Castaldi, V. Galdi, I.M. Pinto, University of Sannio, Italy; L.B. Felsen, Boston University, USA*

17:40 Heuristic High-Frequency Formulations for Scattering at Edges in Material Panels (*Invited*)
R. Tiberio, A. Toccafondi, A. Polemi, M. Brogioni, University of Siena, Italy*

THURSDAY

27 MAY

8:30-9:50	**Plenary Session 4: Perspectives into the History and Development of Electromagnetics – Past, Present and Future** Convenors: O.M. Bucci, R. Mittra, G. Pelosi *Chair(s): S. Strom, P.L.E. Uslenghi*
8:30	Metamaterial Structures for Microwave Circuit Components (*Invited*) *T. Itoh, UCLA, USA*
9:10	Genetic Algorithm (GA) and Particle Swarm Optimization (PSO): Powerful Paradigms for Unconventional Designs (*Invited*) *Presented by: Y. Rahmat-Samii, UCLA, USA*

9:50-10:10 Coffee Break

ROOM: FERMI

10:10-12:10 **Antenna Arrays**
Chair(s): J. Hirokawa, S. R. Rengarajan

10:10 Broadband Series-Fed Printed Dipole Arrays in Uniplanar Configuration
S.G. Mao, S.-L. Chen, National Taipei University of Technology, Taiwan*

10:30 Optimized Design of High-Efficiency Rectangular Horns for Arrays
T.S. Bird, C. Granet, CSIRO ICT Centre, Australia*

10:50 An Efficient Approach for Irregularly Contoured Planar Phased Arrays with Tapered Excitation
E. Martini, S. Maci, A. Toccafondi, R. Tiberio, University of Siena, Italy

11:10 Array of Perforated Dielectric Fresnel Lenses
A. Petosa, A. Ittipiboon, S. Thirakoune, Communications Research Centre, Canada*

11:30 Finite Phased Arrays of Printed Dipoles on Large Circular Cylinders: a Comparison with the Planar Case
V.B. Ertürk, B. Güner, Bilkent University, Turkey*

11:50 Distributed Three-Dimensional Array Configurations for Volumetric Controlled Field Coverage: a New Concept for High-Efficiency, Distance-Selective Wireless Local Area Networks
M. Terada, New Mexico State University, USA*

ROOM: AUDITORIUM

10:10-12:10 **Homogenization of Electromagnetic Material Parameters**
Convenors: G. Kristensson, B.Z. Steinberg
Chair(s): G. Kristensson, B.Z. Steinberg

10:10 Review of Contemporary Homogenization Methods (*Invited*)
N. Wellander, Swedish Defence Research Agency, FOI, Sweden*

10:30 Homegenization and Metamaterial Transmission Lines (*Invited*)
R.W Ziolkowski, C.-Y. Cheng, University of Arizona, USA*

10:50 Decreasing the Computational Complexity of Determination of Effective Permittivity of a Pseudorandom Mixture (*Invited*)
L. Jylhä, A. Sihvola, Helsinki University of Technology, Finland*

11:10 Numerical Methods for Homogenization of Maxwell's Equations
C. Engström, D. Sjöberg, Lund Institute of Technology, Sweden*

11:30 Full-Wave Homogenization Technique for Randomly Oriented PEC Wires in a Lossless Dielectric
S. Van Damme, A. Franchois, Ghent University, Belgium*

11:50 Effective Material Parameters for 3D Periodic Media with Small but Non-Vanishing Microscopic Scale
D. Sjöeberg, Lund Institute of Technology, Sweden*

ROOM: MARCONI

ROOM: VOLTA

10:10-12:10 **Diffraction from Gratings**
Chair(s): O. Breinbjerg, P. Nepa

10:10 Reformulation of the Differential Method for Anisotropic Crossed Gratings with Smooth Profile
K. Watanabe, Fukuoka Institute of Technology, Japan*

10:30 Diffraction of Plane Waves by Multielement Gratings
V. Jandieri, K. Yasumoto, Kyushu University, Japan*

10:50 Diffraction of Electromagnetic Waves on the Layered Cross Gratings of the Periodic Circular Cylinders
V. Jandieri, K. Yasumoto, Kyushu University, Japan*

11:10 Scattering of Electromagnetic Waves by Inhomogeneous Dielectric Gratings with Perfectly Conducting Strip
T.Yamasaki, T. Hinata, T. Hosono, Nihon University, Japan*

11:30 A Spectral-Domain Technique for Plane-Wave Scattering by a Finite Set of Cylinders Buried in a Dielectric Half-Space
M. Di Vico, ROMA TRE University of Rome, Italy; F. Frezza, L. Pajewski, "La Sapienza" University of Rome, Italy; G. Schettini, ROMA TRE University of Rome, Italy*

11:50 Nonspecular Wave Reflection from a Diffraction Grating with a Chiral Medium
S.B. Panin, A.Ye. Poyedinchuk, Institute for Radiophysics and Electronics of National Academy of Sciences of Ukraine, Ukraine*

ROOM: PACINOTTI

10:10-12:10 **Mathematical Modeling of EM Problems**
Chair(s): A. Heldring, P.D. Smith

10:10 Derivation of Novel Simplified Theoretical Formulas in Convergence of Addition Theorem
T. Yamamoto, Yamagata University, Japan; W.C. Chew, University of Illinois, USA*

10:30 Low-Frequency Modeling of the Interaction of Magnetic Dipoles and Ellipsoidal Bodies in a Conductive Medium
G. Perrusson, L2S-DRE, France; P. Vafeas, ICEHT-FORTH, Greece; D. Lesselier, L2S-DRE, France*

10:50 A General Formulation for Analysing an Array of Arbitrarily Oriented Collocated Circular Loops
S. Krishnan, Institute for Infocomm Research, Singapore; L.W. Li, M.S. Leong, P.S. Kooi, National University of Singapore, Singapore*

11:10 Singularity Treatment of Spectral Domain Integrals Arising from the Integral Equation Analysis of Large (M)MIC-Structures
T. Vaupel, T.F. Eibert, FGAN-FHR, Germany; V. Hansen, University of Wuppertal, Germany*

11:30 Two Robust Methods to Compute the Current Along a Straight Thin Wire
M.C. van Beurden, A.G Tijhuis, Eindhoven University of Technology, The Netherlands*

11:50 Degeneracy of Exact Modes in Multi-Layer Optical Fibers
T. Pakizeh, Iran Telecommunication Research Center, Iran; N. Granpayeh, M.S. Abrishamian, K.N. Toosi University of Technology, Iran*

ROOM: FIBONACCI

10:10-12:10 **High-Frequency and Hybrid Methods (1)**
Convenors: P.H. Pathak, R. Tiberio
Chair(s): A.V. Osipov, P.H. Pathak

10:10 Electromagnetic Scattering at Edges in Impedance Screens: a Uniqueness/Reciprocity Intriguing Issue (*Invited*) - *R. Tiberio*, A. Toccafondi, University of Siena, Italy*

10:30 EM Scattering by a Wedge Buried in a Lossy Medium: a UTD Solution for the Field in the Lossy Half-Space (*Invited*)
F. Bertoncini, G. Manara, P. Nepa, University of Pisa, Italy; R.G. Kouyoumjian, The Ohio State University, USA*

10:50 Phase-Space Configuration-Spectrum Hybrid Formulations for High Frequency Guided and Aperture-Radiated Wavefields (*Invited*) - *L.B. Felsen*, Boston University, USA*

11:10 A Hybrid Combination of Full Wave-Asymptotic and Circuit Based Analysis of the Radiation and Receiving (or Scattering) by Large Finite Patch Antenna Arrays with a Printed Feed Network (*Invited*)
P. Mahachoklertwattana, P.H. Pathak, P. Janpugdee, R.J. Burkholder, The Ohio State University, USA; Y.-B. Gan, National University of Singapore, Singapore*

11:30 Two Edge Excited Rays on Convex and Concave Structures - 2D and 3D Problems (*Invited*)
F.A Molinet, Societe MOTHESIM, France*

11:50 Creeping and Generalized Creeping Waves (*Invited*)
D. Bouche, CEA DPTA, France; I. Andronov, University of St. Petersburg, Russia*

12:10-13:40 Lunch Break

ROOM: FERMI

13:40-15:40 **Reflectors and Reflectarrays**
Chair(s): T.S. Bird, G. Di Massa

13:40 Multibeam Reflector Antenna with Interlaced Focal Feeds by Using a 1-D Dielectric EBG Resonator
R. Chantalat, T. Monédière, M. Thévenot, B. Jecko, IRCOM- CREAPE, France; P. Dumon, Cnes, France*

14:00 A New Approach to the Power Pattern Synthesis of Reflectarrays
O.M. Bucci, A. Capozzoli, G. D'Elia, S. Musto, Università di Napoli Federico II, Italy*

14:20 Transmission Line Model for Slot-Coupled Microstrip Reflectarray Antennas
S. Costanzo, F. Venneri, G. Di Massa, D.E.I.S - University of Calabria, Italy*

14:40 Analysis of a Dual Frequency Microstrip Reflectarray
S.R. Rengarajan, California State University, USA*

15:00 Polarimetric Van Atta Reflector for Airborne SAR Calibration
M. Fujita, S. Nakamura, Tokyo Metropolitan Institute of Technology, Japan*

15:20 Influence of Gaps Between Panels in Large Reflector Antennas Comparison of Different Techniques
M. Lumholt, TICRA, Denmark*

ROOM: AUDITORIUM

13:40-15:40 **Random Media and Rough Surfaces**
Chair(s): J.F. Lee, A. Yarovoy

13:40 Scattering Enhancement Phenomenon and Random Medium Intensity
Z.Q. Meng, Fukuoka University, Japan; M. Tateiba, Kyushu University, Japan*

14:00 Backscattering Enhancement of Partially Convex Targets of Large Sizes in Continuous Random Media for E-Polarization Wave - *H. El-Ocla*, Lakehead University, Canada; M. Tateiba, Kyushu University, Japan*

14:20 Transformation of the Angular Spectrum of Scattered Radiation of the Point Source Passing Absorptive Randomly Inhomogeneous Layer
V.G. Gavrilenko, A.V. Sorokin, Nizhny Novgorod State University, Russia; A. Ishimaru, Washington University, USA; G.V. Jandieri, V.G. Jandieri, Georgian Technical University, Georgia*

14:40 Gaussian Beam Summation Formulation of Rough Surface Scattering
G. Gordon, E. Heyman, Tel Aviv University, Israel; R. Mazar, Ben-Gurion University, Israel*

15:00 Electromagnetic Scattering from Natural Surfaces: Validation of a Fractal Approach
G. Franceschetti, A. Iodice, D. Riccio, G. Ruello, Università di Napoli, Italy; P. Blanco, J. Mallorquì, A. Broquetas, Universitat Politècnica de Catalunya, Spain*

15:20 An Analysis of the Effective Propagation Constants for a Composite Media Containing Sparsely and Randomly Distributed Pairs of Dielectric or Chiral Spheres - *D. Ochi, NTT, Japan; T. Matsuoka*, M. Tateiba, Kyushu University, Japan; Y. Nanbu, Sasebo National College of Technology, Japan*

ROOM: MARCONI

13:40-15:40 **Radio Frequency / Microwave Tomography and Applications (1)**
Convenors: K. Langerberg, R. Pierri
Chair(s): K. Langerberg, R. Pierri

13:40 An Overview of the Center for Subsurface Sensing and Imaging Systems (CenSSIS) (*Invited*)
M.B. Silevitch, C.M. Rappaport, Northeastern University, USA; D. Castañon, Boston Universtiy, USA*

14:00 Microwave Tomography Using Linear and Nonlinear Contrast Source Inversion (*Invited*)
P.M. van den Berg, Delft University of Technology, The Netheralnds; A. Abubakar, Schlumberger-Doll Research, USA*

14:20 Adaptive Multiscale Approach for 2D Microwave Tomography
A. Baussard, DRE/LSS, France; E.L. Miller, Censsis, USA; D. Lesselier, DRE/LSS, France*

14:40 Reconstruction of 3-D Objects Buried in Layered Media Using Born and Distorted Born Iterative Methods (*Invited*)
F. Li, Q.H. Liu, L.-P. Song, Duke University, USA*

15:00 An Algorithm for Ground Penetration Imaging Using Synthetic Aperture Radar Concept
C. Ozdemir, Mersin University, Turkey; S. Lim, H. Ling, The Univ. of Texas at Austin, USA*

15:20 Which Model for Inversions? The Case of Strong Scatterers (*Invited*)
R. Pierri, Seconda Università di Napoli, Italy, A. Liseno, Deutsches Zentrum Fuer Luft- und Raumfahrt, Germany; R. Solimene, Università Mediterranea di Reggio Calabria, Italy*

ROOM: VOLTA

13:40-15:40 **Interaction of EM Waves with Biological Tissues (1)**
Convenors: K. Ito, Y. Rahmat-Samii
Chair(s): M. Okoniewski, Y. Rahmat-Samii

13:40 Phantoms for Evaluation of Interactions Between Antennas and Human Body (*Invited*)
K. Ito, H. Kawai, Chiba University, Japan*

14:00 Numerical Dosimetry on the Scales of Biological Body, Tissue and Cell (*Invited*)
X. Chen, Y. Alfadhl, Z. Wang, C.C. Chiau, University of London, UK*

14:20 Application of 3D-SIBC FDTD Method to Electromagnetic Dosimetry of Whole-Body Human Models Standing on Non-Metal Ground Planes (*Invited*) - *S. Watanabe*, National Inst. of Information and Commun. Tech., Japan; Y. Tanaka, M. Takahashi, Tokyo Univ. of Agriculture and Tech., Japan; M. Taki, Tokyo Metropolitan Univ., Japan; Y. Yamanaka, National Inst. of Information and Commun. Tech., Japan*

14:40 Modeling of Interactions of Electrostatic Discharge with the Human Body
E. Okoniewska, M.A. Stuchly, Univ. of Victoria, Canada; M. Okoniewski, Univ. of Calgary, Canada*

15:00 Maximum Temperature Increase in the Human Head for the SAR Values Prescribed in Safety Standards
A. Hirata, T. Shiozawa, Osaka University, Japan*

15:20 Dependance of the EM Power Absorbed in the Head of a Mobile Phone User on the Phone-Head Distance (*Invited*) - *T. N. Zervos*, A.A. Alexandridis, National Centre of Scientific Research "Demokritos", Greece; V.V. Petrovi, University of Belgrade, Yugoslavia; K. Dangakis, National Centre of Scientific Research "Demokritos", Greece; B.M. Kolundžija, A.R. Djordjevi, University of Belgrade, Yugoslavia; C. Soras, University of Patras, Greece*

ROOM: PACINOTTI

13:40-15:40 **Numerical Methods for Integral and Differential Equations (1)**
Chair(s): M. Salazar-Palma, F. Bardati

13:40 Near Field to Equivalent Currents Transformation with Radome Applications
K. Persson, M. Gustafsson, Lund University, Sweden*

14:00 Higher-Order VSIE-MoM Formulation for Scattering by Composite Metallic and Dielectric Objects
O.S. Kim, Technical University of Denmark, Denmark, P. Meincke, O. Breinbjerg, Technical University of Denmark, Denmark, E. Jørgensen, TICRA, Denmark*

14:20 A Vector Multi-Resolution MoM for Complex Antennas on Triangular Meshes
F. Vipiana, P. Pirinoli, G. Vecchi, Politecnico Di Torino, Italy*

14:40 Application of Moment Method with Multigrid to Scattering of a Gaussian Beam by a Dielectric Cylinder - *M. Yokota*, Miyazaki University, Japan*

15:00 Finite Difference Frequency Domain (FDFD) Modeling of Two Dimensional TE Wave Propagation and Scattering
C.M. Rappaport, Q. Dong, E. Bishop, A. Morgenthaler, Northeastern University, USA; M. Kilmer, Tufts University, USA*

15:20 Computational Complexity of the Moment Method for Various Matrix Calculation Schemes
G.K. Avdikos, H.T. Anastassiu, National Technical University of Athens, Greece*

ROOM: FIBONACCI

13:40-15:40 **High-Frequency and Hybrid Methods (2)**
Convenors: P.H. Pathak, R. Tiberio
Chair(s): R. Tiberio, P.L.E. Uslenghi

13:40 A Hybrid Technique for the Analysis of Scattering by Impedance Wedges (*Invited*)
A.V. Osipov, DLR-Oberpfaffenhofen, Germany*

14:00 Analysis of Radiation and Scattering from Large Bodies Using Current Modes (*Invited*)
M.F. Catédra, C. Delgado, O. Gutiérrez, F. Sáez De Adana, Universidad de Alcala, Spain*

14:20 Vertex Diffraction Coefficient for a Quarter Plane (*Invited*)
M. Albani, University of Messina, Italy; F. Capolino, S. Maci, University of Siena, Italy*

14:40 Double Diffraction at a Pair of Completely Skewed Wedges
M. Albani, University of Messina, Italy*

15:00 Creeping and Whispering Gallery Waves at Interfaces (*Invited*)
I. Andronov, St.Petersburg University, Russia; D. Bouche, CEA DIF DPTA, France*

15:20 Unified Asymptotic Methods Formulations for the Shooting and Bouncing Ray Technique
S. Laybros, H.J. Mametsa, ONERA, France; P.F. Combes, UPS, France; P. N'Guyen, OKTAL, France*

15:40-16:00 Coffee Break

ROOM: FERMI

16:00-18:00 **Wideband Antennas for Wireless Communications**
Chair(s): M. Orefice, L.W. Li

16:00 Wideband Microstrip L-Slot Antenna for Wireless Communications
S.I. Latif, University of Manitoba, Canada; S. K. Sharma, Infomagnetics Technologies Corp., Canada; L. Shafai, University of Manitoba, Canada*

16:20 Modified Printed Dipole Antennas for Wireless Multi-Band Communication Devices
E. Surducan, D. Iancu, J. Glossner, Sandbridge Technologies Inc., USA*

16:40 A Strip-Based Broad Band Monopole Antenna Design with Conductive Elements for the 800-2500 MHz Band
V. Monebhurrun, A. Azoulay, F. Jouvie, Ecole Superieure D'electricite, France*

17:00 Synthesis of Planar Antennas with the Use of Higher Order Modes Resonances
M. Polívka, M. Mazánek, Czech Technical University in Prague, Czech Republic*

17:20 Analysis of A 900/1800 MHz Dual-Band Loop Antenna on a Metallic Handset Proximate to a Head Model
L.C. Kuo, H.R. Chuang, National Cheng Kung University, Taiwan*

17:40 Small Multi-Band Planar Inverted-F Antenna for Mobile Communication Systems and WLAN/WPAN Applications
L. Fregoli, University of Pisa, Italy; C. Peixeiro, Instituto Superior Tecnico, Portugal*

ROOM: AUDITORIUM

16:00-17:40 **Artificial Magnetic, Soft and Hard Surfaces and Other Complex Surfaces (2)**
Convenors: P-S. Kildal, A. Kishk, S. Maci
Chair(s): A. Kishk, S.Skobelev

16:00 Frequency Selective Metamaterial Surfaces for Compact Cavity Resonator
M. Caiazzo, S. Maci, University of Siena, Italy; N. Engheta, University of Pennsylvania, USA*

16:20 Anomaly When Studying Electromagnetic Radiation from the Open End of Ideally Hard Circular Waveguide
S.P. Skobelev, Radiophysika, Russia; P.-S. Kildal, Chalmers University of Technology, Sweden*

16:40 Quasi - TEM Waveguide by Using FSS Based Hard Surfaces
A. Cucini, M. Caiazzo, P. Bennati, S. Maci, University of Siena, Italy*

17:00 A New Efficient Approach for the Analysis of MD-EBG
S. Germani, L. Minelli, M. Bozzi, L. Perregrini, University of Pavia, Italy; P. de Maagt, ESA-ESTEC, The Netherlands*

17:20 Left-Handed Metamaterial Based on Dual Split Ring Resonators in Microstrip Technology
R. Marqués, J. Baena, Universidad de Sevilla, Spain; F. Martín, J. Bonache, Universitat Autonoma de Barcelona, Spain; F.J. Falcone, T. Lopetegi, M. Beruete, M. Sorolla, Universidad Publica de Navarra, Spain*

ROOM: MARCONI

16:00-18:00 **Radio Frequency / Microwave Tomography and Applications (2)**
Convenors: K.J. Langerberg, R.Pierri
Chair(s): K.J. Langenberg, R. Pierri

16:00 3-D Image Reconstruction for Tomography Using Incoming Wave Functions and Method of Auxiliary Sources
R. Zaridze, K. Tavzarashvili, Tbilisi State University, Georgia*

16:20 Developement and Feasibility Study of a Functional Brain Passive Microwave Tomography System
I.S. Karanasiou, N.K. Uzunoglu, National Technical University of Athens, Greece*

16:40 A Computer Simulation Study of the Location Estimation $\nabla 2\ \psi = -\ \phi\psi$ (*Invited*)
G. Tsihrintzis, P. Lampropoulou, University of Piraeus, Greece*

17:00 Including Arbitrary Antenna Patterns in Microwave Imaging of Buried Objects (*Invited*)
P. Meincke, O.S. Kim, H.-R. Lenler-Eriksen, Technical University of Denmark, Denmark*

17:20 Nondestructive Evaluation of Embedded Structures in Concrete: Modeling and Tomographic Imaging (*Invited*) - *K. J. Langenberg*, K. Mayer, R. Marklein, University of Kassel, Germany; A. Zimmer, C. Kohl, BAM, Germany*

17:40 Concrete Diagnosis by V-Band ISAR (*Invited*)
K. Kuroda, Y. Baryan, Y. Maruyama, K. Sasaki, Y. Watanabe, Nippon Institute of Technology, Japan*

ROOM: VOLTA

16:00-18:00 **Interaction of EM Waves with Biological Tissues (2)**
Convenors: K.Ito, Y.Rahmat-Samii
Chair(s): K. Ito, M. Okoniewski

16:00 Characterization of Implanted Antennas Inside a Human Head: SDGF and FDTD Techniques (*Invited*)
J. Kim, Y. Rahmat-Samii, UCLA, USA*

16:20 Performance of Multiband Handset Antennas in the Presence of A Human User (*Invited*)
M. Martinez-Vázquez, D. Manteuffel, O. Litschke, IMST, Germany*

16:40 Microwaves in Breast Cancer Detection: a Comparison Between Active and Passive Methods (*Invited*)
F. Bardati, G. Marrocco, M.P. Massaro, Universtity of Tor Vergata Roma, Italy; P. Tognolatti, University of L'Aquila, Italy*

17:00 A BEM Modelling of the Dielectrophoretic Behavior of Bacterial Cells
A. Sanchis, M. Sancho, G. Martínez, J.L. Sebastián, S. Muñoz, Universidad Complutense, Spain*

17:20 Heating Performances of Array Applicator for Interstitial Microwave Hyperthermia: Numerical Simulation and Clinical Trial
K. Saito, K. Ito, Chiba University, Japan; Y. Aoyagi, H. Horita, Tokyo Dental College, Japan*

17:40 RF and Microwave Permittivities of Insects and Some Applications
S.O. Nelson, U.S. Department of Agriculture, USA*

ROOM: PACINOTTI

16:00-18:00 **Numerical Methods for Integral and Differential Equations (2)**
Chairs: M. Salazar-Palma, T. Yamasaki

16:00 Nodal- and Edge-Based Vector Basis Functions on Higher Order and Rational Geometries in the BEM
A. Hellicar, J. Kot, CSIRO, Australia*

16:20 A Quasi Static Iterative Method for Inductor Parameters
P. Johannesson, A. Karlsson, Lund University, Sweden*

16:40 New Preconditioners for the CFIE Equation of Electromagnetism
D.P. Levadoux, ONERA, France*

17:00 GA-Based Complex Image Method of Closed-Form Green's Functions for the CPW Type Structures
S. Kahng, Electronics and Telecommunications Research Institute, Korea; J. Choi, Hanyang University, Korea*

17:20 Domain Integral Equations for Electromagnetic Band-Gap Slab Simulations
B.P. de Hon, M.C. van Beurden, Eindhoven University of Technology, The Netherland; R. Gonzalo, B. Martinez, I. Ederra, C. del Rio, Universidad Publica de Navarra, Spain; L. Azcona, B. Alderman, Rutherford Appleton Laboratory, UK; P. de Maagt, ESA/ESTEC,the Netherland; L. Marchand*

17:40 Application of Spectrally Accelerated BiConjugate Gradient Stablized Method for the Propagation Analysis - *B. Babao lu*, A. Altinta, V. B. Ertürk, Bilkent University, Turkey*

ROOM: FIBONACCI

16:00-18:00 **Time Domain Analysis and Applications**
Chair(s): L.B. Felsen, G. Leone

16:00 A Hybrid Method Combining an Efficient TD-MoM with the TD-UTD
A. Becker, V. Hansen, University of Wuppertal, Germany*

16:20 Improved Spherical-Multipole Based Time-Domain Near-to-Far-Field Transformation
C.-C. Oetting, L. Klinkenbusch, University of Kiel, Germany*

16:40 Switched Boundary Condition (XBC) in Waveguides in FDTD
J. Kivi, M. Okoniewski, University of Calgary, Canada*

17:00 Transient Radiation from A Linear UWB Antenna Array
W. Soergel, C. Waldschmidt, W. Wiesbeck, University of Karlsruhe, Germany*

17:20 Transient Radiation from Aperture Antennas: Efficient Calculation of Time-Domain Effective Height
M. Ciattaglia, G. Marrocco, University of Tor Vergata - Roma, Italy*

17:40 Constitutive Relations in the EMX Software
W. Arter, J.W Eastwood, N.J. Brealey, Culham Electromagnetics and Lightning Ltd, UK*

18:00-18:15 Closing ceremony

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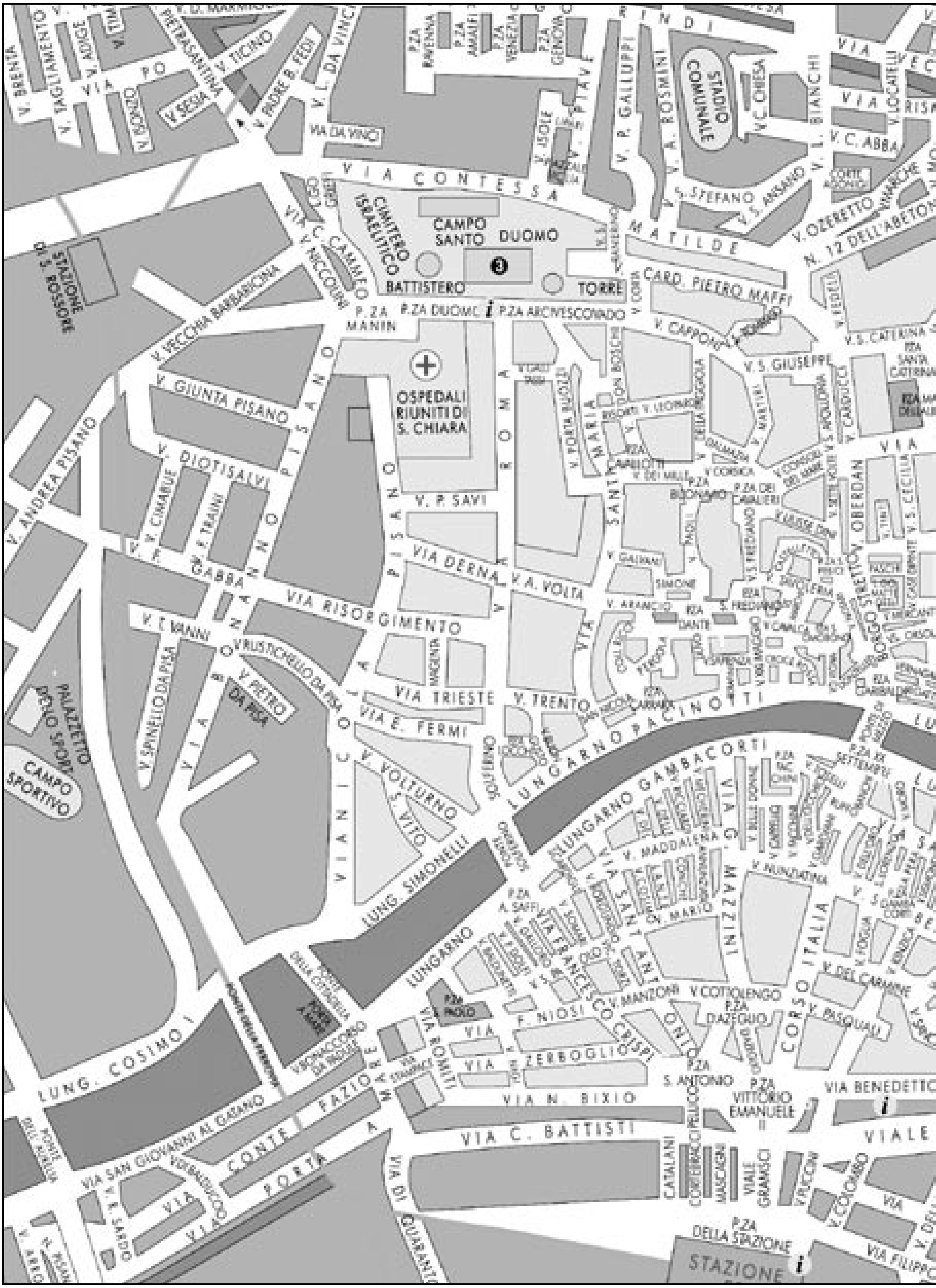

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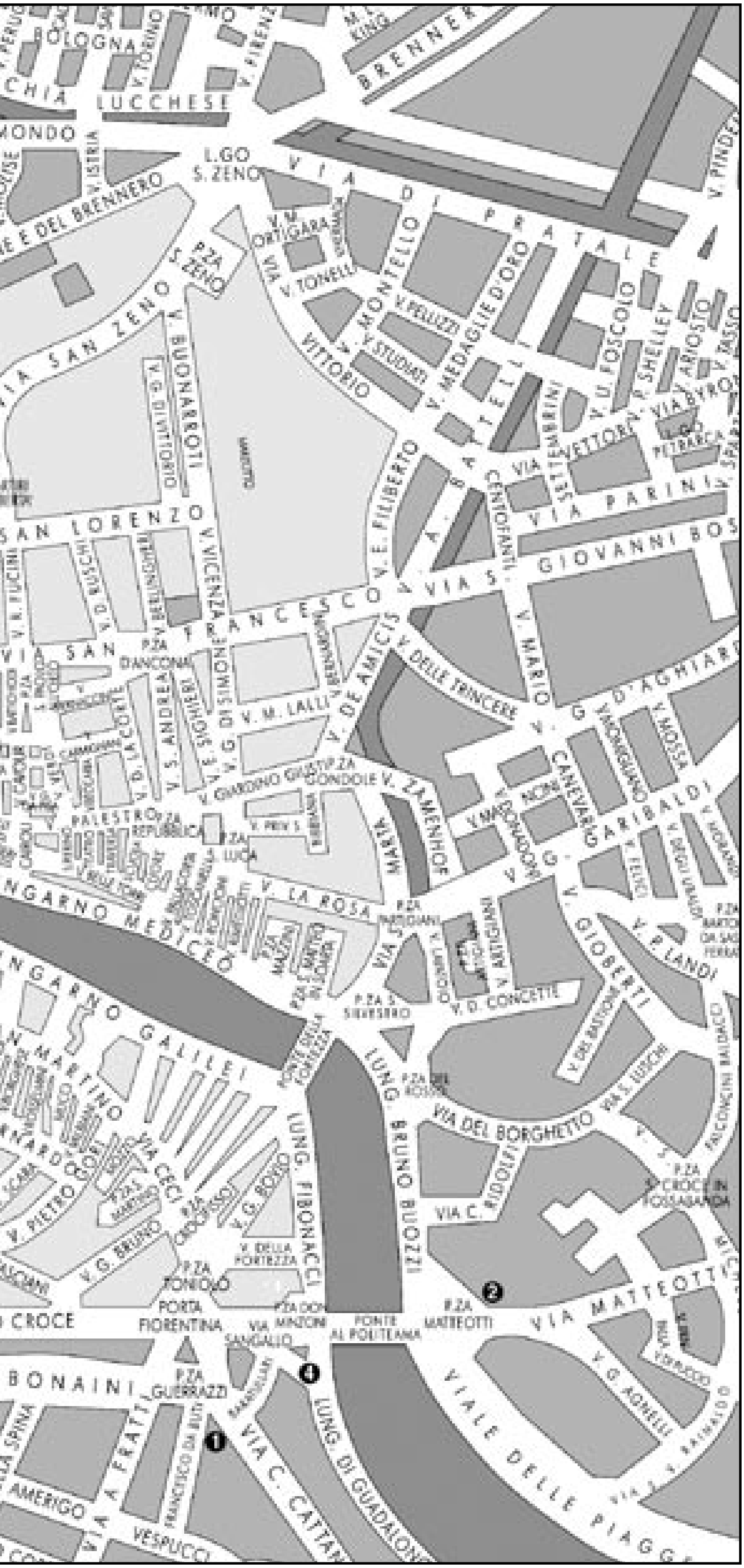

1 **STAZIONE LEOPOLDA**
(Banquet site)

2 **PALAZZO DEI CONGRESSI**
(Symposium site)

3 **CATHEDRAL OF PISA**
(Concert site)

4 **LA DRAGA**
(Pizza party site)

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