«ETTORE MAJORANA» FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE
TO PAY A PERMANENT TRIBUTE TO ARCHIMEDES AND GALILEO GALILEI, FOUNDERS OF MODERN SCIENCE AND TO ENRICO FERMI, THE "ITALIAN NAVIGATOR", FATHER OF THE WEAK FORCES

INTERNATIONAL SCHOOL OF QUANTUM ELECTRONICS

62nd Course: *PROGRESS IN PHOTOACOUSTIC AND PHOTOTHERMAL PHENOMENA: FOCUS ON BIOMEDICAL AND NANOSCALE IMAGING AND NDE*

ERICE-SICILY: 6 – 12 SEPTEMBER 2018

Sponsored by the: • Italian Ministry of Education, University and Scientific Research • Sicilian Regional Government • SBAI Department, "La Sapienza"

PROGRAMME AND LECTURERS

Heat at nanoscale: From solid-state to biological applications
• Y. CHALOPIN, Centre National de Recherche Scientifique, Ecole Centrale Supelec, Gif sur Yvette, FR

Multiscale modelling of heat conduction
• L. CHAPUT, Laboratoire d'Energétique et de Mécanique Théorique et Appliquée, Universite de Lorraine, Vandœuvre-lès-Nancy, FR

Tutorial on photoacoustics: From the wave equation for pressure to sound generation from photothermal interference
• G.J. DIEBOLD, Brown University, Providence, RI, US

Review on past to present achievements in non-destructive testing by active infrared thermography and current prospects
• J. DUMOULIN, Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux, Bouguenais, FR

Thermal lens spectrometry: Theory and applications
• M. FRANKO, University of Nova Gorica, Nova Gorica, SI

Laser ultrasonics for material characterization and defect detection
• C. GLORIEUX, Katholieke Universiteit Leuven, Leuven, BE

Integrated NIRF-IVUS molecular-structural imaging of coronary artery disease
• S. KELLNBERGER, Harvard Medical School, Boston, MA, US

Spatially resolved acoustic spectroscopy (SRAS): Texture and microstructure characterisation by laser ultrasonic
• W. LI, University of Nottingham, Nottingham, UK

Optical excitation fractional fourier transform (FrFT) based enhanced thermal-wave radar imaging (TWRI)
• J.-Y. LIU, State Key Laboratory of Robotics and System, Harbin Institute of Technology, Harbin, CN

Photothermal deflection technique: Theory and applications
• R. LI VOTI, Sapienza University of Rome, Rome, IT

Characterization of defects in fiber reinforced composites using passive and active thermography
• C. MAIERHOFER, Bundesanstalt für Materialforschung und Prüfung, Berlin, DE

Foundations and applications of passive and active infrared thermography
• A. MANDELIS, University of Toronto, Toronto, CA

Thermo-spectroscopy in IR waveband and the application to a micro-scale heat transfer
• J. MORIKAWA, Tokyo Institute of Technology, Tokyo, JP

Infrared thermography analysis application to cultural heritage
• S. PAOLONI, University of Rome Tor Vergata, Rome, IT

Looking and listening at biomolecular vibrations: mid-infrared photoacoustic and photothermal sensing for bioanalysis and imaging
• M.A. PLEITEZ, Helmholtz Zentrum München, Munich, DE

Basis of nanoscale heat transfer
• J.M. RUBI, Universidad de Barcelona, Barcelona, ES

New advances in flying spot thermography
• A. SALAZAR, Universidad del País Vasco/Euskal Herriko Unibertsitatea, Bilbao, ES

Photoacoustic and ultrasound imaging with a handheld integrated probe
• W. STEENBERGEN, University of Twente, Enschede, NL

Principles of laser picosecond ultrasonics
• O.B. WRIGHT, Hokkaido University, Sapporo, Hokkaido, JP

Optimizing linear-array-based photoacoustic tomography for clinical applications
• J. XIA, University at Buffalo, Buffalo, NY, US

PURPOSE OF THE COURSE

The purpose of the Course is to show and discuss key recent advances and progress in Photoacoustic & Photothermal (PA/PT) techniques as applied to biomedical, nanoscale, nondestructive evaluation and testing of materials, and thermophysical phenomena and technologies which has been the main theme of the biennial series of courses organized at EMFCSC since 2010. This fifth Course will bring together natural and biomedical scientists, engineers, technology developers and users who are interested and/or involved in principles and applications of PA/PT. The wealth of present-day PA/PT topics indicates that this field has developed a broad range of tools for fundamental and applied research. PA/PT research has reached a mature state, firmly established as a non-destructive measurement and materials characterization technology on the macro- and nano-scale, as well as a non-invasive biomedical imaging modality. Future progress will be seamlessly linked to close synergy with advances in new laser and detector technologies. The Course emphasizes the explosive growth of biomedical PA, and will focus on the growing biophotoacoustic and emerging biophotothermal imaging modalities and their applications around the world and in Europe, in particular. It also emphasizes the significant and growing contributions of PA/PT to the non-destructive evaluation / characterization of nanoscale, opto-electronic, and other advanced materials. Participants are strongly encouraged to present their own results in the field. Part of the Course will be the School "*Foundations of Photothermal and Photoacoustic Techniques: Theory, Instrumentation and Applications*" that will be organized together with the Graduate School of the University of Nova Gorica, Slovenia. The School is intended for students at the graduate level, who have research and future professional interests in photothermal instrumental techniques and related issues. The School will be organized as a series of comprehensive lectures and case study presentations with compulsory attendance to lectures of the Course and presentation of participants' own papers. Students will earn 10 ECTS credits for having completed the School.

APPLICATIONS

Persons wishing to attend the Course should apply in writing to the Director of the Course:

Professor Roberto LI VOTI
Dipartimento S.B.A.I. – Università La Sapienza di Roma
Via A. Scarpa 16 - 00161 Roma, Italy
Fax: +39.06.44240183 – e-mail: *roberto.livoti@uniroma1.it*

They should specify: i) full name(s), address, age, nationality; ii) academic qualifications and degree; iii) present position and place of work; iv) current research activity; v) list of publications.

POETIC TOUCH

According to legend, Erice, son of Venus and Neptune, founded a small town on top of a mountain (750 metres above sea level) more than three thousand years ago. The founder of modern history — i.e. the recording of events in a methodic and chronological sequence as they really happened without reference to mythical causes — the great Thucydides (~500 B.C.), writing about events connected with the conquest of Troy (1183 B.C.) said: «*After the fall of Troy some Trojans on their escape from the Achaei arrived in Sicily by boat and as they settled near the border with the Sicanians all together they were named Elymi: their towns were Segesta and Erice.*» This inspired Virgil to describe the arrival of the Trojan royal family in Erice and the burial of Anchise, by his son Enea, on the coast below Erice. Homer (~1000 B.C.), Theocritus (~300 B.C.), Polybius (~200 B.C.), Virgil (~50 B.C.), Horace (~20 B.C.), and others have celebrated this magnificent spot in Sicily in their poems. During seven centuries (XIII-XIX) the town of Erice was under the leadership of a local oligarchy, whose wisdom assured a long period of cultural development and economic prosperity which in turn gave rise to the many churches, monasteries and private palaces which you see today. In Erice you can admire the Castle of Venus, the Cyclopean Walls (~800 B.C.) and the Gothic Cathedral (~1300 A.D.). Erice is at present a mixture of ancient and medieval architecture. Other masterpieces of ancient civilization are to be found in the neighbourhood: at Motya (Phoenician), Segesta (Elymian), and Selinunte (Greek). On the Aegadian Islands — theatre of the decisive naval battle of the first Punic War (264-241 B.C.) — suggestive neolithic and paleolithic vestiges are still visible: the grottoes of Favignana, the carvings and murals of Levanzo.

Splendid beaches are to be found at San Vito Lo Capo, Scopello, and Cornino, and a wild and rocky coast around Monte Cofano: all at less than one hour's drive from Erice.

More information about the other activities of the "ETTORE MAJORANA" FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE can be found on the WWW at the following address:
http://www.ccsem.infn.it

PLEASE NOTE

Participants should arrive in Erice on September 6, not later than 5 pm.

R. LI VOTI – A. MANDELIS
DIRECTORS OF THE COURSE

A.N. CHESTER – D.S WIERSMA
DIRECTORS OF THE SCHOOL

A. ZICHICHI
PRESIDENT OF THE EMFCSC