

SESSIONS BY DAY

CIMTEC²⁰¹⁶



Perugia, Italy • June 5-9, 2016



CIMTEC

2016

<i>Flowsheet</i>	JUNE 5		JUNE 6		JUNE 7		JUNE 8		JUNE 9	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
REGISTRATION										
SYMPORIUM A			A	A	A	A	A	A	A	A
SYMPORIUM B			B	B	B	B	B	B	B	B
SYMPORIUM C			C	C	C	C	C	C	C	C
SYMPORIUM D			D	D	D	D	D	D	D	D
SYMPORIUM E			E	E	E	E	E	E	E	E
SYMPORIUM F			F	F	F	F	F	F	F	F
SYMPORIUM G			G	G	G	G	G	G	G	G
SYMPORIUM H			H	H	H	H	H	H	H	H
SYMPORIUM I			I	I	I	I	I	I	I	I
SYMPORIUM J			J	J	J	J	J	J	J	J
SYMPORIUM K			K	K	K	K	K	K	K	K
SYMPORIUM L			L	L	L	L	L	L	L	L
SYMPORIUM M					M	M	M	M	M	M
SYMPORIUM N					N	N	N	N	N	N
SYMPORIUM O			O	O	O	O	O	O	O	O
SYMPORIUM P			P	P	P	P	P	P	P	P
Joint Session O9/P5									09/P5	
Joint Session O10/P6								010/P6	010/P6	
CONFERENCE Q			Q	Q	Q	Q	Q	Q	Q	Q
Special Session Q5							Q5	Q5	Q5	
Joint Session Q6				Q6		Q6	Q6			
POSTER MOUNTING										
POSTER DISCUSSION										
SOCIALS										



WELCOME RECEPTION



JAZZ CONCERT



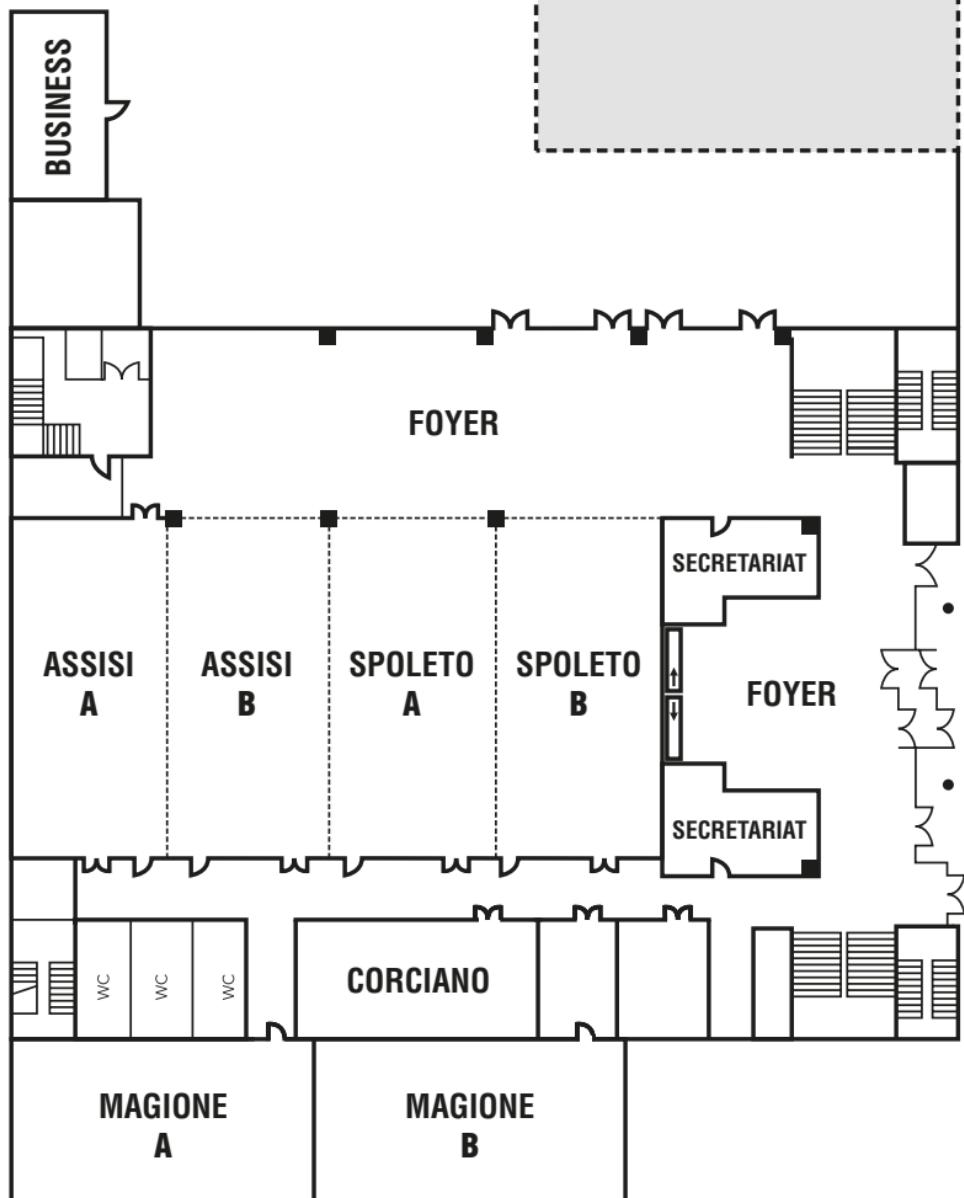
CONFERENCE DINNER



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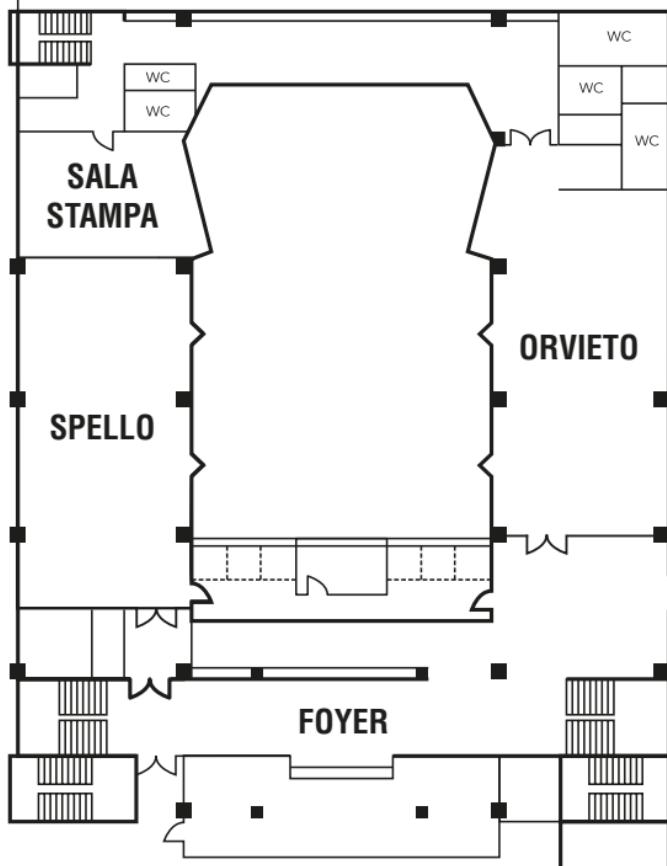
**RESTAURANT
“IL VIZIO”**



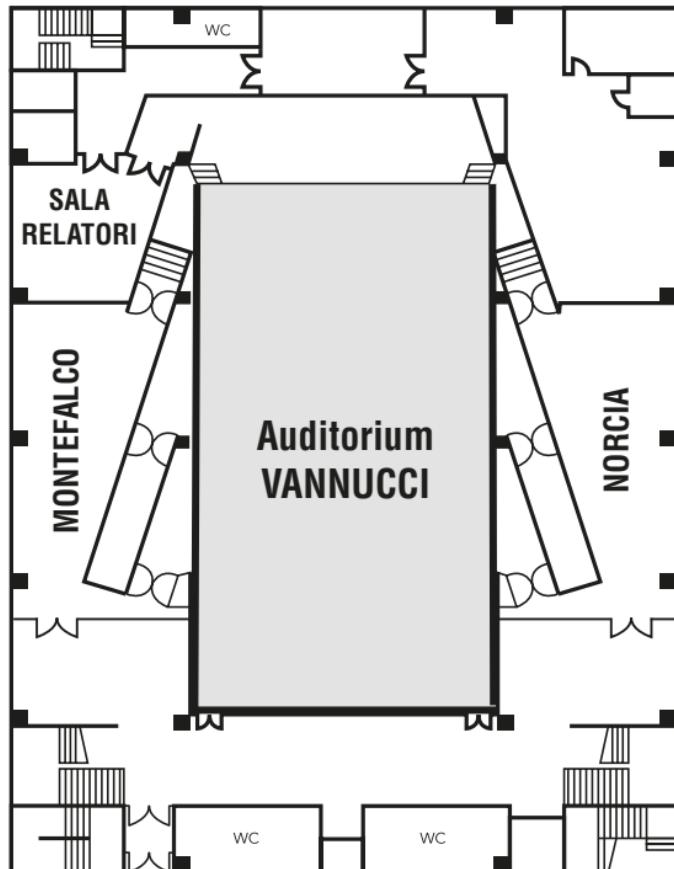
Ground Floor

RESTAURANT
“IL VIZIO
UNDERGROUND”

**POSTER
AREA**



Level -1



Level -2

CIMTEC 2016 OUTLINE

5th International Conference

Smart and Multifunctional Materials, Structures
and Systems

SYMPOSIUM A

Stimuli Responsive and Multifunctional Polymers:
Progress in Materials and Applications

SYMPOSIUM B

State-of-the-art Research and Applications of
Shape Memory Alloys

SYMPOSIUM C

Recent Advances in Multiferroic and
Magnetoelectric Materials and Applications

SYMPOSIUM D

Advances in Inorganic Luminescent Materials
and Applications

SYMPOSIUM E

Progress in Metamaterials Research

SYMPOSIUM F

Graphene and Other Emerging 2D-layered
Nanomaterials: Synthesis, Properties and Potential
Applications

SYMPOSIUM G

Multifunctional Inorganic One-dimensional
Nanostructures: Status and Potential

SYMPOSIUM H

Electroactive Polymers and Shape Memory
Polymers: Advances in Materials and Devices

SYMPOSIUM I

New Concepts and Advances in Photocatalytic
Materials for Energy and Environmental
Applications

SYMPOSIUM J

Functional Nanomaterials for New Generation Solid State Gas Sensors

SYMPOSIUM K

Non-volatile Memory Devices: Materials, Emerging Concepts and Applications

SYMPOSIUM L

Smart and Interactive Textiles

SYMPOSIUM M

Next Generation Micro/Nano Systems

SYMPOSIUM N

Progress in Wearable/Wireless and Implantable Body Sensor Networks for Healthcare Applications

SYMPOSIUM O

Mining Smartness From Nature
From Bio-inspired Materials to Bionic Systems

SYMPOSIUM P

Embodying Intelligence in Structures and Integrated Systems

Joint Special Session O-9/P-5

Biomimetic Design and Motion Control in Autonomous and Remotely Operated Underwater Vehicles

Joint Special Session O-10/P-6

Biomimetic Morphing of Unmanned Aerial Vehicles

11th International Conference Q

Medical Applications of Novel Biomaterials and Nanotechnology

Focused Session Q-5

Biomedical Applications of Carbon Nanotubes and Graphene: Opportunities and Challenges

Focused Session Q-6

Materials Nanotechnologies for Implantable Neural Interfaces

Meeting Rooms by Symposia

OPENING SESSION	AUDITORIUM
Symposium A	SPELLO
Symposium B	ASSISI B
Symposium C	SPOLETO A
Symposium D	DERUTA
Symposium E	CORCIANO
Symposium F.....	ORVIETO
Symposium G	SALA RELATORI
Symposium H	SALA STAMPA
Symposium I	ASSISI A
Symposium J.....	NORCIA
Symposium K	MAGIONE A
Symposium L.....	MONTEFALCO
Symposium M	BUSINESS
Symposium N	SALA STAMPA
	NORCIA
Symposium O	MAGIONE B
Special Session O-9/P-5	MAGIONE B
Special Session O-10/P-6	SPOLETO B
Symposium P	SPOLETO B
Conference Q	AUDITORIUM
Focused Session Q-5	AUDITORIUM
	SALA RELATORI
Focused Session Q-6	BUSINESS

Events by Day

Sunday June 5

15.00-19.00

REGISTRATION

Centro Congressi Hotel Quattrotorri
at Best Western Hotel Quattrotorri Perugia
Via Corcianese 260
Perugia - Italy

Monday June 6

Morning: 9.30-13.00

Opening Session

Welcome Addresses

Plenary Lectures (PL1-PL2)

Symposium A	(A-KL and A-1:IL01)
Symposium B	(B-1:IL01 and IL02)
Symposium C	(C-KL)
Symposium D	(D-1:IL01 and IL02)
Symposium F	(F-1:IL02 and IL03)
Symposium G	(G-1:IL01 and IL02)
Symposium H	(H-1:IL01 and IL02)
Symposium I	(I-1:IL01)
Symposium J	(J-1:IL01 and IL02)
Symposium K	(K-2:IL01 and IL02)
Symposium L	(L-1:IL01 and IL03)
Symposium O	(O-1:IL01 and IL02)
Symposium P	(P-1:IL01 and IL02)
Conference Q	(Q-1:IL01 and IL02)

8.30-13.00

POSTER MOUNTING

Monday June 6

Afternoon: 14.30-18.30

Symposium A	(A-1:IL02 to L05) (A-1:IL06 to L11)
Symposium B	(B-1:IL03 to L06) (B-2:IL01 to IL04)
Symposium C	(C-1:IL02 to IL05) (C-1:IL06 to L08)
Symposium D	(D-1:IL03 and IL04) (D-10:IL03) (D-2:IL03 to L05)
Symposium E	(E-1:IL01 and L03) (E-2:IL01 to L05)
Symposium F	(F-1:KL to L05) (F-1:L06 to L08) (F-6:IL03)
Symposium G	(G-1:IL03 to IL05) (G-1:IL06 to L09)
Symposium H	(H-1:L04 to L06) (H-1:L08 and L09)
Symposium I	(I-1:IL04 to L07) (I-1:IL08 to L10)
Symposium J	(J-1:IL04 to L07) (J-2:IL01 to L03)
Symposium K	(K-2:IL03 to L07) (K-2:IL08 to L11)
Symposium L	(L-1:IL04 and L05) (L-1:L09 to L11)
Symposium O	(O-1:IL03 to L05) (O-2:IL01 to L06)
Symposium P	(P-1:IL03 to L06) (P-1:IL07 to L10)
Conference Q	(Q-1:IL04 to L06) (Q-1:IL07 to L09) (Q-6:IL01 and IL02) (Q-6:IL05 to L08)

14.30-18.30

POSTER MOUNTING

20.30 - 22.30
Welcome Party

Tuesday June 7

Morning: 9.00-13.00

Symposium A	(A-2:IL02 and L04) (A-2:IL05 and IL06)
Symposium B	(B-2:IL05 to L08) (B-2:L10 to L12)
Symposium C	(C-2:L01 to L04) (C-3:IL01 and IL02)
Symposium D	(D-3:L02 to L08) (D-3:IL09 to L11)
Symposium E	(E-2:IL08 to L10) (E-3:IL01 to IL03)
Symposium F	(F-2:KL and IL02) (F-3:KL and IL02) (F-4:IL02 and IL05)
Symposium G	(G-1:IL11 to L15) (G-2:IL01 to IL03)
Symposium H	(H-2:IL03 to L06) (H-3:IL01 and IL02)
Symposium I	(I-1:IL12 to L15) (I-1:IL16 to L19)
Symposium J	(J-2:IL04 to IL06) (J-2:IL07 to L11b)
Symposium K	(K-3:IL01 to L05) (K-3:IL06 to L09)
Symposium L	(L-1:IL12 to IL13+L07) (L-2:IL01 to IL04)
Symposium O	(O-8:IL02) (O-3:IL01 to L04) (O-3:IL05 to L08)
Symposium P	(P-1:IL12 and IL13) (P-2:IL01 to IL03) (P-4:IL01)
Conference Q	(Q-2:L03 to L05) (Q-2:IL06 to IL08) (Q-6:IL10 to IL15) (Q-6:L16 to L18)

Tuesday June 7

Afternoon: 14.30-18.40

Symposium A	(A-3:IL01 to IL04) (A-3:IL05 to L08)
Symposium B	(B-3:IL01 to IL05) (B-4:IL01 to IL03)
Symposium C	(C-4:IL01 to IL04)
Symposium D	(D-3:L14) (D-4:IL01 to IL03) (D-5:IL01 to L04)
Symposium E	(E-4:IL02 to IL04) (E-4:IL05 to IL07)
Symposium F	(F-2:IL03 to IL06) (F-3:IL03 to L06)
Symposium G	(G-2:IL04 to IL06) (G-2:IL07 to IL10)
Symposium H	(H-3:IL03 to IL05) (H-3:IL06 to L08) (H-2:IL02)
Symposium I	(I-2:IL01 to L04) (I-2:IL05 to L08)
Symposium J	(J-2:IL12 to L17) (J-2:IL18 to L21)
Symposium K	(K-1:IL01 to L04) (K-1:L05 to L10)
Symposium L	(L-2:IL07 to L09)
Symposium O	(O-4:IL01 to L04) (O-6:IL01 to L03)
Symposium P	(P-3:IL01 to IL06) (P-2:IL04 and L05)
Conference Q	(Q-3:IL01 to L05) (Q-3:IL06 to L09) (Q-6:IL19 to IL23)

Wednesday June 8

Morning: 9.00-13.00

Symposium A	(A-4:IL01 to IL04) (A-4:IL05 to IL09)
Symposium B	(B-3:L06 to L09b) (B-4:IL04 to IL06)
Symposium C	(C-3:IL05 to L10) (C-4:IL05 to L09)
Symposium D	(D-6:IL01 and IL02) (D-6:IL03 to L07)
Symposium E	(E-6:IL01 to L03) (E-8:IL02)
Symposium F	(F-3:IL07 to L11) (F-1:IL07) (F-3:L12 to L15) (F-4:IL04)
Symposium G	(G-3:IL01 to L04) (G-2:L13) (G-5:L02)
Symposium H	(H-4:IL01 to L04) (H-5:IL01 to L03)
Symposium I	(I-2:IL09 to IL11) (I-2:IL12 to L15)
Symposium J	(J-3:IL01 to IL02) (J-4:IL01 to L05)
Symposium K	(K-4:IL01 to IL04) (K-3:IL10 to IL12)
Symposium L	(L-3:IL01 and IL02) (L-3:IL03 and IL06) (L-4:IL09)
Symposium M	(M-1:IL01 to L04) (M-2:IL01 to L05)
Symposium O	(O-5:IL01 to L06) (O-7:IL02 and IL05)
Joint Session O-10/P-6	(O-10/P-6:IL01 to L04) (O-10/P-6:IL05 to L08)
Conference Q	(Q-4:IL01 to IL03) (Q-5:IL01 to IL04)

Wednesday June 8

Afternoon: 14.30-18.30

Symposium A	(A-7:IL02 to L05)
Symposium B	(B-3:IL11 to L15) (B-5:IL01 to L05)
Symposium C	(C-5:IL01 to L04) (C-6:IL01 to L03)
Symposium D	(D-7:IL01 to L05) (D-7:IL06 to L09)
Symposium E	(E-5:IL01 to L06) (E-6:IL04 to L06)
Symposium F	(F-5:KL and IL01) (F-6:L11 to L14)
Symposium I	(I-3:IL01 to L03) (I-3:IL04 to IL08)
Symposium J	(J-4:IL06 to IL08)
Symposium K	(K-3:IL13 to L15) (K-1:IL12 to L16)
Symposium L	(L-3:IL08 to L12)
Symposium M	(M-3:IL01 to L04) (M-4:IL01 to L05)
Symposium N	(N-1:IL01 to L04) (N-2:IL01 to IL02) (N-4:IL03)
Symposium O	(O-6:IL05 to IL07)
Joint Session O-10/P-6	(O-10/P-6:IL09 and IL10)
Symposium P	(P-3:IL07 to L09)
Conference Q	(Q-2:IL01+L10 to L12) (Q-5:IL05 to L09) (Q-5:IL10 to IL12)

21.30-23.00
Jazz Concert

Thursday June 9

Morning: 9.00-13.00

Symposium A	(A-5:IL01 to L04) (A-5:IL05 and L06)
Symposium B	(B-4:IL07 to IL09) (B-6:L01 to L03)
Symposium C	(C-7:IL02 and L04) (C-7:IL06 and IL07)
Symposium D	(D-8:L01 to L05) (D-9:IL01 and IL03)
Symposium E	(E-7:L02 to L04) (E-7:IL05 and L06)
Symposium F	(F-6:KL and IL01)
Symposium G	(G-4:IL01 and IL02) (G-4:L04 to L06)
Symposium H	(H-5:IL05 to IL09) (H-6:IL01 to IL05)
Symposium I	(I-3:IL07 to L10) (I-3:IL12 to L14)
Symposium K	(K-1:IL18 to IL20) (K-4:IL06 to L10)
Symposium L	(L-4:IL01 to L05)
Symposium M	(M-5:IL01) (M-6:IL01 to L03)
Symposium N	(N-3:IL01 to IL03) (N-5:IL01 to IL03) (N-4:IL01)
Joint Session O-9/P-5	(O-9/P-5:IL02 to IL08) (O-9/P-5:IL10 and IL11)
Symposium P	(P-3:IL14+IL11 and IL12) (P-3:L16 to L18)
Conference Q	(Q-5:IL13 to IL15) (Q-4:IL04 to L08)

Thursday June 9

Afternoon: 14.30-18.00

- Symposium A (A-6:IL01 to L04)
- Symposium B (B-6:IL05 and IL06)
- Symposium D (D-10:IL02 and IL04)
- Symposium E (E-8:IL01 to L04)
- Symposium F (F-6:IL04 to L09)
- Symposium G (G-5:IL03 to IL05)
- Symposium K (K-4:IL11 to IL14)
- Symposium L (L-4:IL07 and L08)
- Symposium M (M-7:IL02 to L04)
(M-8:IL02)
- Symposium N (N-6:IL01 to IL06)
- Symposium O (O-2:IL03)
(O-8:IL01)
- Symposium P (P-7:L01 to L04)
(P-4:IL04 to IL06)
- Conference Q (Q-4:IL10 to L14)

16.00-18.00
POSTER DISCUSSION

20.00-23.30
Conference Dinner

SESSIONS FLOWSHEET

June 6-9

7th Forum

on

New Materials

Chair

Pietro Vincenzini

World Academy of Ceramics
National Research Council, Italy

Programme Chairs

Symposium A: **Andreas Lendlein**, Germany

Symposium B: **Franca Albertini**, Italy

Symposium C: **Gopalan Srinivasan**, USA

Symposium D: **Joanna McKittrick**, USA

Symposium E: **Yuri S. Kivshar**, Australia

Symposium F: **Swastik Kar**, USA

Symposium G: **Chennupati Jagadish**, Australia

Symposium H: **Jinsong Leng**, China

Symposium I: **Gabriele Centi**, Italy

Symposium J: **Camilla Baratto**, Italy

Symposium K: **Sabina Spiga**, Italy

Symposium L: **George K. Stylios**, UK

Symposium M: **Leandro Lorenzelli**, Italy

Symposium N: **Dermot Diamond**, Ireland

Symposium O: **Julian Vincent**, UK

Symposium P: **Fabio Casciati**, Italy

Special Session O-9/P-5: **Cecilia Laschi**, Italy

Special Session O-10/P-6: **Daniel Inman**, USA

Conference Q: **Thomas J. Webster**, USA

Focused Session Q-5: **Maurizio Prato**, Italy

Focused Session Q-6: **Stefano Vassanelli**, Italy

OPENING SESSION

AUDITORIUM

Chair:

Ray BAUGHMAN, USA

9.30 - 10.00

Welcome Addresses

Pietro VINCENZINI
General Chair CIMTEC Conferences

Andrea ROMIZI
Mayor of Perugia

Luigi AMBROSIO
CNR, Italy

Dario DELLA SALA
ENEA, Italy

Masahiro YOSHIMURA
World Academy of Ceramics

Plenary Lectures

10.00 - 10.45

PL1

**Nanogenerators for Self-powered Sensors and
Piezotronics for Smart Systems**
ZHONG LIN WANG

School of Materials Science and Engineering, Georgia
Institute of Technology, Atlanta, USA

10.45 - 11.30

PL2

Graphene Future Emerging Technology
A.C. FERRARI

Cambridge Graphene Centre, University of Cambridge,
Cambridge, UK

SYMPOSIUM A
STIMULI RESPONSIVE AND
MULTIFUNCTIONAL POLYMERS:
PROGRESS IN MATERIALS AND
APPLICATIONS

Room: SPELLO

Chair: Andreas LENDLEIN, Germany (Programme Chair)

11.55 Welcome

12.00 A:KL From Stimuli-responsive Polymers to Self-repairable Materials

M.W. URBAN, Dept. of Materials Science and Engineering, Center for Optical Materials Science and Engineering (COMSET), Clemson University, Clemson, SC, USA

Session A-1 - Shape-memory Polymers and Shape-changing Polymers

12.40 A-1:IL01 3D Printed Shape-memory Polymer Foams for Bio-medical Applications

T.S. WILSON, J.N. RODRIGUEZ, E.B. DUOSS, J.P. LEWICKI, Lawrence Livermore National Laboratory, Livermore, CA, USA; M.K. HEARON, MIT, Cambridge, MA, USA; D.J. MAITLAND, Texas A&M University, College Station, TX, USA

SYMPOSIUM B

STATE-OF-THE-ART RESEARCH AND
APPLICATIONS OF SHAPE MEMORY ALLOYS

Room: ASSISI B

Chair: Franca ALBERTINI, Italy (Programme Chair)

11.55 Welcome

Session B-1 - Materials and Materials Design

12.00 B-1:IL01 Strain Glass as A New Class of Smart Materials

XIAOBING REN, Ferroic Physics Group, National Institute for Materials Science, Tsukuba, Japan; and Multi-disciplinary Materials Research Center, Frontier Institute of Science and Technology, Xi'an Jiaotong University, Xi'an, China

12.30 B-1:IL02 High temperature SMA

A. LUDWIG, Inst. für Werkstoffe / Werkstoffe der Mikrotechnik (ICFO/03/225), Fakultät für Maschinenbau & Materials Research, Dept. Ruhr-Universität Bochum, Bochum, Germany

SYMPORIUM C
**RECENT ADVANCES IN MULTIFERROIC
AND MAGNETOELECTRIC MATERIALS AND
APPLICATIONS**

Room: SPOLETO A

Chair: Gopalan SRINIVASAN, USA (Programme Chair)

12.00 Welcome

- 12.05 C:KL Coupling Magnetism to Electricity In Multiferroic Heterostructures**

R. RAMESH, Department of Physics and Department of Materials Science and Engineering, University of California, Berkeley, CA, USA

SYMPORIUM D

**ADVANCES IN INORGANIC LUMINESCENT
MATERIALS AND APPLICATIONS**

Room: DERUTA

Chair: Shyue Ping ONG, USA (Programme Chair)

11.55 Welcome - Joanna McKITTRICK, USA (Programme Chair)

Session D-1 - Physics and Modelling of Luminescent Materials

- 12.00 D-1:IL01 Modelling of Luminescent Confined Structures**
~~CANCELLED~~
F. PRUDENZIAC, Politecnico di Bari, Bari, Italy

- 12.30 D-1:IL02 Valence Stability of Rare Earth Ions by Madelung Lattice Site Potential in Various Oxide Lattices**

M. YOSHIMURA, National Cheng Kung University, Promotion Center for Global Materials Research, Tainan, Taiwan, Formerly, Tokyo Institute of Technology, Japan

SYMPOSIUM F
GRAPHENE AND OTHER EMERGING
2D-LAYERED NANOMATERIALS:
SYNTHESIS, PROPERTIES AND POTENTIAL
APPLICATIONS

Room: **ORVIETO**

Chair: Swastik KAR, USA (*Programme Chair*)

11.55 *Welcome & Introductory Remarks*

Session F-1 - General Physical and Chemical Properties

- 12.00 **F-1:IL02 Role of Edge Geometry and Chemistry in Electronic and Magnetic Structures of Nanographenes**
TOSHIAKI ENOKI, Tokyo Institute of Technology, Tokyo, Japan
- 12.30 **F-1:IL03 Raman Spectroscopy of Graphene-related Materials**
C. CASIRAGHI, School of Chemistry, University of Manchester, UK

SYMPOSIUM G

MULTIFUNCTIONAL INORGANIC ONE-DIMENSIONAL NANOSTRUCTURES: STATUS AND POTENTIAL

Room: **SALA RELATORI**

Chair: Chennupati JAGADISH, Australia (*Programme Chair*)

11.55 *Welcome*

Session G-1 - Growth and Functionalization of 1-D Nanostructures

- 12.00 **G-1:IL01 Controlled Growth and Optoelectronic Properties of Wide Bandgap Semiconducting Nanowires**
S. GRADECAK, Department of Materials Science and Engineering, MIT, Cambridge, MA, USA
- 12.30 **G-1:IL02 Growth and Structure of Self-catalyzed III-V Nanowires on Silicon**
V.G. DUBROVSKII, St. Petersburg Academic University, St. Petersburg, Russia Ioffe Physical Technical Institute RAS, St. Petersburg, Russia

SYMPORIUM H

**ELECTROACTIVE POLYMERS AND SHAPE
MEMORY POLYMERS: ADVANCES IN
MATERIALS AND DEVICES**

Room: **SALA STAMPA**

Chair: Jinsong LENG, China (*Programme Chair*)

11.55 *Welcome*

Session H-1 - Advances in EAP Materials

- 12.00 **H-1:IL01 The Evolution of Strong, Powerful, Durable, and Cheap Polymer Artificial Muscles from Carbon Nanotube Muscles**
R.H. BAUGHMAN, A.G. MACDIARMID, NanoTech Institute, the University of Texas at Dallas, Dallas, TX, USA
- 12.30 **H-1:IL02 Electromechanical Properties of CNT-ionic Gel Actuators**
KINJI ASAKA, T. SUGINO, K. KIYOHARA, National Institute of Advanced Industrial Science and Technology (AIST), Ikeda, Osaka, Japan

SYMPORIUM I

**NEW CONCEPTS AND ADVANCES IN
PHOTOCATALYTIC MATERIALS FOR ENERGY
AND ENVIRONMENTAL APPLICATIONS**

Room: **ASSISI A**

Chair: Gabriele CENTI, Italy (*Programme Chair*)

12.00 *Welcome*

Session I-1 - Design Elements and Advanced Concepts for Photo-functional Materials

- 12.00 **I-1:IL01 Nanostructured Materials for Photocatalytic Energy Conversion Applications**
E. SELLI, G.L. CHIARELLO, M.V. DOZZI, Dipartimento di Chimica, Università degli Studi di Milano, Milano, Italy

SYMPOSIUM J

**FUNCTIONAL NANOMATERIALS FOR NEW
GENERATION SOLID STATE GAS SENSORS**

Room: **NORCIA**

Chair: Camilla BARATTO, Italy (*Programme Chair*)

11.55 Welcome

**Session J-1 - New Nanocarbons (CNTs, Graphene,
New 2D Materials)-based Gas Sensors;
Nanosilicon-based Gas Sensors**

12.00 **J-1:IL01 Graphene and 2D Materials Based Gas Sensors**

W. WŁODARSKI, School of Electrical and Computer Engineering,
RMIT University, Melbourne, Australia

12.30 **J-1:IL02 Smell Sensors – Optical or by Electronics?**

W. KNOLL, AIT Austrian Institute of Technology, Vienna, Austria,
and Center for Biomimetic Sensor Science, Nanyang Technological
University, Singapore

SYMPOSIUM K

**NON-VOLATILE MEMORY DEVICES:
MATERIALS, EMERGING CONCEPTS AND
APPLICATIONS**

Room: **MAGIONE A**

Chair: Sabina SPIGA, Italy (*Programme Chair*)

11.55 Welcome

Session K-2 - Phase Change Memories (PCM)

12.00 **K-2:IL01 Phase-change Memories for Energy-efficient Data-centric IT Applications**

P. FANTINI, Micron - Process R&D, Vimercate, Italy

12.30 **K-2:IL02 Epitaxial Chalcogenide Superlattices for Memory Application**

R. CALARCO, Paul-Drude-Institut für Festkörperelektronik, Berlin,
Germany

SYMPOSIUM L
SMART AND INTERACTIVE TEXTILES

Room: **MONTEFALCO**

Chair: George K. STYLIOS, UK (*Programme Chair*)

11.55 Welcome

Session L-1 - Adaptive/Active Textiles

12.00 **L-1:IL01 Interfacial Force Mapping by Artificial Smart Skins**

XIAOMING TAO^{1,2}, ZHIFENG ZHANG¹, FEI WANG¹, QIAO LI¹,
¹Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hong Kong, China; ²Interdisciplinary Division of Biomedical Engineering, The Hong Kong Polytechnic University, Hong Kong, China

12.30 **L-1:IL03 Adaptive Textile Materials**

S. MINKO, Nanostructured Materials Lab, Department of Textiles, Merchandising, and Interiors, University of Georgia, Athens, GA, USA

SYMPOSIUM O

**MINING SMARTNESS FROM NATURE
FROM BIO-INSPIRED MATERIALS TO BIONIC
SYSTEMS**

Room: **MAGIONE B**

Chair: Julian VINCENT, UK (*Programme Chair*)

11.55 Welcome

**Session O-1 - Algorithms, Mechanisms and Structures
in Nature as Inspiration for Mimicking**

12.00 **O-1:IL01 Biomimetic Art**

F. SCHENK, Birmingham City University, Birmingham, West Midlands, UK

12.30 **O-1:IL02 Order and Disorder in Natural Photonic Systems**

B. WILTS, Adolphe Merkle Institute, Fribourg, Switzerland

SYMPOSIUM P
EMBODYING INTELLIGENCE IN STRUCTURES
AND INTEGRATED SYSTEMS

Room: **SPOLETO B**

Chair: Fabio CASCIATI, Italy (*Programme Chair*)

11.55 Welcome

**Session P-1 - Smart Materials/Sensors/Actuators/
MEMS/NEMS**

- 12.00 **P-1:IL01 CNT Transduction for Measuring Composite Shear and Air Flow: Triggering of Autonomous Response**

K. SLINKER^{1,2}, C. KONDASH^{1,2}, G. REICH³, **J. BAUR**¹, ¹Materials and Manufacturing Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, USA; ²Universal Technology Corporation, Beavercreek, OH, USA; ³Aerospace Systems Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, USA

- 12.30 **P-1:IL02 Piezoceramic MFC Thin Films Experimental Shear Sensing Response Simulation**

A. BENJEDDOU, Institut Supérieur de Mécanique de Paris, Saint Ouen, France

Q - 11th International Conference

**MEDICAL APPLICATIONS OF NOVEL
BIOMATERIALS AND NANOTECHNOLOGY**

Room: **AUDITORIUM**

Chair: Thomas J. WEBSTER, USA (*Programme Chair*)

11.55 Welcome

Session Q-1 - Advances in Stimuli Responsive, Active and Multi-functional Biomaterials

- 12.00 **Q-1:IL01 Biodegradable Thermoplastic Elastomeric Composites**

P.T. MATHER, E. McMULLIN, J.M. ROBERTSON, P.A. FALCONE, Syracuse Biomaterials Institute and Biomedical and Chemical Engineering Department, Syracuse University, Syracuse, NY, USA

- 12.30 **Q-1:IL02 Bioinspired and Multifunctional Phospholipid Polymer Nanoparticles**

KAZUHIRO ISHIHARA, The University of Tokyo, Tokyo, Japan

MONDAY JUNE 6 AFTERNOON

Session A-1 - Shape-memory Polymers and Shape-changing Polymers

Room: SPELLO

Chair: Andreas LENDLEIN, Germany

- 14.30 A-1:L02 **Shape Memory of Micro- and Nano-scale Imprinted Patterns on a Supramolecular Polymer Compound**

Z. ZHAO, Y.S. CHEN, A. KARIM, R.A. WEISS, Dept. of Polymer Engineering, University of Akron, Akron, OH, USA

- 15.00 A-1:L03 **Embolic Applications of Shape Memory Polymer Foams**

D.J. MAITLAND, Texas A&M University, College Station, TX, USA

- 15.30 A-1:L05 **3D Printed Shape Memory Polymer Biomedical Devices**

M. ZAREK, D. COHN, Casali Center of Applied Chemistry, Institute of Chemistry, Hebrew University of Jerusalem, Jerusalem, Israel

- 15.50 *Break*

Chair: Robert WEISS, USA

- 16.20 A-1:L06 **Near Infared Driven Polymer Actuators**

JENNIFER LU, XINYUAN SHEN, YUZE ZENG, Materials Science and Engineering, University of California at Merced, Merced, CA, USA

- 16.50 A-1:L07 **A Thiol-acrylate Main-chain Liquid-crystalline Elastomer Platform for Multifunctional Applications**

C.M. YAKACKI, M.O. SAED, A.H. TORBATI, R.H. VOLPE, M.S. BOLLINGER, University of Colorado Denver, Denver, CO, USA; C.P. FRICK, D.R. MERKEL, University of Wyoming, Laramie, WY, USA

- 17.10 A-1:L08 **Programmed Anisotropy and Heterogeneity of Porous Liquid Crystal Elastomers**

T. WARE, Department of Bioengineering, The University of Texas at Dallas, Richardson, TX, USA

- 17.30 A-1:L09 **Shape Memory Polymers and Stimuli-responsive Methods**

YANJU LIU¹, JINSONG LENG², FENGHUA ZHANG², ¹Department of Astronautical Science and Mechanics, Harbin Institute of Technology (HIT), Harbin, P.R. China; ²Centre for Composite Materials and Structures, Harbin Institute of Technology (HIT), Harbin, P.R. China

- 17.50 A-1:L10 **Laser Assisted 3D Bioprinting of the Magnetic Polymer Nanocomposites Based on Nanoparticles Fe_xO_y and SrFe₁₂O₁₈ for Medical Applications**

I. SHISHKOVSKY^{1,2}, V. SCHERBAKOV¹, Y. MOROZOV², ¹Lebedev Physical Institute (LPI) of Russian Academy of Sciences, Samara branch, Samara, Russia; ²Institute of Structural Macrokinetics and Materials Science (ISMMS), RAS, Chernogolovka, Russia

- 18.10 A-1:L11 **Characterization of Processing-Microstructure-Property Relationships of a Melt-Blown Shape-Memory Polyurethane Nonwoven using Microcomputed Tomography**

D.L. SAFRANSKI, K.M. DUPONT, J.C. GRIFFIS, MedShape, Inc., A.S. LIN, R.E. GULDBERG, Georgia Institute of Technology, USA

MONDAY JUNE 6 AFTERNOON

Room: ASSISI B

Session B-1 - Materials and Materials Design

Chair: Peter MULLNER, USA

- 14.30 **B-1:IL03 Hierarchical Twin Microstructure and Consequence for High Mobility of Twin Boundaries**
O. HECZKO, Institute of Physics, Academy of Science of the Czech Republic, Prague, Czech Rep.; H. SEINER, Institute of Thermomechanics, Academy of Sciences of Czech Republic, Prague, Czech Rep.; S. FAEHLER, IFW Dresden, Dresden, Germany
- 15.00 **B-1:IL04 Magnetic Shape Memory Effect in Non-Modulated Ni-Mn-Ga-based Martensite**
A. SOZINOV, N. LANSKA, K. ULLAKKO, Lappeenranta University of Technology, Material Physics Laboratory, Savonlinna, Finland
- 15.30 **B-1:IL05 Role of Interstitial Oxygen Atom on Martensitic Transformation of Ti-Nb Alloy**
M. TAHARA, T. INAMURA, H. HOSODA, Tokyo Institute of Technology, Yokohama, Kanagawa, Japan; H.Y. KIM, S. MIYAZAKI, University of Tsukuba, Tsukuba, Ibaraki, Japan
- 15.50 **B-1:IL06 Bulk and Surface Properties of Ti-Nb-based Superelastic Implant Materials**
Yu. ZHUKOVA, S. DUBINSKIY, V. SHEREMETYEV, YU. PUSTOV, M. FILONOVA, M. PETRZHIK, S. PROKOSHKIN, National University of Science and Technology "MISiS", Moscow, Russia; V. BRAILOVSKI, Ecole de technologie superieure, Montreal, Canada
- 16.10 *Break*

Session B-2 - Basic Phenomena and Theory

Chair: Franca ALBERTINI, Italy

- 16.30 **B-2:IL01 First-principles and Monte Carlo Studies of Magnetocaloric Effects**
P. ENTEL, University of Duisburg-Essen, Faculty of Physics and CENIDE, Duisburg, Germany
- 17.00 **B-2:IL02 Phase Diagrams and Physical Properties of Ferromagnetic Shape Memory Heusler Alloys**
R.Y. UMETSU¹, XIAO XU², RYOSUKE KAINUMA², ¹Institute for Materials Research, Tohoku University, Japan; ²Department of Materials Science, Graduate School of Engineering, Tohoku University, Japan
- 17.30 **B-2:IL03 Magnetic Shape Memory Materials: Martensitic Structures and Transformation Behaviour**
L. RIGHI, Department of Chemistry, University of Parma, Parma, Italy; A. CAKIR, M. ACET, Faculty of Physics and Center for Nanointegration (CENIDE), Universitaet Duisburg-Essen, Duisburg, Germany; S. FABBRICI, F. ALBERTINI, IMEM-CNR, Parma, Italy
- 18.00 **B-2:IL04 Magnetic Shape Memory Alloys: Lattice and Volume Instabilities**
V.A. CHERNENKO, BCMaterials & University of Basque Country (UPV/EHU), Bilbao, Spain; and Ikerbasque, Basque Foundation for Science, Bilbao, Spain

MONDAY JUNE 6 AFTERNOON

Session C-1 - Theory and Modeling of Single Phase and Composite Multiferroics

Room: SPOLETO A

Chair: Gopalan SRINIVASAN, USA

- 14.30 C-1:IL02 **The Origin of Hyper-ferroelectricity in LiBO₃ (B=V, Nb, Ta, Os)**

PENGFEI LI, XINGUO REN, G-C GUO, LIXIN HE, Key Laboratory of Quantum Information, University of Science and Technology of China, Hefei, Anhui, China

- 15.00 C-1:IL03 **New Multiferroics at Interfaces of Conducting Oxides**
J.M. RONDINELLI, Northwestern University, Evanston, Illinois, USA

- 15.30 C-1:IL04 **The Path Matters: The Key to Magnetization Reversal by Electric Field**

J. INIGUEZ, Luxembourg Institute of Science and Technology, Esch-sur-Alzette, Luxembourg

- 16.00 C-1:IL05 **Metallo-ferroelectricity, Multiferroicity and Magneto-electricity in Layered Perovskites**

V. FIORENTINI, A. FILIPPETTI, J. INIGUEZ*, F. RICCI, P. DELUGAS, M. SCARROZZA, M.B. MACCIONI, Dipartimento di Fisica, Università di Cagliari, and CNR-IOM, Cagliari, Italy ; *LIST, Esch-sur-Alzette, Luxembourg

- 16.30 Break

Chair: James RONDINELLI, USA

- 17.00 C-1:IL06 **Magnetoelectric Multipoles in Multiferroics and Complex Oxides**

M. FECHNER, ETH Zürich, Switzerland

- 17.30 C-1:IL07 **Impact of Magnetic Configuration and Local Electric Dipoles on Electronic Properties of BiFeO₃ with Spatial Bond Length Modulation**

D. RICINSKI, Tokyo Institute of Technology, Yokohama, Japan

- 18.00 C-1:IL08 **Composites for Novel Magnetic Properties**

E.A. BURGESS, A.P. HIBBINS, J.R. SAMBLES, S. HORSLEY, C. GALLAGHER, C. MCKEEVER, EPSRC Centre for Doctoral Training in Metamaterials (XM2), Dept.of Physics and Astronomy / Dept.of Engineering, University of Exeter, UK

MONDAY JUNE 6 AFTERNOON

Room: **DERUTA**

Chair: Francesco PRUDENZANO, Italy

Session D-1 - Physics and Modelling of Luminescent Materials

- 14.30 **D-1:IL03 Discovery of Novel Narrow-band Red Phosphors using High-throughput First Principles Descriptors**
ZHENBIN WANG, SHYUE PING ONG, Dept. of NanoEngineering, University of California San Diego, La Jolla, CA, USA
- 15.00 **D-1:IL04 Luminescence of Organo-metal-halide Perovskites Probed at Micro- and Nanoscales**
I.G. SCHEBLYKIN, Chemical Physics, Lund University, Lund, Sweden

Session D-10 - Medical Applications and Bioimaging

- 15.30 **D-10:IL03 Inorganic Fluorescent Materials for Biophotonics in the Second Biological Window**
KOHEI SOGA, Dept. of Materials Science and Technology, Japan, Imaging Frontier Center, Tokyo University of Science, Tokyo, Japan
- 16.00 *Break*

Session D-2 - Photonic and Biophotonic Structures; Plasmonic Metamaterials; Photovoltaics; Non-linear Optical Materials and Processes

Chair: Masahiro YOSHIMURA, Taiwan

- 16.30 **D-2:IL03 Contact-free Terahertz Thermometry in Solid, Liquid and Biological Model Systems**
R. NACCACHE, Dept. of Chemistry and Biochemistry, Concordia University, Montréal, Canada; A. MAZHOROVA, A. MARKOV, L. RAZZARI, F. VETRONE, R. MORANDOTTI, Institut National de la Recherche Scientifique – Énergie, Matériaux et Télécommunications, Université du Québec, Varennes, QC, Canada; M. CLERICI, School of Engineering, University of Glasgow, Glasgow, UK; L.K. KHORASHAD, A.O. GOVOROV, Dept. of Physics and Astronomy, Clippinger Research Labs, Ohio University, OH, USA
- 17.00 **D-2:IL04 Glass-derived Photonic Crystals structures**
A. CHIAPPINI¹, C. ARMELLINI¹, A. PIOTROWSKA^{1,2}, A. CARPENTIERO¹, S. VARAS¹, M. MAZZOLA¹, L. PASQUARDINI³, L. LUNELLI^{3,4}, A. VACCARI⁵, S. PELLI^{6,7}, A. LUKOWIAK⁸, A. QUANDT⁹, C. PEDERZOLLI³, D. ZONTA^{1,2}, G.C. RIGHINI^{6,7}, R. RAMPONI¹⁰, M. FERRARI^{1,7}, ¹CNR-IFN CSMFO Lab., Povo, Trento, Italy, ²Dep. of Civil, Env. and Mech. Eng., Univ. of Trento, Trento, Italy, ³FBK-LaBSSAH, Povo Trento, Italy, ⁴CNR-Inst.of Biophysics, Unit at Trento, Povo Trento, Italy, ⁵ARES unit at FBK-CMM, Povo, Trento, Italy, ⁶IFAC-CNR, MiPLab., Sesto Fiorentino, Italy, ⁷Enrico Fermi Centre, Roma, Italy, ⁸Inst. of Low Temperature and Structure Research, PAS, Wroclaw, Poland, ⁹MERG Group, Univ. of Witwatersrand, Johannesburg, South Africa, ¹⁰IFN-CNR and Politecnico di Milano, Dip. Fisica, Milano, Italy
- 17.30 **D-2:L05 Cell Performances of Inorganic-organic Hybrid Solar Cells using Fluorosilicate/Phosphorus Oxide Composite Microparticles**
KEISUKE SATO, Y. SUGANO, K. HIRAKURI, Dept. of Electrical and Electronic Engrg, Tokyo Denki University, Tokyo, Japan; N. FUKATA, MANA, NIMS, Tsukuba, Ibaraki, Japan

SYMPORIUM E

PROGRESS IN METAMATERIALS RESEARCH

Room: **CORCIANO**

Chair: Yuri S. KIVSHAR, Australia (*Programme Chair*)

14.55 *Welcome*

Session E-1 - Physics and Modelling of Metamaterials Systems

- 15.00 **E-1:L01 Some Perspectives in Non-Hermitian Metamaterials**
V. GALDI, University of Sannio, Benevento, Italy
- 15.30 **E-1:L03 Validity of Effective Medium Approximation in Deeply Subwavelength All-dielectric Multilayers**
A.V. LAVRINENKO, S.V. ZHUKOVSKY, A. ANDRYIEUSKI, O. TAKAYAMA, E. SHKONDIN, R. MALUREANU, F. JENSEN, Technical University of Denmark, Kgs. Lyngby, Denmark

16.00 *Break*

Session E-2 - Microwave and THz Metamaterials

Chair: Andrei LAVRINENKO, Denmark

- 16.30 **E-2:L01 Digital Metamaterials for Terahertz Single Pixel Imaging**
W.J. PADILLA, Duke University, Department of Electrical and Computer Engineering, Durham, NC, USA
- 17.00 **E-2:L03 Enhanced Chirality in the Near-field of Electromagnetic Metamaterials**
L.E. BARR, A.P. HIBBINS, E. HENDRY, XM2 Centre for Doctoral Training in Metamaterials, University of Exeter, Exeter, Devon, UK
- 17.20 **E-2:L04 RF Plasmonic State and Negative Permittivity Properties of Random Percolative Composites**
RUNHUA FAN, College of Ocean Science and Engineering, Shanghai Maritime University, Shanghai, P.R.China; and School of Material Science and Engineering, Shandong University, Jinan, P.R. China
- 17.40 **E-2:L05 Mode Index Tunable Moiré Pattern Metasurfaces**
R.C. MITCHELL-THOMAS, J.R. SAMBLES, A.P. HIBBINS, Electromagnetic and Acoustic Materials Group, Department of Physics and Astronomy, University of Exeter, Stocker Road, Exeter, UK

MONDAY JUNE 6 AFTERNOON

Session F-1 - General Physical and Chemical Properties

Room: ORVIETO

Chair: Swastik KAR, USA

- 14.30 **F-1:KL 2D Materials: Standards, Science, and Technology**
A.H. CASTRO NETO, National University of Singapore, Singapore
- 15.10 **F-1:L01 Optoelectronic Properties of Transition Metal Dichalcogenides**
L. BALICAS, D. RHODES, National High Magnetic Field Lab, Florida State University, Tallahassee, FL, USA
- 15.30 **F-1:L04 Determining the Nature of the Gap in Semiconducting Graphene**
M.S. OSOFSKY¹, J. PRESTIGIACOMO^{1*}, A. NATH², S.C. HERNANDEZ¹, V.D. WHEELERT¹, S. WALTON¹, D.K. GASKILL¹, ¹Naval Research Laboratory, Washington, DC, USA; ²George Mason University *NRC Postdoctoral Fellow
- 15.50 **F-1:L05 Understanding the Structural Evolution of Graphene Heated with Electrical Current in Air**
IN-SANG YANG, MINKYUNG CHOI, Ewha University, Korea; JANGYUP SON, JONGIN CHA, JONGILL HONG, Yonsei University, Korea; HEECHAE CHOI, SEUNGCHUL KIM, KWANG-RYEOL LEE, KIST, Korea; SANG JIN KIM, BYUNG HEE HONG, Seoul National University, Korea; SANPON VANTASIN, ICHIRO TANABE, YUKIHIRO OZAKI, Kwansei Gakuin University, Japan

16.10 Break

Chair: Gianluca FIORI, Italy

- 16.40 **F-1:L06 Super-low Friction Property of Si-doped Diamond-like Carbon by the Generation of Graphene Structure: Quantum Chemical Molecular Dynamics Simulations**
M. KUBO, S. BAI, M. NAKAMURA, Y. HIGUCHI, N. OZAWA, Institute for Materials Research, Tohoku University, Sendai, Japan
- 17.00 **F-1:L08 Graphene-boron Nitride 2D Heterosystems Functionalized with Hydrogen: Structure, Vibrations, Optical Response and Electron Band Engineering and Bonding**
A.I. SHKREBTII, B. WILK, Z.A. IBRAHIM, R. MINNINGS, University of Ontario, Institute of Technology, Oshawa, ON, Canada; I.M. KUPCHAK, Institute of Semiconductor Physics, Academy of Sciences, Kiev, Ukraine; R. ZAPATA-PENÃ, S.M. ANDERSON, B.S. MENDOZA, Centro de Investigaciones en Óptica, León, Guanajuato, México

Session F-6 - Application of Graphene and other 2D Layered Materials and Composites

- 17.20 **F-6:L03 A New Paradigm for Selective NO₂ Gas Sensing with Physisorption based Two Dimensional SnS₂**
K. KALANTAR-ZADEH¹, J.Z. OU¹, W. GE², W. SHAN², S.P. RUSSO³, Y. X. LI^{1,2}, ¹School of Electrical and Computer Engineering, RMIT University, Melbourne, Australia; ²The Key Laboratory of Inorganic Functional Materials and Devices, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, P.R. China; ³School of Applied Sciences, RMIT University, Melbourne, Australia

MONDAY JUNE 6 AFTERNOON

Session G-1 - Growth and Functionalization of 1-D Nanostructures

Room: SALA RELATORI

Chair: Chennupati JAGADISH, Australia

- 14.30 G-1:IL03 **GaN/InGaN Nanowire Structures - MBE Growth and Optical Properties**

H. RIECHERT, Paul-Drude-Institut, Berlin, Germany

- 15.00 G-1:IL04 **Demonstration of Hole Gas Accumulation Control in Ge/Si Core-shell Nanowires**

NAOKI FUKATA¹, K. NISHIBE¹, M. YU¹, W. JEVASUWAN¹, T. TAKEI¹, Y. BANDO¹, W. WU², Z.L. WANG², ¹National Institute for Materials Science (NIMS), Tsukuba, Japan; ²School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA, USA

- 15.30 G-1:IL05 **Heterostructure Formation in Nanowires of Alloyed Compound Semiconductors - Experiments and Theory**

F. GLAS, G. PRIANTE, F. OEHLER, K. PANTZAS, G. PATRIARCHE, J.-C. HARMAND, Laboratoire de Photonique et de Nanostructures, CNRS, Université Paris Saclay, Marcoussis, France

16.00 Break

Chair: Silvija GRADECAK, Australia

- 16.30 G-1:IL06 **Hybrid Nanophotonics-nanomaterial Platforms with III/V Semiconductor Nanowires on Si**

MASAYA NOTOMI, NTT Basic Research Laboratories and NTT Nano-photonics Center, Atsugi, Japan

- 17.00 G-1:IL07 **MBE Growth of Self Assisted InAs Nanowires on Graphene**

JUNG-HYUN KANG, Y. COHEN, Y. RONEN, M. HEIBLUM, D. CONVERTINO, A. ROSSI, C. COLETTI, S. HEUN, L. SORBA, H. SHTRIKMAN, Braun Center for Submicron Research, Weizmann Institute of Science, Rehovot, Israel; Istituto Nanoscienze-CNR and Scuola Normale Superiore, Italy

- 17.30 G-1:IL09 **Au-catalyst Assisted Self-assembly of CdTe Nanowires by Metalorganic Vapour Phase Epitaxy**

V. DI CARLO, F. MARZO, N. LOVERGINE, Dept. of Engineering for Innovation, University of Salento, Lecce, Italy; P. PRETE, IMM-CMR, Lecce, Italy

MONDAY JUNE 6 AFTERNOON

Session H-1 - Advances in EAP Materials

Room: SALA STAMPA

Chair: Jinsong LENG, China

14.30 H-1:L04 Stronger VHB Dielectric Elastomer Actuator

GIH-KEONG LAU, THANH-GIANG LA, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

14.50 H-1:L05 Piezoelectric Polymer Foams: Structure and Property Adjustment for Air-borne Ultrasonic Transducer

M. SBORIKAS¹, J. EALO², **M. WEGENER**¹, ¹Department of Sensors and Actuators, Fraunhofer IAP, Potsdam, Germany; ²School of Mechanical Engineering, University of Valle, Ciudad Universitaria Meléndez, Cali, Colombia

15.10 H-1:L06 Polymeric Electrochemical Motors Sense Physical and Chemical Working Conditions: Artificial Proprioception

T. F.OTERO¹, **Y.A. ISMAIL**², L. VALERO^{1,3}, J.G. MARTINEZ¹, ¹Laboratory for Electrochemistry, Intelligent Materials and Devices, Univ. Politécnica de Cartagena, Cartagena, Spain; ²Dept.of Basic Sciences, College of Applied Science, A'Sharqiyah University, Ibra, Oman; ³Electronic Engineering School, Universidad Autónoma del Estado de México, Toluca, México

15.30 Break

Chair: Salvatore GRAZIANI, Italy

16.00 H-1:L08 Impact of Structural Modifications on Electrically Induced Properties of Relaxor Polymer Systems

V. BOBNAR, G. CASAR, S. GLINSEK, J. KORUZA, B. MALIC, J. Stefan Institute, Ljubljana, Slovenia; X. LI, Q.M. ZHANG, Department of Electrical Engineering and Materials Research Institute, The Pennsylvania State University, University Park, PA, USA

16.20 H-1:L09 High Dielectric Permittivity Elastomers for Artificial Muscles

D.M. OPRIS, S. DÜNKI, E. PERJU, F. NÜESCH, Swiss Federal Laboratories for Materials Science and Technology Empa, Duebendorf, Switzerland

MONDAY JUNE 6 AFTERNOON

Session I-1 - Design Elements and Advanced Concepts for Photo-functional Materials

Room: ASSISI A

Chair: Gabriele CENTI, Italy

- 15.00 **I-1:L04 Z-scheme over all Water Splitting on Rh/K4Nb6O17 Nanosheet Photocatalyst**
HSIN-YU LIN, YU-LIN YE, Department of Materials Science and Engineering, National Dong Hwa University, Hualien, Taiwan
- 15.30 **I-1:L05 Iron Oxide-based Electrocatalysts for Water Oxidation at Neutral pH**
HIROSHI IRIE, K. ISHIKAWA, T. TAKASHIMA, Clean Energy Research Center, University of Yamanashi, Kofu, Yamanashi, Japan
- 15.50 **I-1:L07 Bismuth Vanadate-based Heterojunction Photoelectrodes for Photoelectrochemical Water Splitting: Synthesis and Characterisation**
CHONG SIANG YAW¹, MENG NAN CHONG^{1,2}, AI KAH SOH³,
¹School of Engineering, Chemical Engineering Discipline, Monash University Malaysia, Bandar Sunway, Selangor, Malaysia;
²Sustainable Water Alliance, Advanced Engineering Platform, Monash University Malaysia, Bandar Sunway, Selangor, Malaysia;
³School of Engineering, Mechanical Engineering Discipline, Monash University Malaysia, Bandar Sunway, Selangor, Malaysia

16.10 Break

Chair: Hsin-Yu LIN, Taiwan

- 16.40 **I-1:L08 Reflections on Rust: Iron Oxide Photoelectrodes for Solar Energy Conversion and Storage**
A. ROTHSCHILD, Department of Materials Science and Engineering, Technion – Israel Institute of Technology, Haifa, Israel
- 17.10 **I-1:L09 Hybrid Organic/Inorganic Assemblies with Tailored Photoelectro-chemical Activity: from Synthetic Aspects to Energy Applications**
C. JANAKY, A. VARGA, A. KORMANYOS, G. SAMU, University of Szeged, Hungary; K. RAJESHWAR, The University of Texas at Arlington, TX, USA
- 17.40 **I-1:L10 Flexible Transparent Conductive Electrodes and Photocatalytic Conversion of CO₂ to CO Gas Sensor using Single Crystal Cu Thin Film**
SE-YOUNG JEONG^{1,2}, I.H. PARK¹, W.K. KIM³, S. LEE⁴, H.Y. PARK¹, Y.J. LEE¹, G.W. LEE⁵, ¹Department of Cogno-Mechatronics Engineering, Pusan National University, Miryang, Rep.of Korea; ²Department of optics and mechatronics engineering, Pusan National University, Miryang, Rep.of Korea; ³R&D Center, LG Display Co., Ltd., Paju, Rep.of Korea; ⁴Materials and Science Engineering, University of Maryland, College Park, Maryland, USA; ⁵Korea Research Institute of Standards and Science & Department of Science of Measurement, University of Science and Technology, Daejeon, Rep.of Korea

MONDAY JUNE 6 AFTERNOON

Room: NORCIA

Session J-1 - New Nanocarbons (CNTs, Graphene, New 2D Materials)-based Gas Sensors; Nanosilicon-based Gas Sensors

Chair: Camilla BARATTO, Italy

- 15.00 **J-1:IL04 High Performance Chemoresistive Gas Sensors based on Self-activated Graphene and Functionalized Graphene**
HO WON JANG, Department of Materials Science and Engineering, Seoul National University, Seoul, Korea
- 15.30 **J-1:IL05 Graphene-based Materials and Nanostructures for Discriminative Gas Sensing**
A. SINITSKII, University of Nebraska - Lincoln, Lincoln, NE, USA
- 16.00 **J-1:IL07 Adsorption Characterization of Fabricated Buckypapers (BPs) for Volatile Organic Compound (VOC) Sampling and Analysis**
JONGHWA OH, C.T. LUNGU, University of Alabama at Birmingham, Birmingham, AL, USA; E.L. FLOYD, University of Oklahoma, Oklahoma City, OK, USA

16.20 Break

Session J-2 - Semiconductor/Ion Conduction Oxides-based Gas Nanosensors

Chair: Prabir DUTTA, USA

- 16.50 **J-2:IL01 Nanostructured Semiconductor Gas Sensors for Detection of Sub-ppm Concentrations**
T. SAUERWALD, M. LEIDINGER, A. SCHÜTZE, Saarland University, Saarbrücken, Germany; J. HUOTARI, J. LAPPALAINEN, Microelectronics and Materials Physics Laboratories, University of Oulu, Oulu, Finland
- 17.20 **J-2:IL02 Detection of Particulate Matter by using Limiting Current-type Oxygen Sensor**
M. NISHIBORI, H. WAKITA, K. SHIMANOE, Kyushu University, Kasuga, Fukuoka, Japan; Y. SADAOKA, Ehime University, Matsuyama, Ehime, Japan
- 17.50 **J-2:IL03 Functional Oxide Materials for High Performance SiC-FET Sensors for Indoor Air Quality Control**
D. PUGLISI, M. BASTUCK, M. ANDERSSON, A. LLOYD SPETZ, Linköping University, Linköping, Sweden; M. BASTUCK, A. SCHUETZE, Saarland University, Saarbruecken, Germany; M. ANDERSSON, J. HUOTARI, J. LAPPALAINEN, A. LLOYD SPETZ, University of Oulu, Oulu, Finland; V. KEKKONEN, J. LIIMATAINEN, Picodeon LTD Oy, Ii, Finland

MONDAY JUNE 6 AFTERNOON

Session K-2 - Phase Change Memories (PCM)

Room: **MAGIONE A**

Chair: Marco BERNASCONI, Italy

- 14.30 **K-2:L03 Advances in Nanowire-based Phase Change Memories**
M. LONGO, Laboratory MDM, IMM-CNR, Agrate Brianza, Italy

- 15.00 **K-2:L05 Epitaxial Trigonal Ge-Sb-Te Alloys: Model Materials for Future Low Energy Consumption Non-volatile Memory Applications?**

H. HARDTDEGEN¹, S. RIESS¹, M. SCHUCK¹, K. KELLER¹, P. JOST², M. BORNHÖFFT³, H. DU⁴, A. SCHWEDT³, J. MAYER^{3,4}, G. ROTH⁵, G. MUSSLER¹, M. VON DER AHE¹, D. GRÜTZMACHER¹, M. MIKULICS¹, ¹Peter Grünberg Inst. (PGI 9) and JARA - Fundamentals of Future Information Tech., Forschungszentrum Jülich GmbH, Germany; ²I. Physikalisches Inst. (IA), RWTH Aachen Univ.; ³Central Facility for Electron Microscopy, RWTH Aachen Univ., Germany; ⁴Ernst Ruska-Centre, Forschungszentrum Jülich GmbH, Germany; ⁵Inst. for Crystallography, RWTH Aachen Univ., Germany

- 15.20 **K-2:L06 Au-catalyzed Synthesis and Characterization of In-Ge-Te Nanowires by MOCVD**

R. CECCHINI¹, S. SELMO^{1,2}, C. WIEMER¹, M. FANCIULLI^{1,2}, E. ROTUNNO³, L. LAZZARINI³, L. CACCAMO⁴, A. WAAG⁴, B. SHEEHAN⁵, S. MONAGHAN⁵, K. CHERKAOUI⁵, P.K. HURLEY⁵, M. LONGO¹, ¹Laboratorio MDM, IMM-CNR, Unità di Agrate Brianza, Agrate Brianza, (MB), Italy; ²Dip. di Scienza dei Materiali, Univ. of Milano Bicocca, Milano, Italy; ³IMEM-CNR, Parma, Italy; ⁴Inst. für Halbleitertechnik and Lab. for Emerging Nanometrology, Technische Univ. Braunschweig, Braunschweig, Germany; ⁵Tyndall National Inst., Univ. College Cork, Dyke Parade, Cork, Ireland

- 15.40 **K-2:L07 Operation Fundamentals of Phase Change Memory Devices based on Ge-rich GST Materials and Featuring High Reliability Performances**

V. SOUSA, G. NAVARRO, N. CASTELLANI, M. COUÉ, O. CUETO, C. SABBIONE, V. DELAYE, F. FILLOT, P. NOÉ, L. PERNIOLA, CEA-LETI, Grenoble Cedex, France; S. BLONKOWSKI, STMicroelectronics, Crolles, France; P. ZULIANI, R. ANNUNZIATA, STMicroelectronics, Agrate Brianza, Italy

- 16.00 *Break*

Chair: Massimo LONGO, Italy

- 16.30 **K-2:L08 Atomistic Simulations of the Heterogeneous Crystallization of Phase Change Materials**

M. BERNASCONI, Dept. of Materials Science, Univ. of Milano-Bicocca, Italy; A. BOUZID, C. MASSOBRI, Inst. de Physique et Chimie des Matériaux de Strasbourg, Univ. of Strasbourg-CNRS, France; S. CARAVATI, Dept. of Chemistry, Univ. of Zurich, Switzerland

- 17.00 **K-2:L10 Integrated All-photonic Data Storage Enabled by Phase-change Materials**

C. RIOS¹, M. STEGMAIER², P. HOSSEINI¹, C.D. WRIGHT³, W. PERNICE^{2,4}, H. BHASKARAN¹, ¹Dept. of Materials, University of Oxford, UK; ²Inst. of Nanotechnology, Karlsruhe Inst. of Technology (KIT), Eggenstein-Leopoldshafen, Germany; ³Dept. of Engineering, Univ. of Exeter, UK; ⁴Dept. of Physics, Univ. of Muenster, Germany

- 17.20 **K-2:L11 Phase Change Material based Non-volatile Optoelectronic Interface for Optical Systems**

G. RODRIGUEZ HERNANDEZ, P. HOSSEINI, C. RIOS, H. BHASKARAN, Oxford University, Dept. of Materials, Oxford, UK; C.D. WRIGHT, University of Exeter, Engineering Dept., Exeter, UK

MONDAY JUNE 6 AFTERNOON

Session L-1 - Adaptive/Active Textiles

Room: MONTEFALCO

Chair: George K. STYLIOS, UK

15.00 **L-1:L04 Shape-memory Nanocomposite Elastomers filled with Carbon Nanomaterials**

G.C. LAMA^{1,2}, G. GENTILE¹, P. CERRUTI¹, V. AMBROGI^{1,2}, C. CARFAGNA¹, ¹Institute for Polymers, Composites and Biomaterials of Italian National Research Council (IPCB-CNR), Pozzuoli, Italy; ²Department of Chemical Engineering, Materials and Industrial Production, University of Napoli, Napoli, Italy

15.30 **L-1:L05 Active Textile Materials via Polymer Grafting**

I. LUZINOV, Department of Materials Science and Engineering, Clemson University, Clemson, SC, USA

15.50 Break

Chair: Xiaoming TAO, China

16.20 **L-1:L09 Electromechanically Active Textiles for Soft Robotics**

A. MAZIZ¹, A. KHALDI¹, N.-K. PERSSON², E.W.H. JAGER¹, ¹Biosensors and Bioelectronics Centre, Dept. of Physics, Chemistry and Biology (IFM), Linköping University, Linköping, Sweden; ²Smart Textiles, University of Borås, Borås, Sweden

16.40 **L-1:L10 Textile Materials with SMA Elements for Active Protection against Heat and Flame**

G. BARTKOWIAK, A. DABROWSKA, Central Institute for Labour Protection, National Research Institute, Warsaw, Poland

17.00 **L-1:L11 Dispenser printed Actively Controlled Thermochromic Colour Changing Device on Fabric for Smart Fabric Applications**

YANG WEI, Z. AHMED, R. TORAH, J. TUDOR, University of Southampton, Hampshire, UK

MONDAY JUNE 6 AFTERNOON

Room: MAGIONE B

Session O-1 - Algorithms, Mechanisms and Structures in Nature as Inspiration for Mimicking

Chair: Julian VINCENT, UK

14.30 O-1:L03 Tuning Mechanical Properties of Spider Cuticle by its Composition and by Structural Gradients

Y. POLITI¹, B. BAR-ON¹, F.G. BARTH², P. FRATZL¹, ¹Department of Biomaterial, Max-Planck-Institute of Colloids and Interfaces, Potsdam, Germany; ²Department of Neurobiology, Faculty of Life Sciences, University of Vienna, Vienna, Austria

15.00 O-1:L04 Introducing Self-healing in a Lattice Spring Model to simulate Bone Fracture and Repair

F. BOSIA¹, L. BRELY¹, N.M. PUGNO^{2,3,4}, ¹Dept. of Physics, University of Torino, Italy; ²Lab. of Bio-Inspired & Graphene Nanomechanics, Dept. of Civil, Env.I and Mechanical Engrg, University of Trento, Trento, Italy; ³Center for Materials and Microsystems, Fondazione Bruno Kessler, Povo (Trento), Italy; ⁴School of Engrg and Materials Science, Queen Mary University of London, London, UK

15.20 O-1:L05 Structural Integration Design for Enhanced Photoluminescence in Butterfly Wings

TONGXIANG FAN, School of Materials Science and Engineering, Shanghai Jiaotong University, Shanghai, China

15.40 Break

~~CANCELLED~~

Session O-2 - Bio-inspired and Bio-enabled Materials and Manufacturing

Chair: Zhendong DAI, China

16.10 O-2:L01 Bio-enabled, Chemically-tailored, Hierarchically-structured, 3-D Materials

K.H. SANDHAGE, School of Materials Engineering, Purdue University, West Lafayette, IN, USA

16.40 O-2:L02 Novel Bio-inspired Morphing Materials

G. LANZARA, K SAMADIKAH, E. BARRESI, Y. CHEN, Engineering Department, University of Rome, RomaTre, Italy

17.10 O-2:L04 Transport and Mechanical Properties of Ordered Biomimetic Porous Materials from Freeze Casting and Ionotropic Gelation

M. KEUPER, K. KLANG, G. BUCK, C. LAUER, **K.G. NICKEL**, University Tuebingen, Applied Mineralogy, Tuebingen, Germany

17.30 O-2:L05 Textile as Artificial Nature - From Synthetic Sea Grass to Fibrous Implants

N.-K. PERSSON, Smart Textiles Technology Lab, Swedish School of Textiles, University of Borås, Borås, Sweden

17.50 O-2:L06 Multidimensional Biomimetic Synthesis of Magnetic Materials via Selective Mineralization of Ferritin Subunits

D. CARMONA¹, L. TRECCANI², S. LID³, L. COLOMBI CIACCHI^{3,4}, ¹Advanced Ceramics, Faculty of Production Engineering, University of Bremen, Germany; ²Petroceramics Spa, Kilometro Rosso Parco Scientifico Tecnologico, Stezzano, Bergamo, Italy; ³Hybrid Materials Interfaces, Faculty of Production Engineering, University of Bremen, Germany; ⁴MAPEX Center for Materials and Processes, University of Bremen, Germany

MONDAY JUNE 6 AFTERNOON

Session P-1 - Smart Materials/Sensors/Actuators/ MEMS/NEMS

Room: **SPOLETO B**

Chair: Ayech BENJEDDOU, France

14.30 P-1:L03 Shape control by PZT

H. IRSCHIK, Johannes Kepler University of Linz, Linz, Austria; M. KROMMER, Vienna University of Technology, Vienna, Austria; C. Zehetner, Linc Center of Mechatronics, Linz, Austria

15.00 P-1:L04 Shape Memory Alloys Wires for Engineering Applications. Particular Characteristics of NiTi SMA: From Small to Medium Diameter

S. CASCIATI, DICA Dept., University of Catania, Siracusa, Italy; M. VECE, Structural Mechanics Dept., Pavia University, Italy; **V. TORRA**, Applied Physics Dept. Polytechnic University of Catalonia, Barcelona, Spain

15.30 P-1:L06 Carbon Nanotube Nanocomposites with Enhanced Strength and Damping Capabilities

G. LANZARA, S. CHAKRABARTI, G. FORMICA, University of Rome, RomaTre, Italy; M. TALÒ, **W. LACARBONARA**, Sapienza University of Rome, Italy

15.50 Break

Chair: Vicenc TORRA, Spain

16.20 P-1:L07 Vibroacoustic Behaviour of Periodic Smart Structures

M. ICHCHOU, C. ZHOU, J.P. LAINE, A. ZINE, Ecole Central de Lyon, Ecully, France

16.50 P-1:L08 Perspectives of TiNi-based and Fe-based SMA in Vibration Protection of Structures

A. VOLKOV, F.S. BELYAEV, M.E. EVARD, N.A. VOLKOVA, Saint Petersburg State University, Saint Petersburg, Russia

17.20 P-1:L09 In Situ Monitoring of CFRP's Fatigue Damage due to Manufacturing Flaws using Carbon Nanotube-embedded Spatial Strain Sensor

YINGJUN ZHAO, S. HOERRMANN, M. SCHAGERL, Institute of Constructional Lightweight Design, Johannes Kepler University Linz, Linz, Austria; C. DOPPLER, Laboratory for Structural Strength Control of Lightweight Constructions, Linz, Austria

17.40 P-1:L10 FBG-Galfenol Integrated Magnetic Field Sensors for Harsh Environments

D. DAVINO, **C. VISONE**, University of Sannio, Benevento, Italy; M.A. CAPONERO, C. CIANFARANI, A. POLIMADEI, ENEA C.R. Frascati, Frascati, RM, Italy

MONDAY JUNE 6 AFTERNOON

Session Q-1 - Advances in Stimuli Responsive, Active and Multi-functional Biomaterials

Room: **AUDITORIUM**

Chair: Thomas J. WEBSTER, USA

- 15.00 Q-1:IL04 **Design of Biodegradable Injectable Polymer Systems Exhibiting Temperature-responsive Covalent Hydrogel Formation**

YUICHI OHYA, YASUYUKI YOSHIDA, KEISUKE KAWAHARA, AKINORI KUZUYA, Department of Chemistry and Materials Engineering, Kansai University, Suita, Osaka, Japan

- 15.30 Q-1:IL05 **Multifunctional Organic Electronics for Cell Sensing and Manipulation**

PEILIN CHEN, Research Center for Applied Sciences, Academia Sinica, Taipei, Taiwan

- 16.00 Q-1:IL06 **Non-adhesive, Slippery, Antimicrobial Surfaces using Dynamic Surface Lubricant Layers**

B.D. HATTON¹, N. LAVIELLE², D. ASKER¹, ¹University of Toronto, Toronto, ON, Canada; ²ESPCI ParisTech and Ecole Polytechnique, France

- 16.20 *Break*

Chair: Yuichi OHYA, Japan

- 16.50 Q-1:IL07 **Nitric Oxide -A Key Player for Novel Anti-cancer Immuno-therapeutics-**

YUKIO NAGASAKI, Department of Materials Science and Medical Sciences, Satellite Laboratory, International Center for Materials Nanoarchitectonics (WPI-MANA), University of Tsukuba, Japan

- 17.20 Q-1:IL08 **Design of Nanogel Particles for Capture and/or Release of Target Molecules/Ions**

YU HOSHINO, Kyushu University, Fukuoka, Japan

- 17.50 Q-1:IL09 **In Vitro Bioactivity Study of TiCaPCO(N) and Ag-doped TiCapCO(N) Films in Simulated Body Fluid**

E.V. LEVASHOV, D.V. SHTANSKY, I.V. SUKHORUKOVA, A.N. SHEVEYKO, PH.V. KIRYUKHANTSEV-KORNEEV, E.I. ZAMULAEVA, National University of Science and Technology "MISIS", Moscow, Russia

Focused Session Q-6

**MATERIALS NANOTECHNOLOGIES
FOR IMPLANTABLE NEURAL INTERFACES**

Room: BUSINESS

Chair: Stefano VASSANELLI, Italy (Programme Chair)

14.55 Welcome

15.00 Q-6:L01 Semiconductor Nanowires for Neural Interface Applications

C.N. PRINZ, Division of Solid State Physics, NanoLund and Neuronano Research Center, Lund University, Lund, Sweden

15.30 Q-6:L02 Carbon Nanotube Technology for Flexible Neuronal Interfacing

Y. HANEIN, School of Electrical Engineering, Tel Aviv University, Tel Aviv, Israel

16.00 Break

16.30 Q-6:L05 Tissue Engineering Conducting Polymer Coatings for Implantable Neural Interfaces

R. GREEN, Biomedical Engineering, UNSW, Sydney, Australia

17.00 Q-6:L06 A Direct Comparison of Glassy Carbon and PEDOT-PSS for High Charge Injection and Low Impedance Neural Interfaces

M. VOMERO¹, E. CASTAGNOLA², S. DE FAVERI², E. MAGGIOLINI², I. REMBADO², L. FADIGA^{2,3}, S. KASSEGNE¹, D. RICCI², ¹MEMS Research Lab., Department of Mechanical Engineering, College of Engineering, San Diego State University, San Diego, CA, USA; ²CTNS@UniFe, Istituto Italiano di Tecnologia, Ferrara, Italy; ³Section of Human Physiology, University of Ferrara, Ferrara, Italy

17.20 Q-6:L08 Investigation of HfO₂-based Capacitive Transducers for Neuron Interfacing

G. TALLARIDA¹, S. SPIGA¹, A. CORNA², L. GELMI¹, A. LAMPERTI¹, M. FANCIULLI^{1,2}, ¹Laboratorio MDM - CNR-IMM, Agrate Brianza, Italy; ²Dipartimento di Scienza dei Materiali, Università degli Studi di Milano Bicocca, Milano, Italy

Session A-2 - Degradable, Stimuli-sensitive Polymers

Room: SPELLO

Chair: Burkhard SCHULZ, Germany

- 9.30 A-2:IL02 **Effects of Macromolecular Architecture on the Response of Oxidation-responsive Polymers**
R. D'ARCY, **N. TIRELLI**, University of Manchester, Manchester, UK
- 10.00 A-2:IL04 **Mechanical Characterization of Self-folding Chitosan Film**
A. RATH, S. MATHESAN, P. GHOSH, Indian Institute of Technology Madras, Chennai, India

10.20 *Break*

Chair: Nicola TIRELLI, UK

- 10.50 A-2:IL05 **Dynamic Covalent Crosslinking in Polymer Networks for Materials-healing**
M.B. GORDON, **C.J. KLOXIN**, Dept. of Materials Science and Engineering, Dept. of Chemical and Biomolecular Engineering, University of Delaware, Newark, DE, USA
- 11.20 A-2:IL06 **Biobased Polymer Systems with Multifunctionality**
A. LENDLEIN, Institute of Biomaterial Science and Berlin-Brandenburg Centre for Regenerative Therapies (BCRT), Helmholtz-Zentrum Geesthacht, Teltow, Germany, and University of Potsdam, Potsdam, Germany

Session B-2 - Basic Phenomena and Theory

Room: ASSISI B

Chair: Volodymyr A. CHERNENKO, Spain

- 9.00 **B-2:L05 Avalanche Criticality in Martenitic Transformations: An Acoustic Emission Study**
A. PLANES, Departament d'Estructura i Constituents de la Matèria, Facultat de Física, Universitat de Barcelona, Barcelona, Catalonia, Spain
- 9.30 **B-2:L06 High Mobility of Twin Interfaces in Ni-Mn-Ga at Ultra-sonic Frequencies**
H. SEINER, P. SEDLAK, M. LANDA, Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic; V. KOPECKY, O. HECZKO, Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic
- 9.50 **B-2:L07 Elastic Anisotropy of Polycrystalline Martensite of NiTi-based Alloys**
P. SEDLAK, M. THOMASOVA, H. SEINER, M. FROST, M. SEVCIK, M. LANDA, Institute of Thermomechanics of the CAS, Prague, Czech Republic
- 10.10 **B-2:L08 Isothermal B2 - B19' Martensitic Transformation in TiNi-based Shape Memory Alloy**
N. RESNINA, S. BELYAEV, Saint Petersburg State University, Saint Petersburg, Russia; A. SHELYAKOV, National Research Nuclear University "MEPhI" (Moscow Engineering Physics Institute), Moscow, Russia
- 10.30 *Break*

Chair: Oleg HECZKO, Czech Republic

- 11.00 **B-2:L10 Elasticity of Fe-Pd Single Crystals Under Unidirectional Prestress**
M. LANDA, P. STOKLASOVÁ, H. SEINER, P. SEDLÁK, M. JANOVSKÁ, Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic; T. FUKUDA, T. YAMAGUCHI, T. KAKESHITA, Dept. of Materials Science and Engineering, Graduate School of Eng., Osaka University, Suita, Osaka, Japan
- 11.20 **B-2:L11 The Magnetovolume Transition of LaFe_{11.8}Si_{1.2} as a Model System to Understand the Influence of Volume Expansion on Hysteresis During First Order Phase Transitions**
A. WASKE¹, A. FUNK¹, B. WEISE¹, A. RACK², S. FÄHLER¹, ¹IFW Dresden, Germany, ²ESRF Grenoble, France
- 11.50 **B-2:L12 Localization of Phase Transformation in NiTi Shape Memory Alloy Studied by the Finite Element Method Employing a Nonlocal Averaging Technique**
M. FROST, P. SEDLAK, Institute of Thermomechanics, CAS, Prague, Czech Republic; P. SEDMAK, L. HELLER, P. SITTNER, Institute of Physics, CAS, Prague, Czech Republic

TUESDAY JUNE 7 MORNING

Room: SPOLETO A

Session C-2 - Non-oxide, Organic-inorganic and 5-d Oxide Multiferroics

Chair: Seiji NAKASHIMA, Japan

- 9.30 C-2:L01 **Multiferroic Properties of Organic-inorganic Hybrid Compounds**
T.M. PALSTRA, **M. KAMMINGA**, Zernike Institute for Advanced Materials, University of Groningen, The Netherlands
- 10.00 C-2:L02 **Multiferroic Behavior Triggered by a Spin-state Transition**
V. ZAPF, S. CHIKARA, S. LIN, B. SCOTT, C. BATISTA, N. SMYTHE, Los Alamos National Lab., Los Alamos, NM, USA
- 10.30 C-2:L03 **Multiferroics and Magnetoelectric Effects in Metal-organic Frameworks**
YOUNG SUN, YING TIAN, WEI WANG, LIQIN YAN, YISHENG CHAI, Institute of Physics, Chinese Academy of Sciences, Beijing, China
- 11.00 C-2:L04 **Infrared Phonon Modes and Intrinsic Dielectric Response of Magnetodielectric La₂CoMnO₆**
R.L. MOREIRA, R. PANIAGO, R.M. ALMEIDA, Belo Horizonte, MG, Brazil; R.X. SILVA, C.W.A. PASCHOAL, São Luís, MA, Brazil

11.20 Break

Session C-3 - Advances in Materials Synthesis and Processing

Chair: Thomas M. PALSTRA, The Netherlands

- 11.50 C-3:L01 **DNA-assisted Self-assembly of Multiferroic Nano-composites and Studies on Magneto-electric Interactions**
G. SRINIVASAN¹, G. SREENIVASULU¹, M. PANDA², F.A. CHAVEZ²,
¹Department of Physics, Oakland University, Rochester, MI, USA;
²Department of Chemistry, Oakland University, Rochester, MI, USA
- 12.20 C-3:L02 **Epitaxial Growth of BiFeO₃ Thin Films by RF and Dual Ion Beam Sputtering**
SEIJI NAKASHIMA, M. SHIMIZU, H. FUJISAWA, University of Hyogo, Himeji, Hyogo, Japan

Session D-3 - Phosphors, Quantum Dots and Low Dimensional Materials for Lighting and Displays

Room: **DERUTA**

Chair: Christophe DUJARDIN, France

- 9.00 **D-3:L02 Tunable Performance of Nanostructured Eu-doped Oxide and Oxynitride Thin Films**
I. CAMPS, A. MARISCAL, R. SERNA, Laser Processing Group, Institute of Optics - CSIC, Madrid, Spain
- 9.20 **D-3:L03 Phosphor in Glass Based on High Refractive Index Glasses for LEDs**
V. ASEEV, Y. TUZOVA, Y. NEKRASOVA, N. NIKONOROV, E. KOLOBOKOVA, Y. FEDOROV, ITMO University, St. Petersburg, Russia
- 9.40 **D-3:L04 Ln(III)-Doped ZrO₂ Nanoparticles through Hierarchical Multilayer Growth Strategy for White Light Emission Applications**
C.S. OLIVEIRA, F.A. SIGOLI, I.O. MAZALI, Institute of Chemistry, University of Campinas - UNICAMP, Campinas, SP, Brazil
- 10.00 **D-3:L05 Enhancement of Thermal Behavior of BaMgAl₁₀O₁₇:Eu²⁺ Blue Phosphors Using a Microwave Assisted Combustion Synthesis Process**
A. POTDEVIN, N. PRADAL, G. CHADEYRON, ENSCCF, Institut de Chimie de Clermont-Ferrand, Clermont-Ferrand and Université Blaise Pascal, Institut de Chimie de Clermont-Ferrand, Clermont-Ferrand; P. BONVILLE, CEA, Centre de Saclay, DSM/Service de Physique de l'Etat Condensé, Gif-sur-Yvette; R. MAHIOU, Université Blaise Pascal, Institut de Chimie de Clermont-Ferrand, Clermont-Ferrand and CNRS, UMR 6296, ICCF, Aubiere, France
- 10.20 **D-3:L06 The Dependence of Luminous Efficacies (LE) and Color Rendering Indices (CRI) of Simulated Warm-white pcLEDs on the Applied Red Emitting Phosphor**
F. BAUR, T. JUESTEL, Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany
- 10.40 **D-3:L08 Luminescent Glasses and Glass Ceramics for White Light Emitting Diodes**
F. STEUDEL¹, A.C. RIMBACH², S. LOOS², B. AHRENS^{1, 2}, S. SCHWEIZER^{1, 2}, ¹Fraunhofer Application Center of Inorganic Phosphors, Branch Lab of Fraunhofer Institute for Microstructure of Materials and Systems IMWS, Soest, Germany; ²Department of Electrical Engineering, South Westphalia University of Applied Sciences, Soest, Germany
- 11.00 *Break*

Continued on next page

Continued from preceding page

Chair: Ivan CAMPS, Spain

- 11.30 **D-3:L09 From Red Band to Red Line Emitting Materials for Solid State Light Sources**
T. JUESTEL, F. BAUR, Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany
- 12.00 **D-3:L10 High Efficient Phosphor Based on Ion-exchanged Sodium-zinc-aluminosilicate Glasses**
Y.M. SGIBNEV, N.V. NIKONOROV, A.I. IGNATIEV, ITMO University, Saint-Petersburg, Russia
- 12.20 **D-3:L11 Luminescent Properties of Silver Molecular Clusters and Nanoparticles in Fluorine, Chlorine and Bromine Photo-thermo-refractive Glasses**
N. NIKONOROV, V. DUBROVIN, A. IGNATIEV, D. IGNATIEV, D. KLUKIN, A. SIDOROV, ITMO University, St. Petersburg, Russia

TUESDAY JUNE 7 MORNING

Room: CORCIANO

Session E-2 - Microwave and THz Metamaterials

Chair: Arseniy KUZNETSOV, Singapore

- 9.30 **E-2:L08 Metasurfaces with Electric, Magnetic and Magneto-electric Properties**
A. GRBIC, B. TIERNEY, C. PFEIFFER, Dept. of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI, USA
- 10.00 **E-2:L09 Resonant Transmission through Thin Metal Layers using Two Dimensional Arrays**
M. CAMACHO-AGUILAR, A.P. HIBBINS, J.R. SAMBLES, University of Exeter, Exeter, UK
- 10.20 **E-2:L10 Exploring the Interactions in Systems of Densely Packed Split Ring Resonators**
S. SEETHARAMAN, I.R. HOOPER, W.L. BARNES, College of Engineering, Mathematics and Physical Sciences, University of Exeter, Devon, UK
- 10.40 Break

Session E-3 - All-dielectric Metamaterials and Metasurfaces

Chair: Yuri KIVSHAR, Australia

- 11.10 **E-3:L01 High Quality Factor Silicon-based Metasurfaces**
J. VALENTINE, YUANMU YANG, Vanderbilt University, Nashville, TN, USA; A. BOULESBAA, I.I. KRAVCHENKO, D.P. BRIGGS, A. PURETZKY, D. GEOHEGAN, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge, TN, USA
- 11.40 **E-3:L02 Dielectric Nanoantennas and Metasurfaces based on Si Nanoparticles**
A.I. KUZNETSOV, Data Storage Institute, A*STAR, Innovis, Singapore
- 12.10 **E-3:L03 Resonant Dielectric Huygens' Metasurfaces**
I. STAUDE, Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University Jena, Jena, Germany; K.E. CHONG, M. DECKER, D.N. NESHEV, Nonlinear Physics Centre, Research School of Physics and Engineering, Australian National University, Canberra, ACT, Australia; I. BRENER, Center for Integrated Nanotechnologies, Sandia National Laboratories, Albuquerque, NM, USA; YU. S. KIVSHAR, Nonlinear Physics Centre, Research School of Physics and Engineering, Australian National University, Canberra, ACT, Australia

TUESDAY JUNE 7 MORNING

Room: ORVIETO

Session F-2 - Novel Properties

Chair: Andres CASTELLANOS-GOMEZ, Spain

- 9.00 **F-2:KL Charge and Spin in Layered Materials and Topological Insulators**
A. BANSIL, Physics Department, Northeastern University, Boston, MA, USA
- 9.40 **F-2:IL02 Ultrafast Dynamics of Spin-valley Coupled Polarization in Monolayer MoS₂**
CHIH-WEI LUO, Department of Electrophysics, National Chiao Tung University, Hsinchu, Taiwan

10.10 *Break*

Chair: Arun BANSIL, USA

Session F-3 - Synthesis, Processing and Integration of Graphene and other 2D Layered Compounds

- 10.40 **F-3:KL Defect Engineering in 2-Dimensional Materials: From Theory to Applications**
M. TERRONES, Department of Physics, Department of Chemistry, Department of Materials Science and Engineering and Center for 2-Dimensional & Layered Materials, The Pennsylvania State University, University Park, PA, USA & Institute of Carbon Science and Technology, Shinshu University, Japan
- 11.20 **F-3:IL02 Black-phosphorus, Graphene and 2D Binary Transition Metal Dichalcogenides for Device Applications**
A. KAUL, University of Texas, El Paso, TX, USA

Session F-4 - Synthesis and Processing of Composites

- 11.50 **F-4:IL02 Fabrication Processes and Properties of Multi-functional Graphene and Carbon Nanotube Nanocomposites**
SOON HYUNG HONG, Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea
- 12.20 **F-4:IL05 Graphene Oxide Composite 3D Materials obtained by Self-assembly Process using Biological Macromolecules**
R. IPPOLITI, M. ARDINI, L. OTTAVIANO, S. SANTUCCI, F. PERROZZI, G. FIORAVANTI, G. PANELLA, A. CIMINI, E. BENEDETTI, F. ANGELUCCI, University of L'Aquila, Italy; G. FABRIZI, University of Rome La Sapienza, Rome, Italy; V. MORANDI, L. ORTOLANI, M. CHRISTIAN, V. PALERMO, CNR, Bologna, Italy; L. PALOMBI, University of Salerno, Salerno, Italy

TUESDAY JUNE 7 MORNING

Room: SALA RELATORI

Session G-1 - Growth and Functionalization of 1-D Nanostructures

Chair: Henning RIECHERT, Germany

- 9.00 G-1:IL11 **Guided Growth of Horizontal Nanowires: A General Approach to Structural Control and Large-scale Integration**
E. JOSELEVICH, Department of Materials and Interfaces, Weizmann Institute of Science, Rehovot, Israel
- 9.30 G-1:IL12 **Quantum Dots in Group IV Nanowires**
A. LUGSTEIN¹, M. GLASER¹, SEBASTIAN GLASSNER¹, S. PRUCNAL², ANDREAS JOHANNES³, SÒNIA CONESA-BOJ⁴, CARSTEN RONNING³, A. FONTCUBERTA I MORRAL⁴, W. SKORUPA², E. BERTAGNOLLI¹, ¹Institute for Solid State Electronics, Vienna University of Technology, Austria; ²Institute of Ion Beam Physics and Materials Research, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany; ³Institute for Solid State Physics, Friedrich-Schiller-University Jena, Germany; ⁴Lab. des Matériaux Semiconducteurs, EPFL, Lausanne, Switzerland
- 10.00 G-1:IL13 **III-V Nanowires, Growth Challenges and Applications in Next Generation Photovoltaics**
E. ALARCON-LLADO, A. FONTCUBERTA I MORRAL, G. TUTUNCUOGLU, EPFL, Lausanne, Switzerland
- 10.30 G-1:L15 **Selective-area MOVPE Growth of GaAs Nanowires on Silicon using a Non-lithographic Approach to SiO₂ Mask Patterning**
E. STEVANATO, Dept. of Engineering for Innovation, University of Salento & Italian Institute of Technology, Lecce, Italy; A. PEDIO, F. MARZO, N. LOVERGINE, Dept. of Engineering for Innovation, University of Salento, Lecce, Italy; P. PRETE, IMM-CMR, Lecce, Italy
- 10.50 Break

Session G-2 - Structure and Properties of 1-D Nanostructures

Chair: Ernesto JOSELEVICH, Israel

- 11.20 G-2:IL01 **Analysis of 1D-nanostructure Properties using in Situ Transmission Electron Microscopy**
D. GOLBERG, WPI-MANA, National Institute for Materials Science (NIMS), Tsukuba, Ibaraki, Japan
- 11.50 G-2:IL02 **Thermoelectric Properties of Single Nanowires**
I. ZARDO, Department of Physics, University of Basel, Basel, Switzerland
- 12.20 G-2:IL03 **X-ray Investigations of Single Nanowire Devices**
J. WALLENTIN, Synchrotron Radiation Research, Lund University, Sweden

TUESDAY JUNE 7 MORNING

Room: SALA STAMPA

Session H-2 - Analysis and Mechanical Mechanisms

Chair: Hidenori OKUZAKI, Japan

- 9.30 **H-2:L03 New Resonance Mode in Dielectric Elastomer Actuators**
JIANWEN ZHAO, YONG GE, SHU WANG, BO HUANG, Harbin Institute of Technology, Weihai, China
- 10.00 **H-2:L04 Theoretical Model of the Stress-composition Interaction for Electrochemical Actuators Based on Single-walled Carbon Nanotubes and Ionic Liquids**
H. RANDRIAMAHAZAKA, Université Paris Diderot, Sorbonne Paris Cité, ITODYS, UMR 7086 CNRS, Paris Cedex, France; KINJI ASAKA, National Institute of Advanced Industrial Science and Technology (AIST), Ikeda, Osaka, Japan
- 10.20 **H-2:L05 Thermodynamics and Stability of Dielectric Elastomer**
LIWU LIU¹, YANJU¹, JINSONG LENG², ¹Department of Astronautical Science and Mechanics, Harbin Institute of Technology (HIT), Harbin, China; ²Centre for Composite Materials, Science Park of Harbin Institute of Technology (HIT), Harbin, China
- 10.40 **H-2:L06 Detection and Quantification of Structural Processes in Conducting Polymers Exchanging Cations**
L. VALERO^{1,2}, J.G. MARTINEZ², T.F. OTERO², M. FUCHIWAKI³, Y.A. ISMAIL⁴, ¹Electronic department, Engineering school, Universidad Autónoma del Estado de México, Toluca, México; ²Centre for Electrochemistry and Intelligent Materials (CEMI), Universidad Politécnica de Cartagena, Aulario II, Cartagena, Murcia, Spain; ³Kyushu Institute of Technology, Department of Mechanical Information Science and Technology, Iizuka (Fukuoka), Japan; ⁴Dept.of Basic Sciences, College of Applied Science, A'Sharqiyah University, Ibra, Oman

11.00 Break

Session H-3 - Device Development and Integration Technologies

Chair: Jianwen ZHAO, China

- 11.30 **H-3:L01 Stretchable Conducting Polymer Electrodes for Soft Actuators**
HIDENORI OKUZAKI, University of Yamanashi, Kofu, Japan
- 12.00 **H-3:L02 Solid State Electrochemical Microactuator on Soft Substrates**
C. PLESSE, A. MAZIZ, G.T.M. NGUYEN, F. VIDAL, LPPI, University of Cergy-Pontoise, Cergy, France; M. BENFETRIT, C. SOYER, E. CATTAN, IEMN, CNRS, Villeneuve D'Ascq, France

**Session I-1 - Design Elements and Advanced Concepts
for Photo-functional Materials**

Room: ASSISI A

Chair: Csaba JANAKY, USA

- 9.00 **I-1:L12 Electron Trapping in Semiconductor Photocatalysis**
BUNSHO OHTANI^{1,2}, AKIO NITTA², NAOYA MURAKAMI³, MAI TAKASE⁴, ¹Institute for Catalysis, Hokkaido University, Sapporo, Japan; ²Graduate School of Environmental Science, Hokkaido University, Sapporo, Japan; ³Graduate School of Engineering, Kyushu Institute of Technology, Kitakyushu, Fukuoka, Japan; ⁴Graduate School of Engineering, Muroran Institute of Technology, Muroran, Japan
- 9.30 **I-1:L13 Doped Lanthanum Ferrite Perovskites: Promising Materials for Photocatalytic Applications**
F. PARRINO¹, E. GARCÍA-LÓPEZ¹, G. MARCÌ¹, L. PALMISANO¹, V. FELICE², I. NATALI SORA², L. ARMELAO³, ¹"Schiavello-Grillone" Photocatalysis Group, Dipartimento di Energia, Ingegneria dell'informazione e Modelli matematici (DEIM), University of Palermo, Palermo, Italy; ²INSTM R.U. Bergamo and Dipartimento di Ingegneria, University of Bergamo, Dalmine, Bergamo, Italy; ³IENI-CNR and INSTM, Dipartimento di Scienze Chimiche, Università di Padova, Padova, Italy
- 10.00 **I-1:L14 Enhancing Photocatalytic Activity of TiO₂ by a Synergistic Effect between Plasmon Resonance in Ag Nanoparticles and Optical Interference**
G. CACCIATO^{1,2}, M. ZIMBONE², M. BAYLE³, C. BONAFOS³, V. PRIVITERA², M.G. GRIMALDI^{1,2}, R. CARLES³, ¹Dipartimento di Fisica ed Astronomia-Università di Catania, Catania, Italy; ²IMM-CNR, Catania, Italy; ³CEMES-CNRS Université de Toulouse, Toulouse Cedex, France
- 10.20 **I-1:L15 Ternary TiO₂-CuxS-Fly Ash System: Synthesis, Characterisation and Application in Adsorption and Photocatalysis**
L. ANDRONIC, M. VISA, A. DUTA, Transilvania University of Brasov, R&D Centre of Renewable Energy Systems and Recycling, Brasov, Romania
- 10.40 *Break*

Continued on next page

TUESDAY JUNE 7 MORNING

Continued from preceding page

Chair: Krishnan RAJESHWAR, USA

- 11.10 **I-1:L16 Novel Functional Materials Applied to Photocatalysis**
YEN-TING CHEN¹, KAO-SHUO CHANG^{1,2}, ¹Department of Materials Science & Engineering, National Cheng Kung University, Tainan City, Taiwan; ²Promotion Center for Global Materials Research (PCGMR), National Cheng Kung University
- 11.40 **I-1:L17 Micro-TiO2 as Photocatalyst for New Ceramic Surfaces Activated via Digital Printing**
M. STUCCHI, C.L. BIANCHI, C. PIROLA, Università degli studi di Milano, Milano, Italy; G. CERRATO, Università degli studi di Torino, Torino, Italy; A. DIMICHELE, Università degli studi di Perugia, Perugia, Italy; V. CAPUCCI, GranitiFiandre SpA, Fiorano M.se, Italy
- 12.00 **I-1:L18 Designing Bimetallic Reduction Co-catalysts – Correlating Atomic Structure with Properties**
M. BAR SADAN, Department of chemistry, Ben Gurion University of the Negev, Israel
- 12.20 **I-1:L19 Nanoplasmonics-assisted Degradation of Pollutants and Oxidation of Glycerol under Visible Light**
Z. CHEHADI^{1,2}, S. ZAID^{3,4}, J.-S. GIRARDON^{3,4}, J. TOUFAILY², M. CAPRON^{3,4}, F. DUMEIGNIL^{3,4}, T. HAMIEH², R. BACHELOT¹, S. JRADI¹, ¹Laboratoire de Nanotechnologie et d'Instrumentation Optique, Institut Charles Delaunay, UMR 6281 CNRS, Université de Technologie de Troyes, Troyes Cedex, France; ²Laboratory of Materials, Catalysis, Environment and Analytical Methods, Faculty of Sciences I, Doctorate School of Science and Technology, Lebanese University, Beirut, Lebanon; ³Université Lille Nord de France, Lille, France; ⁴Unité de Catalyse et de Chimie du Solide, UCCS (UMR CNRS 8181), Villeneuve d'Ascq, France

Session J-2 - Semiconductor/Ion Conduction Oxides-based Gas Nanosensors

Room: NORCIA

Chair: Kengo SHIMANOE, Japan

- 9.00 **J-2:L04 Highly Selective Detection of Methylbenzenes using p-type Oxide Semiconductors**

JONG-HEUN LEE, Department of Materials Science and Engineering, Korea University, Seoul, Republic of Korea

- 9.30 **J-2:L05 Nanocomposites-based Oxygen Gas Sensors**

M. BREZEANU, B.C. SERBAN, V. AVRAMESCU, C. COBIANU, V. DUMITRU, O. BUIU, A. STRATULAT, Honeywell Romania SRL, Bucharest, Romania; A. DE LUCA, Univ. of Cambridge; S.Z. ALI, Cambridge CMOS Sensors; F. UDREA, Univ. of Cambridge

- 10.00 **J-2:L06 Effective Design and Fabrication of Harsh Environment and Biomedical Gas Sensors**

P.K. DUTTA, Department of Chemistry and Biochemistry, The Ohio State University, Columbus, OH, USA

10.30 *Break*

Chair: Jong-Heun LEE, Korea

- 11.00 **J-2:L07 Investigating the Selective Behaviour of CuO in Gas Sensing Applications**

S. PALZER¹, J. WÖLLENSTEIN^{1,2}, J. KNEER¹, ¹Laboratory for Gas Sensors, Department of Microsystems Engineering, University of Freiburg, Germany; ²Fraunhofer Institute for Physical Measurement Techniques; Freiburg, Germany

- 11.30 **J-2:L08 Sensitivity and Selectivity of SnO₂-based Sensor for CO and H₂ Detections**

XING-MIN GUO, JIE-TING ZHAO, XI-TAO YIN, University of Science and Technology Beijing, Beijing, China

- 12.00 **J-2:L09 Synthesis and Gas-sensing Properties of Nanoporous Cobalt Oxide Materials**

S. VETTER, S. HAFFER, T. WAGNER, **M. TIEMANN**, Faculty of Science, Dept. of Chemistry, University of Paderborn, Germany

- 12.20 **J-2:L11 Enhanced Gas Sensing Properties of Different ZnO 3D Hierarchical Structures**

A. FIORAVANTI^{1,2}, A. BONANNO¹, M. MAZZOCCHI³, M.C. CAROTTA⁴, M. SACERDOTI⁵, ¹CNR-IMAMOTER Ferrara, Ferrara, Italy; ²Dip. di Chimica, Università di Parma, Parma, Italy; ³CNR-ISTEC Faenza, Italy; ⁴Consorzio Futuro in Ricerca, Ferrara, Italy; ⁵Dip. di Fisica e Scienze della Terra, Università di Ferrara, Ferrara, Italy

- 12.40 **J-2:L11b Enhanced Formaldehyde NiO Gas Sensing Properties by a Controlled Zn Doping using a Malonate Coprecipitation Synthesis**

R. LONTIO FOMEKONG^{1,4}, D. LAHEM², M. DEBLIQUY³, J. LAMBI NGOLUI⁴, A. DELCORTE¹, ¹Inst. de la Matière Condensée et des Nanosciences, Univ. Catholique de Louvain, Louvain-La-Neuve, Belgium; ²Materia Nova ASBL, Mons, Belgium; ³Service de Science des Matériaux, UMONS, Mons, Belgium; ⁴Lab. Physico-chimie des Matériaux, Dep. Chimie Inorg., Univ. de Yaoundé I, Yaounde, Cameroon

Session K-3 - Magnetic, Ferroelectric and Multiferroic Materials for Memory Devices

Room: **MAGIONE A**

Chair: Alexei GRUVERMAN, USA

9.00 K-3:IL01 Nano Spintronics Devices for CMOS Integration

HIDEO OHNO, Laboratory for Nanoelectronics and Spintronics, RIEC; Center for Spintronics Integrated Systems; Center for Innovative Integrated Electronics; WPI Advanced Institute for Materials Research, Tohoku University, Sendai, Japan

9.30 K-3:IL02 Ferroelectric HfO₂ for Non-volatile Memory Devices

U. SCHROEDER, T. SCHENK, M. HOFFMANN, C. RICHTER, M. PEŠIĆ, F. FENGLER, S. SLESAZECK, NaMLab gGmbH, Dresden, Germany; T. MIKOLAJICK, Nanoelectronic Materials, TU Dresden, Dresden, Germany; R. MATERLIK, C. KÜNNETH, A. KERSCH, Munich University of Applied Sciences, Munich, Germany; X. SANG, J.M. LEBEAU, North Carolina State University, Raleigh, NC, USA; S.V. KALININ, Oak Ridge National Laboratory, Oak Ridge, TN, USA

10.00 K-3:L03 Hafnium Oxide based Ferroelectrics prepared by Chemical Solution Deposition

S. STARSCHICH, U. BÖTTGER, RWTH Aachen University, Institut für Werkstoffe der Elektrotechnik II, Aachen, Germany

10.20 K-3:L04 Toward Experimental Implementation of HfO₂ based Ferroelectric Tunnel Junctions

A. CHERNIKOVA, D. NEGROV, **A. ZENKEVICH**, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow region, Russia

10.40 K-3:L05 Formation of Nanoscale BaTiO₃ MOSCAPs for Ferroelectric Field Effect Transistor Application

P. PONATH, A. POSADAS, University of Texas at Austin, Austin, TX, USA; M. SCHMIDT, P. HURLEY, R. DUFFY; Tyndall National Institute, University, Cork, Ireland; A.A. DEMKOV; University of Texas at Austin, Austin, TX, USA

11.00 Break

Chair: Uwe SCHROEDER, Germany

11.20 K-3:IL06 Nonvolatile Resistive Switching in Interface-engineered Ferroelectric Junctions

A. SAWA, A. TSURUMAKI-FUKUCHI, Y. TOYOSAKI, H. YAMADA, AIST, Tsukuba, Ibaraki, Japan

11.50 K-3:IL07 Polarization-enabled Electronic Properties of Hybrid 2D-ferroelectric Structures

A. GRUVERMAN, Department of Physics and Astronomy, University of Nebraska-Lincoln, Lincoln, NE, USA

12.20 K-3:L08 Leakage Currents in FeRAM Capacitors: Mechanisms and Correct Interpretation

A. SIGOV, K. VOROTILOV, YU. PODGORNY, MIREA, Moscow, Russia

12.40 K-3:L09 Memristive and Magnetoresistive Properties of SrTiO₃ based Junctions

I. BERGENTI, P. GRAZIOSI, A. RIMINUCCI, L. VISTOLI, M. CALBUCCI, F. BORGATTI, V. DEDIU, ISMN CNR, Bologna, Italy; D. MACLAREN, School of Physics and Astronomy, University of Glasgow, UK

TUESDAY JUNE 7 MORNING

Room: MONTEFALCO

Session L-1 - Adaptive/Active Textiles

Chair: Jian FANG, Australia

- 9.30 **L-1:L12 Advanced Microgel-functionalised Polyester Textiles Adaptive to Ambient Conditions**
P. GLAMPEDAKI, Pharmathen, R&D Dpt., Pallini, Attiki, Greece

- 10.00 **L-1:L13 Advances in Photovoltaic Fabrics**
YONG K. KIM, University of Massachusetts, Dartmouth, MA, USA

- 10.30 **L-1:L07 Temperature Responsive 3D Nitinol Textile with Adaptive Cross-section**
M. VYSANSKA, K. JANOUCHOVÁ, **O. LOUDA**, Technical University of Liberec, Faculty of Textile Engineering, Liberec, Czech Republic; L. HELLER, P. SITTNER, Institute of Physics AS CR, v. i. v. i., Prague, Czech Republic

10.50 Break

Session L-2 - E-textiles

Chair: Pelagia GLAMPEDAKI, Greece

- 11.20 **L-2:L01 Printed Electroluminescent Fabrics**
P. CALVERT, New Mexico Tech, Socorro, NM, USA; BIN HU, Dartmouth College, Hanover, NH, USA

- 11.50 **L-2:L02 Vibration Energy to Electricity Conversion of Electro-spun Nanofibers**
JIAN FANG, TONG LIN, Deakin University, Institute for Frontier Materials, Geelong, Australia

- 12.20 **L-2:L04 Resistance-invariant Superstretchable Conductor for DC and AC Signal Transmission**
YOURACK LEE, LE VIET THONG, MIN-KYU JOO, YOUNG HEE LEE, **DONGSEOK SUH**, Department of Energy Science, and IBS Center for Integrated Nanostructure Physics (CINAP), Institute for Basic Science, Sungkyunkwan University, Suwon, Korea

Room: **MAGIONE B**

Chair: Francesco RICCI, Italy

Session O-8 - Ongoing and Perspective Applications of Bio-inspired Technologies

9.00 O-8:L02 Parallel Computing with Molecular Motors

H. LINKE, M. LARD, NanoLund, Lund University, Lund, Sweden; T. KORTEN, S. DIEZ, TU Dresden; A. MÅNSSON, Linné University, Kalmar; D. NICOLAU Jr., Molecular Sense; D. NICOLAU Sr., McGill University

Session O-3 - Functional Bio-inspired Surfaces and Interfaces

9.30 O-3:L01 Nanostructuring Surfaces to Control Wetting

F. SCHELLENBERGER, S. WOIH, N. ENCINAS, P. PAPADOPoulos, D. VOLLMER, **H.-J. BUTT**, Max Planck Institute for Polymer Research, Mainz, Germany

10.00 O-3:L02 S-layer Lattices as Templates for Molecular Imprinting

D. PUM, E. LADENHAUF, D.S. WASTL, U.B. SLEYTR, University of Natural Resources and Life Sciences, Vienna, Austria; P.A. LIEBERZEIT, University of Vienna, Vienna, Austria

10.20 O-3:L03 Cell-inspired Mechanoresponsive Interfaces

M. TIMMERMANN, S.B. GUTEKUNST, **C. SELHUBER-UNKEL**, Dept. Biocompatible Nanomaterials, University of Kiel, Germany

10.40 O-3:L04 Bio-inspired Multifunctional Wrinkle Surface

HIROSHI ENDO, Department of Mechanical Systems Engineering, Toyama Prefectural University, Imizu, Japan

11.00 Break

Chair: Vladimir TSUKRUK, USA

11.30 O-3:L05 Biomimetic Design and Manufacturing of Anti-erosion Functional Surfaces Inspired from Desert Scorpion

ZHIWU HAN, Key Laboratory of Bionics Engineering of Ministry of Education, Jilin University, Changchun, China

12.00 O-3:L06 Nature-inspired Polymeric Nanofur for Environmental Applications: from Oil Spill Cleaning to Frictional Drag Reduction

M. KAVALENKA, C. ZEIGER, F. VÜLLERS, J. KUMBERG, H. HÖLSCHER, Institute of Microstructure Technology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany

12.20 O-3:L07 Spinach Extracts for the Development of Metal Patterns onto Plastic Substrates

D.E. WATSON, J. MARQUES-HUESO, M.P.Y. DESMULLIEZ, Heriot-Watt University, School of Engineering & Physical Sciences (EPS), Institute of Signals, Sensors and Systems, Microsystems Engineering Centre (MISEC), Edinburgh, Scotland, UK

12.40 O-3:L08 Bioinspired Multi-gradient Surfaces with Water Collection/Repellency

YONGMEI ZHENG, School of Chemistry and Environment, Beihang University, Beijing, China

TUESDAY JUNE 7 MORNING

Room: SPOLETO B

Session P-1 - Smart Materials/Sensors/Actuators/ MEMS/NEMS

Chair: Hans IRSCHIK, Austria

- 9.30 **P-1:IL12 Nonlinear Modeling and Analysis of Electro-active Plates: Stability, Post-buckling Behavior and Nonlinear Vibrations**
M. KROMMER, E. STAUDIGL, Y. VETYUKOV, Institute of Mechanics and Mechatronics, Vienna University of Technology, Vienna, Austria
- 10.00 **P-1:IL13 Dynamics of Shallow Arched Microstructures**
M.I. YOUNIS, Physical Sciences and Engineering Division, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia
- 10.30 Break

Chair: Les LEE, USA

Session P-2 - Integration Technologies

- 11.00 **P-2:IL01 Development and Application of Some Hybrid Non-linear Dissipative Devices**
Z. LU, D. ZHANG, Tongji University, China; **S.F. MASRI**, University of Southern California, Los Angeles, CA, USA; X. LU, Tongji University, China
- 11.30 **P-2:IL02 Model Order Reduction in Nonlinear Systems**
L. FARAVELLI, University of Pavia, Pavia, Italy
- 12.00 **P-2:IL03 Bridge Deflection Estimation under Unknown Moving Loads by Fusion of Measured Acceleration and Strain Data**
YING LEI, WEI HUA, Department of Civil Engineering, Xiamen University, Xiamen, China

Session P-4 - Ongoing and Perspective Applications

- 12.30 **P-4:IL01 Structural Monitoring and Assessment of Composite Structure**
W. OSTACHOWICZ, Polish Academy of Sciences (IMP PAN) and Warsaw University of Technology, Poland

TUESDAY JUNE 7 MORNING

Session Q-2 - Multifunctional Materials in Tissue Engineering and Regenerative Medicine

Room: AUDITORIUM

Chair: Esmaiel JABBARI, USA

- 9.30 Q-2:L03 **Robust Regenerative Engineering of the Shoulder**
R. JAMES, C.T. LAURENCIN, Department of Orthopaedic Surgery and The Raymond and Beverly Sackler Center for Biomedical, Biological, Physical and Engineering Sciences, University of Connecticut Health Center, Farmington, CT, USA
- 9.50 Q-2:L04 **Fabrication of Interconnected Porous Calcite from Calcium Sulfate and its Tissue Response**
KUNIO ISHIKAWA, KANJI TSURU, Dept. of Biomaterials, Faculty of Dental Science, Kyushu University, Fukuoka, Japan
- 10.10 Q-2:L05 **Progress in Calcium-magnesium Phospho-silicate Hydraulic Bio-cements**
T. TROCZYNSKI, M. YAGHTIN, Materials Engineering, University of British Columbia, Vancouver B.C., Canada

10.30 *Break*

Chair: Evgeny LEVASHOV, Russia

- 11.00 Q-2:ILO6 **Developmentally Inspired Approach to Cartilage Tissue Engineering**
E. JABBARI, University of South Carolina, Columbia, SC, USA
- 11.30 Q-2:ILO7 **Supramolecularly Movable Polyrotaxane Surfaces Directing Stem Cell Differentiation**
N. YUI, J.-H. SEO, Tokyo Medical and Dental University, Tokyo, Japan; T. YAMAOKA, S. KAKINOKI, M. HIRATA, National Cerebral and Cardiovascular Center Research Institute, Osaka, Japan
- 12.00 Q-2:ILO8 **Enhanced Tissue Infiltration into Porous Scaffolds by Active Growth Factor-immobilizing Technology**
T. YAMAOKA, S. KAKINOKI, National Cerebral and Cardiovascular Center Research Institute, Suita, Osaka, Japan; Y. HASHIMOTO, S. BABA, Osaka Dental University, Chuo-ku, Osaka, Japan

Focused Session Q-6 - Materials Nanotechnologies for Implantable Neural Interfaces

Room: BUSINESS

Chair: Stephanie P. LACOUR, Switzerland

- 9.30 Q-6:L10 Stretchable Hydrogel Biobelectronics: From 3D Printing to Neural Applications**
XUANHE ZHAO, Soft Active Materials Laboratory, MIT, Cambridge, MA, USA
- 10.00 Q-6:L12 Soft and Leaky Encapsulation Materials for Neural Interface Devices**
A. JOSHI-IMRE, A. GARCIA SANDOVAL, R. MODI, S. COGAN, W. VOIT, The University of Texas at Dallas, Richardson, TX, USA
- 10.20 Q-6:L15 Systemic Inhibition of Innate Immunity Pathways Improves Intracortical Microelectrode Performance**
J.R. CAPADONA, J.K. HERMANN, M. RAVIKUMAR, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH, USA; Advanced Platform Technology Center, L. Stokes Cleveland VA Medical Center, USA

10.50 Break

Chair: Christopher BETTINGER, USA

- 11.20 Q-6:L16 Recording High Frequency Neural Signals using Conformable and Low-impedance ECoG Electrodes Arrays coated with PEDOT-PSS-PEG**
E. CASTAGNOLA¹, M. MARRANI², E. MAGGIOLINI¹, S. DE FAVERI¹, F. MAITA², L. PAZZINI², D. POLESE², A. PECORA², L. MAIOLO², L. FADIGA^{1,3}, D. RICCI¹, ¹CTNS@UniFe, Istituto Italiano di Tecnologia, Ferrara, Italy; ²CNR-IMM Istituto per la Microelettronica e i Microsistemi, Rome, Italy; ³Section of Human Physiology, University of Ferrara, Ferrara, Italy
- 11.40 Q-6:L17 Interface Investigation of Electrogenic Cells on 3D Laser-patterned PEDOT Structures**
F. SANTORO¹, G.C. FARIA^{2,3}, Y. VAN DE BURGT², A. SALLEO², B. CUI¹, ¹Department of Chemistry, Stanford University, Stanford, CA, USA; ²Department of Material Science and Engineering, Stanford University, Stanford, CA, USA; ³Sao Carlos Physics Institute, Sao Paulo University, Sao Carlos, Brazil
- 12.00 Q-6:L18 A Nanoscale Interface Directs Alignment of a Cell-assembled Extracellular Matrix to Template Neurite Outgrowth**
J. SCHWARTZ¹, S.B. BANDINI¹, G.M. HARRIS², L.S.F. ADLER¹, A.O. PARikh¹, J. SPECHLER³, C.B. ARNOLD³, H. WANG⁴, J.E. SCHWARZBAUER², ¹Department of Chemistry, Princeton University, Princeton, NJ, USA; ²Department of Molecular Biology, Princeton University, Princeton, NJ, USA; ³Department of Mechanical and Aerospace Engineering, Princeton University, Princeton, NJ, USA; ⁴Department of Neurologic Surgery, Mayo Clinic, Rochester, MN, USA

TUESDAY JUNE 7 AFTERNOON

Session A-3 - Stimuli-sensitive Gels

Room: SPELLO

Chair: Andreas LENDLEIN, Germany

- 14.30 A-3:IL01 **Stimuli-responsive DNA Hydrogels: Switchable Materials and Interfaces and their Applications**
I. WILLNER, Institute of Chemistry, The Hebrew University of Jerusalem, Jerusalem, Israel
- 15.00 A-3:IL02 **Large Cilia Arrays of Multi-responsive Gels: Bulk Properties and Limits to Miniaturization**
E. MENDES, P. GLAZER, Dept. of Chemical Engineering, Delft University of Technology, Delft, The Netherlands; H. AN, Eastman, Kingsport, TN, USA
- 15.30 A-3:IL03 **Design and Applications of Self-folding Hydrogel Micro-structures**
D. GRACIAS, Johns Hopkins University, Baltimore, MD, USA
- 16.00 A-3:IL04 **Injectable and Stimuli-responsive Block Copolymer Hydrogels**
DOO SUNG LEE, Theranostic Macromolecules Research Center, School of Chemical Engineering, Sungkyunkwan University, Suwon, Gyeonggi-do, South Korea
- 16.30 Break

Chair: Itamar WILLNER, Israel

- 16.50 A-3:IL05 **Evolution of Self-oscillating Polymer Gels: Functional Control from Nanosize to Bulk Range**
R. YOSHIDA, The University of Tokyo, Tokyo, Japan
- 17.20 A-3:IL06 **Redox Responsive Organometallic Hydrogels as Metal Nanoparticle Foundry**
G.J. VANCSO, XUELING FENG, JING SONG*, XIAOFENG SUI, BRAM ZOETEBIER, MARK A. HEMPENIUS, Department of Materials Science and Technology of Polymers, MESA+ Institute for Nanotechnology, University of Twente, Enschede, The Netherlands;
*Institute for Materials Research and Engineering, A*STAR, Singapore
- 17.50 A-3:IL07 **Stimuli-sensitive (Glyco-) Poly peptide Based Polymers and Gels**
H. SCHLAAD, University of Potsdam, Institute of Chemistry, Potsdam, Germany; K.-S. KRANNIG, C.D. VACOGNE, Max Planck Institute of Colloids and Interfaces, Colloid Chemistry, Potsdam, Germany
- 18.20 A-3:IL08 **Nanoparticles and Hydrogels from Thermoresponsive Self-assembly of Fluorinated Oligo(Ethylene Glycol) Methacrylate-based Copolymers**
F. ZUPPARDI, F.R. CHIACCHIO, R. SAMMARCO, M. MALINCONICO, G. GOMEZ D'AYALA, **P. CERRUTI**, Institute for Polymers, Composites and Biomaterials (IPCB-CNR), Pozzuoli (NA), Italy

TUESDAY JUNE 7 AFTERNOON

Room: ASSISI B

Session B-3 - Functional Properties

Chair: Peter ENTEL, Germany

- 14.30 **B-3:IL01 Caloric and Multicaloric Effects in Ferroic and Multiferroic Materials**
L. MANOSA, Dept. ECM. Facultat de Física. Universitat de Barcelona, Barcelona, Spain
- 15.00 **B-3:IL02 Heusler Alloys for Solid State Refrigeration**
O. GUTFLEISCH, T. GOTTSCHALL, S. ENER, K. SKOKOV, TU Darmstadt, Materialwissenschaft, Darmstadt, Germany
- 15.30 **B-3:IL03 Magnetostructural Coupling and Magnetocaloric Effect in Ni-Mn-Ga-Cu Microwires**
X.X. ZHANG, M.F. QIAN, H.H. ZHANG, L. GENG, J.F. SUN, School of Materials Science and Engineering, Harbin Institute of Technology, Harbin, China
- 15.50 **B-3:IL04 Elastocaloric Effect in an Iron-Palladium Shape Memory Alloy**
TOMOYUKI KAKESHITA, FEI XIAO, **TAKASHI FUKUDA**, Osaka University, Suita, Osaka, Japan
- 16.20 **B-3:IL05 Functional Fatigue of Elastocaloric NiTiCu-based Thin Films**
C. CHLUBA¹, WENWEI GE², R. LIMA DE MIRANDA¹, J. STROBEL¹, L. KIENLE¹, M. WUTTIG², **E. QUANDT**¹, ¹Institute for Materials Science, Faculty of Engineering, University of Kiel, Germany; ²Department of Materials Science and Engineering, University of Maryland, USA

16.50 Break

Session B-4 - Thin Films and Micro Nano-systems

Chair: Eckhard QUANDT, Germany

- 17.10 **B-4:IL01 Elastocaloric Microcooling: From Basic Effects to Miniature Cooling Devices**
M. KOHL¹, H. OSSMER¹, C. CHLUBA², E. QUANDT², ¹Karlsruhe Institute of Technology, IMT, Karlsruhe, Germany; ²University of Kiel, IMS, Kiel, Germany
- 17.40 **B-4:IL02 Multicaloric Effects in Mn-Ga-Co Films on Ferroelectric Substrates**
B. SCHLEICHER^{1,2}, R. NIEMANN^{1,2}, S. SCHWABE¹, A. DIESTEL¹, A. WASKE¹, R. HÜHNE¹, P. WALTER^{3,4}, L. SCHULTZ^{1,2}, **S. FÄHLER**^{1,2}, ¹IFW Dresden, Dresden, Germany; ²TU Dresden, Institute for Solid State Physics, Dresden, Germany; ³Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany; ⁴2nd Institute of Physics B and JARA-FIT, RWTH Aachen University, Aachen, Germany
- 18.10 **B-4:IL03 Giant Inverse Magnetocaloric Effect of NiCoMnAl Films**
N. TEICHERT, L. HELMICH, **A. HÜTTEN**, Department of Physics, Bielefeld University, Bielefeld, Germany

**Session C-4 - Magnetoelectric Characterization and
Electric Field Control of Magnetization**

Room: **SPOLETO A**

Chair: **Tsuyoshi KIMURA, Japan**

**15.00 C-4:IL01 Voltage Control of Magnetic Vortex States in Ni Discs
Using Ferroelectric Substrates**

M. GHIDINI^{1, 2}, R. MANSELL³, X. MOYA¹, B. NAIR¹, S. FAROKH-IPOOR¹, D. PESQUERA¹, F. MACCHEROZZI⁴, C.H.W. BARNES³, R.P. COWBURN³, S.S. DHESI⁴, **N.D. MATHUR**¹, ¹Department of Materials Science, University of Cambridge, Cambridge, UK; ²DiFeST, University of Parma, Parma, Italy; ³Cavendish Laboratory, University of Cambridge, Cambridge, UK; ⁴Diamond Light Source, Chilton, Didcot, Oxfordshire, UK

15.30 C-4:IL02 Spintronics with Ferroelectrics

E.Y. TSYMBAL, Department of Physics and Astronomy, University of Nebraska, Lincoln, Nebraska, USA

**16.00 C-4:IL03 Electrical Control of Large Magnetization Reversal
in a Helimagnet**

KEE HOON KIM, CeNSCMR, Department of Physics and Astronomy, Seoul National University, Seoul, Korea

**16.30 C-4:IL04 Mesoscale Interfacial Dynamics in Magnetoelectric
Nanocomposites**

D. VIEHLAND, J.F. LI, Dept. Materials Science and Engineering, Virginia Tech, Blacksburg, VA, USA

TUESDAY JUNE 7 AFTERNOON

Room: **DERUTA**

Chair: Thomas JUESTEL, Germany

Session D-3 - Phosphors, Quantum Dots and Low Dimensional Materials for Lighting and Displays

- 14.30 **D-3:L14 Plasmonic Enhanced Rare Earth Doping Quantum Cutting Phosphor for Si Solar Cells**
DONG XIAO, TALIB HISSAIN, HUIQI YE, LIANG TANG, Nanjing Institute of Astronomical Optics & Technology, Nanjing, Jiangsu, P.R. China

Session D-4 - Advances in Scintillator Development

- 14.50 **D-4:IL01 Advances in Scintillation Physics Toward Development of New and Improved Scintillators**
G. BIZARRI, Lawrence Berkeley National Laboratory, Berkeley, CA, USA
- 15.20 **D-4:IL02 Modelling Energy Deposition in Nanoscintillators to Predict the Efficiency of the X-ray-Induced Photodynamic Effect**
A.-L. BULIN¹, A. VASIL'EV², A. BELSKY¹, D. AMANS¹, G. LEDOUX¹, **C. DUJARDIN**¹, ¹Institut Lumière Matière, UMR5306, Université Claude Bernard Lyon1-CNRS, France; ²Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, Moscow
- 15.50 **D-4:IL03 Recent Progress of Transparent Ceramic Scintillators**
TAKAYUKI YANAGIDA, Nara Institute of Science and Technology, Takayama, Ikoma, Nara, Japan

16.20 Break

Session D-5 - Upconversion Materials

Chair: Takayuki YANAGIDA, Japan

- 16.50 **D-5:IL01 Transparent Glass-ceramics Produced by Melting and Sol-gel. Crystallisation Mechanisms and Optical and Photonic Activity**
G. GORNI¹, J.J. VELÁZQUEZ¹, R. BALDA², J. FERNÁNDEZ², Y. CASTRO¹, M.J. PASCUAL¹, **A. DURAN**¹, ¹Instituto de Cerámica y Vidrio (CSIC), Madrid, Spain; ²Dep. Física Aplicada I, Escuela Superior de Ingenieros, Bilbao, Spain
- 17.20 **D-5:IL02 Plasmon Enhanced Luminescence Upconversion**
WON PARK, University of Colorado Boulder, Boulder, CO, USA
- 17.50 **D-5:IL04 Synthesis and Characterization of Bright Up-conversion Phosphor YTa7O19**
SAKAYA TAMURA, K. TOMITA, Tokai University, Kanagawa, Japan; K. KATAGIRI, Hiroshima University, Hiroshima, Japan; M. KOBAYASHI, M. KAKIHANA, Tohoku University, Miyagi, Japan

Session E-4 - Nonlinear, Tunable and Active Metamaterials

Room: **CORCIANO**

Chair: **Ilya SHADRIVOV**, Australia

- 15.00 E-4:IL02 Optimizing the Second Harmonic Chiroptical Effects in Plasmonic Nanostructures**

V.K. VALEV, Department of Physics, University of Bath, Bath, UK

- 15.30 E-4:IL03 Thermally Tunable Self-assembled Metamaterials**

C. ROCKSTUHL, Institute of Theoretical Solid State Physics, Institute of Nanotechnology, Karlsruhe Institute of Technology, Karlsruhe, Germany; M. FRUHNERT, Institute of Theoretical Solid State Physics, Karlsruhe Institute of Technology, Karlsruhe, Germany; W. LEWANDOWSKI, J. MIECZKOWSKI, E. GÓRECKA, Faculty of Chemistry, University of Warsaw, Warsaw, Poland

- 16.00 E-4:IL04 Tunable Metamaterials: Conceptual Overview and Recent Highlights**

M. LAPINE, University of Technology Sydney, NSW, Australia

- 16.30 Break**

Chair: **Carsten ROCKSTUHL**, Germany

- 17.00 E-4:IL05 Enhanced Optical Nonlinearities from Metasurfaces Coupled to Semiconductors**

I. BRENER, Sandia National Labs and Center for Integrated Nanotechnologies, Albuquerque, NM, USA

- 17.30 E-4:IL06 Nonlinear and Tunable Metamaterials**

MINGKAI LIU¹, KEBIN FAN², W. PADILLA², D.A. POWELL¹, XIN ZHANG³, **I.V. SHADRIVOV**¹, ¹Nonlinear Physics Centre, Research School of Physics and Engineering, Australian National University, Canberra ACT, Australia; ²Duke University Department of Electrical & Computer Engineering, Durham NC, USA; ³Department of Mechanical Engineering, Boston University, Boston, MA, USA

- 18.00 E-4:IL07 Alternative Materials and Solutions for Next Generation Plasmonic Technology**

M. FERRERA, School of Electrical and Computer Engineering and Birck Nanotechnology Center, Purdue University, West Lafayette, IN, USA, & School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, Scotland, UK

TUESDAY JUNE 7 AFTERNOON

Room: ORVIETO

Session F-2 - Novel Properties

Chair: Mauricio TERRONES, USA

14.30 **F-2:IL03 Lateral Heterostructure Field Effect Transistors**

G. FIORI, G. IANNACCONE, Dipartimento Ingegneria dell'Informazione, University of Pisa, Pisa, Italy

15.00 **F-2:IL04 Spectral Response of 2D Materials based Photodiodes**

M. LEMME, Graphene-based Nanotechnology, University of Siegen, Siegen, Germany

15.30 **F-2:IL05 Ultrafast and Nonlinear Dynamics in 2D Materials and their Heterostructures**

K.M. DANI, M. MAN, Femtosecond Spectroscopy Unit, Okinawa Institute of Science and Technology Graduate University, Onna-son, Okinawa, Japan

16.00 **F-2:IL06 Quantum Confinement in Black Phosphorus through Strain-engineered Rippling**

J. QUEREDA¹, V. PARENTE², P. SAN-JOSÉ³, N. AGRAÏT^{1,2,4}, G. RUBIO-BOLLINGER^{1,4}, F. GUINEA², R. ROLDÁN^{2,3}, **A. CASTELLANOS-GOMEZ**², ¹Dpto. de Física de la Materia Condensada, Universidad Autónoma de Madrid, Madrid, Spain; ²Instituto Madrileño de Estudios Avanzados en Nanociencia (IMDEA-nanociencia), Campus de Cantoblanco, Madrid, Spain; ³Instituto de Ciencia de Materiales de Madrid, CSIC, Madrid, Spain; ⁴Condensed Matter Physics Center (IFIMAC), Universidad Autónoma de Madrid, Madrid, Spain

16.30 Break

Session F-3 - Synthesis, Processing and Integration of Graphene and other 2D Layered Compounds

Chair: Chih-Wei LUO, Taiwan

17.00 **F-3:IL03 Taming Functional Complexity in Graphene based Materials Mastering the Supramolecular Approach**

P. SAMORI, IIS, Université de Strasbourg & CNRS, Strasbourg, France

17.30 **F-3:IL04 2D Magnetic Materials based on Coordination Chemistry**

S. MAÑAS-VALERO, M. CLEMENTE-LEÓN, **E. CORONADO**, ICMol, University of Valencia, Spain

18.00 **F-3:IL05 Epitaxial Growth of Large Area MoS₂ Few Layers by Sputtering Process**

TAEKYUNG OH, HYUNGSEOB MIN, HYUNSU JU, **JEON-KOOK LEE**, Center of Opto-Electronic Materials and Devices, Korea Institute of Science and Technology, Seoul, Korea

18.20 **F-3:IL06 Rapid and Catalyst-free van der Waals Epitaxy of Graphene on Hexagonal Boron Nitride**

N. MISHRA¹, V. MISEIKIS¹, D. CONVERTINO¹, M. GEMMI¹, V. PIAZZA¹, **C. COLETTI**^{1,2}, ¹Center for Nanotechnology Innovation @ NEST, Istituto Italiano di Tecnologia, Pisa, Italy; ²Graphene Labs, Istituto Italiano di Tecnologia, Genova, Italy

TUESDAY JUNE 7 AFTERNOON

Session G-2 - Structure and Properties of 1-D Nano-structures

Room: SALA RELATORI

Chair: Dmitri GOLBERG, Japan

14.30 G-2:IL04 **From 1D Silicene Nanoribbons to 2D Sheets**

P. DE PADOVA, Consiglio Nazionale delle Ricerche, Istituto di Struttura della Materia, Roma, Italy

15.00 G-2:IL05 **Dislocation-driven Nanowire Growth and Lead Halide Perovskite Nanowire Lasers with Low Lasing Thresholds and High Quality Factors**

SONG JIN, Department of Chemistry, University of Wisconsin-Madison, Madison, WI, USA

15.30 G-2:IL06 **Contact-free Surface Acoustic Wave Control of Nanowire Heterostructures**

H.J. KRENNER¹, M. WEISS¹, J.B. KINZEL¹, F.J.R. SCHÜLEIN¹, M. HEIGL¹, D. BÜHLER¹, A. WIXFORTH¹, D. RUDOLPH², M. BICHLER², G. ABSTREITER^{2,3}, J.J. FINLEY², G. KOBLMÜLLER², ¹Lehrstuhl für Experimentalphysik 1, Universität Augsburg, Augsburg, Germany; ²Walter Schottky Institut, TU München, Garching, Germany; ³Institute for Advanced Study, TU München, Garching, Germany

16.00 Break

Chair: Paola DE PADOVA, Italy

16.30 G-2:IL07 **GaAs-AlGaAs Core-(Multi)Shell Nanowire Structures: MOVPE Growth and Nano-scale Optical/Electronic Properties**

P. PRETE, IMM-CNR, Lecce, Italy; R. ROSATO, E. STEVANATO, F. MARZO, N. LOVERGINE, Dept. of Engineering for Innovation, University of Salento, Lecce, Italy

17.00 G-2:IL09 **Structure-property Correlations in 1D-nanowires using Atom Probe Tomography**

L.J. LAUHON, Dept. of Materials Science and Engineering, Northwestern University, Evanston, IL, USA

17.30 G-2:IL10 **Quantum Gases in ZnO Nanowires**

R. SCHMIDT-GRUND, Universität Leipzig, Institut für Experimentelle Physik II, Leipzig, Germany

TUESDAY JUNE 7 AFTERNOON

Session H-3 - Device Development and Integration Technologies

Room: SALA STAMPA

Chair: Herbert SHEA, Switzerland

- 14.30 **H-3:IL03 Skin-inspired Multimodal Sensors for Soft Robots**
I. GRAZ, Soft Matter Physics, Johannes Kepler University, Linz, Austria
- 15.00 **H-3:IL04 IPMC Actuators Fabricated Using MEMS Technology**
SHIGEKI TSUCHITANI¹, K. KIKUCHI¹, I. SHIMIZU², T. TANIGUCHI², H. MIKI¹, ¹Department of Systems Engineering, Wakayama University, ²Graduate School of Systems Engineering, Wakayama University, Wakayama, Japan
- 15.30 **H-3:IL05 Interpenetrating Polymer Networks for Novel Actuators**
C. PLESSE, G.T.M. NGUYEN, **F. VIDAL**, LPPI / Université de Cergy Pontoise, Neuville sur Oise, France

16.00 Break

Chair: Kinji ASAKA, Japan

- 16.30 **H-3:IL06 Miniaturized Dielectric Elastomer Actuators (DEA): Towards Intelligent Soft Machines**
H. SHEA, EPFL, Neuchatel, Switzerland
- 17.00 **H-3:IL07 Humanoids and the Role of Electroactive Materials/ Mechanisms in Advancing their Capability**
Y. BAR-COHEN, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA
- 17.30 **H-3:L08 Comparison of Annealing Treatments on Contact Resistance between Au Contacts and IGZO Semiconductor on TFTs on Shape Memory Polymer**
G. GUTIERREZ-HEREDIA, O. RODRIGUEZ, J. ESPINOZA, R. REIT, W. VOIT, University of Texas at Dallas, Richardson, TX, USA

Session H-2 - Analysis and Mechanical Mechanisms

- 17.50 **H-2:IL02 Asymmetric Bilayer Artificial Muscles Based on Polypyrrole**
MASAKI FUCHIWAKI, Kyushu Institute of Technology, Iizuka, Fukuoka, Japan; J.G. MARTINEZ, T.F. OTERO, Universidad Politecnica de Cartagena, Spain

TUESDAY JUNE 7 AFTERNOON

Session I-2 - Understanding Fundaments of Photo-induced Processes and Charge Transport

Room: ASSISI A

Chair: Chris SORRELL, Australia

14.30 **I-2:IL01 Understanding Charge Transfer Processes on Metal Oxide Surfaces through Laser Flash Photolysis Analysis**

J. SCHNEIDER¹, I. KRETSCHMER¹, D. BAHNEMANN^{1,2}, ¹Institut für Technische Chemie, Leibniz Universität Hannover, Germany; ²St. Petersburg State University, St. Petersburg, Russia

15.00 **I-2:IL02 Charge-carrier Dynamics in Photocatalytic Processes**

C. COLBEAU-JUSTIN¹, A. HERISSAN¹, S. PIGEOT-RÉMY², O. DURUPHY², S CASSAIGNON², C. FERRONATO³, R. HAZIME³, C. GUILLARD³, ¹Laboratoire de Chimie Physique, CNRS UMR 8000, Université Paris-Sud, Orsay, France; ²Chimie de la Matière Condensée de Paris, Collège de France, CNRS UMR 7574, UPMC, Paris, France; ³IRCELYON, CNRS UMR 5256, Université Lyon 1, Villeurbanne, France

15.30 **I-2:IL03 Role of Reduced Graphene Oxide in Promoting the Photoelectro-chemical Responses of 1D Oxide-0D Chalcogenide Nanocomposites**

R. SUBRAMANIAN, University of Nevada, Reno Pawan Pathak, University of Nevada, Reno, USA

16.00 **I-2:L04 Mimicking in Photocatalysis the Photosynthesis Z Scheme with one Monophasic Material**

J.C. CONESA, R. LUCENA, Inst. de Catálisis y Petroleoquímica, CSIC, Madrid, Spain; P. PALACIOS, P. WAHNON, Inst. de Energía Solar, Univ. Politécnica de Madrid, Spain

16.20 *Break*

Chair: Detlef BAHNEMANN, Germany

16.50 **I-2:IL05 Molecular Electrets: Effects of Localized Fields on Photo-induced Charge Transfer**

J.M. LARSEN, E.M. ESPINOZA, V.I. VULLEV, Department of Bioengineering and Department of Chemistry, University of California, Riverside, CA, USA

17.20 **I-2:IL06 Interfacing Light Absorbers with Catalysts for Enhanced Photo(electro)catalysis**

R. BERANEK, Institute of Electrochemistry, Universität Ulm, Germany

17.50 **I-2:L08 Kinetics of Photocatalytic, Self-cleaning Surfaces: Connecting Contaminant Removal to Contact Angle Evolution**

D. OLLIS, Chemical Engineering Department, North Carolina State University, USA

TUESDAY JUNE 7 AFTERNOON

Session J-2 - Semiconductor/Ion Conduction Oxides-based Gas Nanosensors

Room: NORCIA

Chair: Jyrki LAPPALAINEN, Finland

- 14.30 **J-2:L12 UV Activated Hollow ZnO Microspheres for Selective VOCs Sensors at Low Temperatures**

XIAOGAN LI, Dalian University of Technology, School of Electronic Science and Technology, Institute for Sensor Technology, Dalian, Liaoning, P.R. China

- 15.00 **J-2:L14 New Semiconductor Gas Sensor Based on Enhancing Oxygen Partial Pressure**

K. SHIMANOE, N. MA, R. KATO, M. NISHIBORI, Kyushu University, Kasuga, Fukuoka, Japan

- 15.30 **J-2:L15 Self-doped Nanocolumnar Vanadium Oxides for Exhaled Breath Analyzer**

SOO DEOK HAN, H.G. MOON, I.S. KIM, S.J. YOON, C.Y. KANG, Korea Institute of Science and Technology, Seoul, South Korea; S.D. HAN, C.Y. KANG, KU-KIST Graduate School of Converging Science and Technology, Korea University, Seoul, South Korea

- 15.50 **J-2:L16 Patterned Laser-grown Nanowires for Hydrogen Isotopes Detection with SAW-sensors**

A. MARCU¹, C. VIESPE¹, I. NICOLAE¹, B. BUTOI¹, D. PAUL¹, L. AVOTINA^{1,2}, C.P. LUNGU¹, ¹National Institute for Laser Plasma and Radiation Physics, Laser Dept., Bucharest-Magurele, Romania; ²Institute of Chemical Physics, University of Latvia, Riga, Latvia

- 16.10 **J-2:L17 Electronic Dopants in SnO₂ and ZnO: Effect for Surface Acidity and Gas Sensor Behavior**

A.V. MARIKUTSA, N.A. VOROBIEVA, M.N. RUMYANTSEVA, **A.M. GASKOV**, Chemistry Department, Moscow State University, Moscow, Russia

- 16.30 *Break*

Chair: Mihai BREZEANU, Romania

- 17.00 **J-2:L18 Metal Oxide Nanocomposites and Surface Modifications for Chemical Sensing**

M. EPIFANI, CNR-IMM, Lecce, Italy

- 17.30 **J-2:L19 Pulsed Laser Deposited Platinum Decorated Tin Oxide Nanotree Layers as Highly Sensitive Gas Sensing Material**

J. HUOTARI¹, T. HAAPALAINEN¹, T. BAUR², C. ALÉPÉE³, J. PUUSTINEN¹, **J. LAPPALAINEN¹**, ¹Microelectronics and Materials Physics Laboratories, University of Oulu, Oulu, Finland; ²Laboratory for Measurement Technology, Department of Mechatronics, Saarland University, Saarbrücken, Germany; ³SGX SensorTech SA, Corcelles-Cormondrèche, Switzerland

- 17.50 **J-2:L21 MgO-modified SrMoO₄ and Nano-SrMoO₄ Sensing Materials for H₂ and SO₂ Detection at High Temperatures**

E. CIFTYUREK, K. SABOLSKY, **E.M. SABOLSKY**, Department of Mechanical & Aerospace Engineering, West Virginia University, Morgantown, WV, USA

TUESDAY JUNE 7 AFTERNOON

Session K-1 - Resistance Switching Memories (ReRAM)

Room: MAGIONE A

Chair: Sabina SPIGA, Italy

14.30 **K-1:L01 New Trends and Progress in Redox-based Resistive Switching Memories**

I. VALOV, Research Centre Juelich, Electronic Materials (PGI-7), Juelich, Germany

15.00 **K-1:L02 Structural Changes and Conductive Filament Formation in Silicon Oxide during Resistance Switchings**

A.J. KENYON¹, A. MEHONIC¹, M. BUCKWELL¹, L. MONTESI¹, M. SINGH MUNDE^{1,2}, D. GAO³, S. HUDZIAK¹, R.J CHATER⁴, S. FEARN⁴, D. MCPHAIL⁴, M. BOSMAN², A.L. SHLUGER³, ¹Dept. of Electronic & Electrical Engrg, UCL, London, UK; ²Institute of Materials Research and Engrg, Singapore; ³Dept. of Physics and Astronomy and London Centre for Nanotechnology, University College London, London, UK; ⁴Dept. of Materials, Imperial College London, London, UK

15.30 **K-1:L03 Impact of Cation-stoichiometry on Switching Speed and Data Retention in SrTiO₃ Thin Film Devices**

N. RAAB, C. BÄUMER, S. MENZEL, R. DITTMANN, Peter Gruenberg Institut, Forschungszentrum Juelich GmbH, Juelich, Germany; K. FLECK, Institut fuer Werkstoffe der Elektrotechnik (IWE-2), RWTH Aachen, Aachen, Germany

15.50 **K-1:L04 Investigation of Ions Movement during the Operation of Al₂O₃-Based CBRAM using Thermodynamic and Kinetic Approaches**

C. NAIL, P. BLAISE, G. MOLAS, M. BERNARD, A. ROULE, A. TOFFOLI, L. PERNIOLA, CEA/LETI, Grenoble, France; C. VALLÉE, CNRS/LTM, Grenoble, France

16.10 Break

Chair: Ilia VALOV, Germany

16.40 **K-1:L05 Resistive Switching and Nanoscale Electronic Transport in Au/Nb:SrTiO₃ Schottky Junctions**

R. BUZIO, A. GERBI, E. BELLINGERI, CNR-SPIN Institute for Superconductivity, Innovative Materials and Devices, Genova, Italy; A.S. SIRI, D. MARRÉ, Physics Dept., University of Genova, Genova, Italy

17.00 **K-1:L08 Switching Performance of CMOS Integrated HfO₂-based Resistive Memory Cells**

C. WENGER¹, E. PEREZ¹, A. GROSSI², C. ZAMBELLI², P. OLIVO², ¹IHP GmbH - Leibniz Institute for innovative microelectronics, Frankfurt, Germany; ²Dept. Engineering ENDIF, Università degli Studi di Ferrara, Ferrara, Italy

17.20 **K-1:L09 Ab-initio Modeling of the Evolution of Oxygen Vacancies due to Heating and Electric Fields in HfO₂-RRAM**

L. SEMENTA, M. MONTORSI, L. LARCHER, University of Modena and Reggio Emilia, Modena, Italy

17.40 **K-1:L10 Potential Fluctuation in RRAM based on Non-stoichiometric Hafnium Sub-oxides**

D.R. ISLAMOV^{1,2}, V.N. KRUCHININ¹, V.SH. ALIEV¹, T.V. PEREVALOV^{1,2}, V.A. GRITSENKO^{1,2}, I.P. PROSVIRIN³, O.M. ORLOV⁴, A. CHIN⁵, ¹Rzhanov Inst.of Semiconductor Physics SB RAS, Novosibirsk, Russian Fed.; ²Novosibirsk State University, Novosibirsk, Russian Fed.; ³Boreskov Inst. of Catalysis SB RAS, Novosibirsk, Russian Fed.; ⁴JSC Molecular Electronics Research Inst., Zelenograd, Russian Fed.; ⁵National Chiao Tung University, Hsinchu, Taiwan

TUESDAY JUNE 7 AFTERNOON

Session L-2 - E-textiles

Room: MONTEFALCO

Chair: Paul CALVERT, USA

- 15.00 **L-2:IL07 Electronic Textiles Fabricated using Atomic Layer Deposition**
HAN-BO-RAM LEE, Department of Materials Science and Engineering, Incheon National University, Incheon, Korea
- 15.30 **L-2:IL08 Plastic Electronics as a Versatile Technology based on Organic Semiconductors: Perspectives for Smart Textiles**
D. VANDERZANDE, imo-imomec, Hasselt University, Hasselt, Belgium
- 16.00 **L-2:L09 Hybrid Large-area Thin-film / CMOS System Technology for Wearable Electronics**
S. WAGNER, W. RIEUTORT-LOUIS, J. SANZ-ROBINSON, T. MOY, L. HUANG, Y. HU, Y. AFSAR, J.C. STURM, N. VERMA, Princeton University, Princeton, NJ, USA

TUESDAY JUNE 7 AFTERNOON

Room: **MAGIONE B**

Session O-4 - Bio-inspired Sensors and Actuators

Chair: Poramate MANOONPONG, Denmark

- 14.30 O-4:IL01 **Recent Developments in Bio-inspired Sensors Fabricated by Additive Manufacturing Technologies**
G. KRIJNEN, R. SANDERS, Transducers Science & Technology Group, University of Twente, Enschede, The Netherlands
- 15.00 O-4:IL02 **Nature-inspired DNA-based Sensors**
F. RICCI, University of Rome, Tor Vergata, Rome, Italy
- 15.30 O-4:IL03 **Micromechanics of Vibration Sensors in the Spider Cuticle**
V.V. TSUKRUK, School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA, USA
- 16.00 O-4:IL04 **A Bio-inspired Real-time Capable Artificial Lateral Line System for Freestream Flow Velocity Measurements**
C. ABELS^{1,2,3}, W.M. MEGILL¹, A. QUALTIERI², M. DE VITTORIO^{2,3}, F. RIZZI², ¹Rhine-Waal University of Applied Sciences, Faculty of Technology and Bionics, Kleve, Germany; ²Center for Biomolecular Nanotechnologies @UNILE, Istituto Italiano di Tecnologia, Arnesano (LE), Italy; ³Università del Salento, Dip. di Ingegneria dell'Innovazione, Lecce, Italy

16.20 Break

Session O-6 - Bio-inspired Optics and Photonics

Chair: Akira SAITO, Japan

- 16.50 O-6:IL01 **Bioinspired Optical Structure for Enhancement Infrared Absorption**
WANG ZHANG, YUN QIANG TIAN, JIAJUN GU, QINGLEI LIU, DI ZHANG, State key lab of metal matrix composites, Shanghai Jiao Tong University, Shanghai, China
- 17.20 O-6:L02 **Omnidirectional Anti-reflection Structures Inspired by the Random Nanostructures of the Glasswing Butterfly (Greta oto)**
R.H. SIDDIQUE, G. GOMARD, **H. HÖLSCHER**, Karlsruhe Institute of Technology, Karlsruhe, Germany
- 17.40 O-6:L03 **Biological Inspiration in Optics and Photonics – Harnessing Nature's Light Manipulation Strategies and Manufacturing Capabilities for Multifunctional Optical Materials**
M. KOLLE, J. SANDT, S. NAGELBERG, A. MCDOUGAL, Mechanical Engineering Department, MIT, Cambridge, MA, USA; LING LI, J. AIZENBERG, School of Engineering and Applied Sciences, Harvard University, USA; P. VUKUSIC, College of Engineering, Mathematics and Physical Sciences, Exeter University, UK

TUESDAY JUNE 7 AFTERNOON

Room: SPOLETO B

Session P-3 - Smart Structures and Integrated Systems

Chair: Lucia FARAVELLI, Italy

- 14.30 **P-3:IL01 Multifunctional Design of Materials & Structures: Critical Issues**
B.-L. ("LES") LEE, U.S. Air Force Office of Scientific Research, Arlington, VA, USA
- 15.00 **P-3:IL02 Monitoring of Building for Safety, Security and Soundness**
AKIRA MITA, Department of System Design Engineering, Keio University, Yokohama, Japan
- 15.30 **P-3:IL03 Smart Monitoring System Based on Electromechanical Impedance and Guided Ultrasonic Waves**
A. NASROLLAHI¹, V. GULIZZI², P. RIZZO¹, ¹University of Pittsburgh, Department of Civil & Environmental, Pittsburgh, PA, USA; ²Department of Civil, Environmental, Aerospace, and Materials Engineering, University of Palermo, Palermo, Italy
- 16.00 **P-3:IL04 Data Science and Engineering for Structural Health Monitoring**
HUI LI, YUEQIAN BAO, QI JUNLONG LI, School of Civil Engineering, Harbin Institute of Technology, Harbin, China
- 16.30 **P-3:IL05 Verification of the Rotation Algorithm with Data from a Three Story Steel Frame Test**
K. BALAFAS, A. KIREMIDJIAN, YIZHANG LIAO, R. RAJAGOPAL, Stanford University, Stanford, CA, USA; C.H. LOH, National Taiwan University, Taipei, Taiwan
- 17.00 **P-3:IL06 Structural Control for Large Civil Infrastructure**
S. CASCIATI, University of Catania, Siracusa, Italy; L. ELIA, University of Pavia, Italy
- 17.30 Break

Session P-2 - Integration Technologies

Chair: Anne KIREMIDJAN, USA

- 17.50 **P-2:IL04 Advances in Ultrasonic Defect Detection and Imaging in Structures**
T. NGUYEN, S. STERNINI, F. LANZA DI SCALEA, Department of Structural Engineering, University of California San Diego, La Jolla, CA, USA
- 18.20 **P-2:IL05 A Magnetostrictive Energy Harvesting System for Bridge Structural Health Monitoring**
C.S. CLEMENTE, D. DAVINO, A.IELARDI, M.R. PECCE, C. VISONE, University of Sannio, Benevento, Italy

Session Q-3 - Smart Drug/Gene Delivery and Release Systems

Room: AUDITORIUM

Chair: Vladimir TORCHILIN, USA

- 14.30 Q-3:L01 **Manipulation of Lipid Bilayer Membranes by Peptide/Cationic Copolymer Complex**
A. MARUYAMA, Tokyo Institute of Technology, Yokohama, Japan
- 15.00 Q-3:L04 **PolyEthylene (Glycol) Microneedles Devices for Drug Delivery and Diagnostic Applications**
P. DARDANO, A. CALIO, I. POLITI, I. REA, L. DE STEFANO, IMM-CNR Iuvs Napoli, Italy; V. DI PALMA, M.F. BEVILACQUA, A. DI MATTEO, ST Microelectronics, Italy
- 15.20 Q-3:L05 **BN Nanoparticles with a Petal-like Surface as Anti-cancer Drug-delivery System**
D.V. SHTANSKY¹, I.V. SUKHORUKOVA¹, I.V. ZHITNYAK², A.M. KOVALSKII¹, A.T. MATVEEV¹, O.I. LEBEDEV³, X. LI⁴, N.A. GLOUSHANKOVA², D. GOLBERG³, ¹National University of Science and Technology "MISIS", Moscow, Russia; ²N.N. Blokhin Russian Cancer Research Center, Moscow, Russia; ³CRISMAT, UMR 6508, CNRS-ENSICAEN, Caen, France; ⁴National Institute for Materials Science (NIMS), Tsukuba, Ibaraki, Japan

15.40 *Break*

Chair: Atsushi MARUYAMA, Japan

- 16.10 Q-3:L06 **Advances in Delivery of Stimuli-sensitive Combination Nanopreparations of siRNA and Chemotherapeutic Drugs to Treat Multidrug Resistant Tumors**
V. TORCHILIN, Center for Pharmaceutical Biotechnology and Nanomedicine, Northeastern University, Boston, MA, USA
- 16.40 Q-3:L07 **Engineering of Enzyme Nano-capsules for Biomedical Applications**
A. KISHIMURA, Department of Applied Chemistry, Faculty of Engineering, Kyushu University, and Center for Molecular Systems, Kyushu University, Japan
- 17.10 Q-3:L08 **Novel Sol Gel Antibiotic Release Coatings for Cement-less Arthroplasty Fixations**
R. AKID¹, T. NICHOL², **T.J. SMITH²**, J.T. CALLAGHAN³, P.V. HATTON³, ¹School of Materials, University of Manchester, UK; ²BioMedical Research Centre, Sheffield Hallam University, UK; ³School of Clinical Dentistry, University of Sheffield, UK
- 17.30 Q-3:L09 **Liposome Loaded Chitosan Hydrogels. A Promising Delayed Release Biomaterial and Related Mechanism**
J. DESBRIERES¹, M. POPA², C. PEPEU², S. BACAITA³, ¹Université de Pau et des Pays de l'Adour, PREM (UMR CNRS 5254), Hélioparc Pau Pyrénées, Pau Cedex, France; ²Department of Natural and Synthetic Polymers, "Gheorghe Asachi" Technical University of Iasi, Iasi, Romania; ³Department of Physics, "Gheorghe Asachi" Technical University of Iasi, Iasi, Romania

**Focused Session Q-6 - Materials Nanotechnologies for
Implantable Neural Interfaces**

Room: **BUSINESS**

Chair: **Stefano VASSANELLI, Italy**

- 14.30 Q-6:IL19 **Narrowing the Physical Mismatch between Neural Implants and Neural Tissues**
S.P. LACOUR, Laboratory for Soft Bioelectronics Interfaces, Centre for Neuroprosthetics, School of Engineering, EPFL, Lausanne, Switzerland
- 15.00 Q-6:IL20 **Ultracompliant Electrodes for Next-generation Brain-machine Interfaces**
C.J. BETTINGER, Carnegie Mellon University, Pittsburgh, PA, USA
- 15.30 Q-6:IL23 **SiC-based Neural Interfaces for the Central Nervous System**
C.L. FREWIN, **S.E. SADDOW**, University of South Florida, Tampa, FL, USA

Session A-4 - Multifunctional (Nano)composites and Multi-material Systems

Room: SPELLO

Chair: Hyujoon KONG, USA

- 9.00 A-4:L01 **Bio-inspired Design of Organic-inorganic Nano-composites for Applications in Regenerative Medicine**
R. NEJADNIK, H. WANG, M. DIBA, S.C.G. LEEUWENBURGH, Radboud University Medical Center, Department of Biomaterials, Nijmegen, The Netherlands
- 9.30 A-4:L02 **Light and Heat Induced Patterning of Silver Nano-particle/Polymer Nanocomposites**
J. MARQUES-HUESO, D.E. WATSON, M.P.Y. DESMULLIEZ, Heriot-Watt University, School of Engineering & Physical Sciences (EPS), Institute of Signals, Sensors and Systems, Microsystems Engineering Centre (MISEC), Edinburgh, Scotland, UK
- 9.50 A-4:L03 **Spatiotemporal Control of Self-oscillating Gel by Uniformly Aligned Inorganic Nano Sheets**
YOUN SOO KIM¹, Y. ISHIDA², Y. EBINA³, T. SASAKI³, R. YOSHIDA¹, T. AIDA¹, ¹School of Engineering, The University of Tokyo, Tokyo, Japan; ²RIKEN Center for Emergent Matter Science, Saitama, Japan; ³National Institute for Materials Science, International Center for Materials Nanoarchitectonics, Tsukuba, Ibaraki, Japan
- 10.10 A-4:L04 **New Developments in Advanced Polybenzoxazine Thermosets and Related Nanocomposites**
L. DUMAS, L. BONNAUD, M. POORTEMAN, M. OLIVIER, Ph. DUBOIS, Materia Nova Research Center & University of Mons UMONS, Mons, Belgium

10.40 *Break*

Chair: Philippe DUBOIS, Belgium

- 11.10 A-4:L05 **Nanobiomaterials Enabling Low Dose Bioimaging Diagnosis and Stem Cell Therapies of Vascular Disease**
HYUNJOON KONG, Chemical & Biomolecular Engineering/Bioengineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA
- 11.40 A-4:L06 **Green Source Based Carbon Nano Rods for Developing the Quantum Resistive Vapor Sensors to Detect Cancer Biomarkers**
A. SACHAN, K.M. TRIPATHI, M. CASTRO, J.F. FELLER, Smart Plastics Group, European University of Brittany (UEB), LIMATB-UBS, Lorient, France; V. CHOUDHARY, Centre for Polymer Science & Engineering, Indian Institute of Technology, Delhi, India
- 12.00 A-4:L07 **The Effects of External Magnetic Field on Polymeric Foam-ferromagnet Composites**
M. D'AURIA^{1, 2}, V. VOLPE³, D. DAVINO², R. PANTANI³, L. SORRENTINO¹, ¹Istituto per i Polimeri, Compositi e Biomateriali, Consiglio Nazionale delle Ricerche, Portici (NA), Italy; ²Dipartimento di Ingegneria, Università degli Studi del Sannio, Benevento, Italy; ³Dipartimento di Ingegneria Industriale, Università di Salerno, Fisciano (SA), Italy
- 12.20 A-4:L09 **3-D Templates for Hierarchical Device Structures**
J.J. WATKINS, University of Massachusetts, Amherst, MA USA

Room: ASSISI B

Session B-3 - Functional Properties

Chair: Jordina FORNELL, USA

- 9.00 **B-3:L06 Effects of Pseudoelastic Cycling under Different Temperatures on Physical and Mechanical Properties of a NiTi Alloy**
M.C.M. RODRIGUES, G.C. SOARES, V.T.L. BUONO, **L.A. SANTOS**, Department of Metallurgical and Materials Engineering, Universidade Federal de Minas Gerais, Belo Horizonte-MG, Brazil
- 9.20 **B-3:IL07 Mechanical Behaviour, Shape Memory Effect and Micro-structures of Ti-based Shape Memory Alloys**
SHUICHI MIYAZAKI, HEE YOUNG KIM, Division of Materials Science, University of Tsukuba, Tsukuba, Ibaraki, Japan
- 9.50 **B-3:IL08 Surface Modification of NiTi Shape Memory Alloy by Hafnium Ion Implantation**
YAN LI, T.T. ZHAO, School of Materials Science and Engineering, Beihang University, Beijing, China
- 10.20 **B-3:L09 Thermo-mechanical Properties of NiTi Alloy after High Strain Rate Tension and Compression**
V. GRIGORIEVA, E. OSTROPIKO, **A. RAZOV**, Saint-Petersburg State University, Saint-Petersburg, Russia; A. MOTORIN, Saint-Petersburg National Research University of Information Technologies, Mechanics and Optics, Saint-Petersburg, Russia
- 10.40 **B-3:L09b Influence of Softening on Martensitic Transformation During Ti50Ni50 Alloy Thermal Cycling**
A. SIBIREV, S. BELYAEV, N. RESNINA, Saint-Petersburg State University, Saint-Petersburg, Russia
- 11.00 Break

Session B-4 - Thin Films and Micro Nano-systems

Chair: Shuichi MIYAZAKI, Japan

- 11.30 **B-4:IL04 Size Effects and Orientation Dependence in Super-elastic Cu-Zn-Al Micro/Nano-pillars**
J. FORNELL, Dept. of Materials Science and Engineering, MIT, Cambridge, MA, USA and Dept. de Física, Facultat de Ciències, Universitat Autònoma de Barcelona, Bellaterra, Spain, N.TUNCER, C.A. SCHUH, Dept. of Materials Science and Engineering, MIT, Cambridge, MA, USA
- 12.00 **B-4:L05 High Temperature Ti-Ni-Pd Shape Memory Alloys Subjected to High Pressure Torsion**
S. TULIĆ, M. KERBER, A. PANIGRAHI, **T. WAITZ**, University of Vienna, Faculty of Physics, Physics of Nanostructured Materials, Vienna, Austria; MITSUHIRO MATSUDA, Kumamoto University, Dept. of Materials Science and Engineering, Kumamoto, Japan
- 12.20 **B-4:IL06 Microstructure – Functional Property Relationships of NiTi Filaments**
J. PILCH, O. TYC, P. SITTNER, L. KADERAVEK, L. HELLER, Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic; J.E. SCHAFFER, Fort Wayne Metals Research Products Corp, Fort Wayne, IN, USA; J. STRASKA, K. HORVATH, Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic; P. BUBLIKOVA, Research Centre Rez, Husinec-Rez, Czech Republic; P. STRUNZ, V. RYUKHTIN, Nuclear Physics Institute, Husinec-Rez, Czech Republic; B. MALARD, CIRIMAT, Toulouse, France; R. DELVILLE, SCK•CEN, Mol, Belgium

WEDNESDAY JUNE 8 MORNING

Room: SPOLETO A

Session C-3 - Advances in Materials Synthesis and Processing

Chair: Tsuyoshi KIMURA, Japan

- 9.00 C-3:L05 **Spray Pyrolysis to Process Thin Films of Multiferroic Materials**
A.E. LÓPEZ-LÓPEZ, L. ROLDÁN, J. ORTIZ-LANDEROS, **C. GOMEZ-YANEZ**, Department of Metallurgical and Materials Eng., ESIQIE, National Polytechnic Institute, Zacatenco, Mexico city, Mexico
- 9.30 C-3:L09 **Correlation of Magnetoelectric Coupling in Multiferroic BaTiO₃-BiFeO₃ Superlattices and Composite Thin Films with Ordering of Oxygen-related Defects**
M. LORENZ¹, V. LAZENKA², G. WAGNER³, P. SCHWINKENDORF¹, M.J. VAN BEAL⁴, A. VANTOMMEE², K. TEMST², O. OECKLER³, M. GRUNDMANN¹, ¹Inst. für Experimentelle Physik II, Universität Leipzig, Leipzig, Germany; ²Inst. voor Kern- en Stralingsphysica, KU Leuven, Leuven, Belgium; ³Inst. für Mineralogie, Kristallographie und Materialwissenschaft, Universität Leipzig, Leipzig, Germany; ⁴Lab. voor Vaste-Stoffysica en Magnetisme, KU Leuven, Leuven, Belgium
- 9.50 C-3:L10 **Heterostructured Ceramic Materials Based on PZTN-CFO Compounds**
P. GALIZIA, C. CAPIANI, **C. GALASSI**, CNR-ISTEC, Faenza, Italy
- 10.10 *Break*

Session C-4 - Magnetoelectric Characterization and Electric Field Control of Magnetization

Chair: Evgeny Y. TSYMBAL, USA

- 10.40 C-4:L05 **Observation and Control of Spin Chirality in Room-temperature Magnetoelectric Hexaferrites**
TSUYOSHI KIMURA¹, H. UEDA¹, H. NAKAJIMA¹, T. USUI¹, Y. HIRAKAWA¹, Y. WAKABAYASHI¹, Y. TANAKA², ¹Osaka University, Toyonaka, Osaka, Japan; ²RIKEN SPring-8 Center, Japan
- 11.10 C-4:L06 **Room Temperature Magnetoelectric Effect in Novel Oxides**
J.A. EIRAS, Federal University of São Carlos, São Carlos, SP, Brazil
- 11.40 C-4:L07 **Enhanced Magnetoelectric Coupling in Multiferroics from First-principles**
S. LISENKOVA, University of South Florida, Tampa, FL, USA
- 12.00 C-4:L08 **Observation of Magnetoelectric Effect in Organic Ferromagnetic and Ferroelectric Liquid Crystals**
RUI TAMURA, K. SUZUKI, Kyoto University, Kyoto, Japan; Y. UCHIDA, Osaka University, Osaka, Japan
- 12.20 C-4:L09 **Anomalous Magnetoresistivity in Co-doped ZnO with Varying Bottom Gate Voltage**
MIYEON CHEON¹, YONG CHAN CHO², CHUL-HONG PARK³, SE YOUNG JEONG^{4,5}, ¹Crystal Bank Research Inst., Pusan National University, Miryang, Korea; ²Korea Research Inst. of Standards and Science, Daejeon, Korea; ³Dept. of Physics Education, Pusan National University, Busan, Korea; ⁴Dept. of Cogno-Mechatronics Eng., Pusan National University, Miryang, Korea; ⁵Dept. of Optics and Mechatronics Eng., Pusan National University, Miryang, Korea

WEDNESDAY JUNE 8 MORNING

Session D-6 - Optical Fibers; Sensing and Imaging

Room: **DERUTA**

Chair: **Koji TOMITA, Japan**

9.30 D-6:IL01 Luminescent Optical Fibers

D. DOROSZ, J. ZMOJDA, M. KOCHNOWICZ, P. MILUSKI, Bialystok University of Technology, Bialystok, Poland; J. PISARSKA, W. PISARSKI, University of Silesia, Katowice, Poland; M. FERRARI, IFN-CNR CSMFO Lab. & FBK CMM, Povo, Trento, Italy; G.C. RIGHINI, IFAC-CNR, Sesto Fiorentino, Italy

10.00 D-6:IL02 Performances and Applications of Rare-earth Doped Silica-based Scintillating Fibers

A. VEDDA, Department of Materials Science, University of Milano-Bicocca, Milano Italy

10.30 Break

11.00 D-6:IL03 Versatile Lithium Fluoride Luminescent Detectors for High Resolution Imaging Applications from Extreme-ultraviolet to Soft and Hard X-rays

F. BONFIGLI, R.M. MONTEREALI, M.A. VINCENTI, ENEA C.R. Frascati, Photonic Micro and Nanostructures Laboratory, FSN-TECFIS-MNF, Frascati (Rome), Italy; E. NICHELATTI, ENEA C.R. Casaccia, Photonic Micro and Nanostructures Laboratory, FSN-TECFIS-MNF, S. Maria di Galeria (Rome), Italy

11.30 D-6:L07 Gas Effects on the Electrical and Photoluminescence Properties of Individual ZnO Nanowire

F. RIGONI, C. BARATTO, M. DONARELLI, A. PONZONI, E. COMINI, G. SBERVEGLIERI, G. FAGLIA, Sensor Lab, Department of Information Engineering, University of Brescia & CNR-INO, Brescia, Italy

Session E-6 - Antenna, Nanoantenna and Waveguide Applications, Transformation Optics, Superlenses

Room: **CORCIANO**

Chair: Mario AGIO, Germany

- 9.30 **E-6:IL01 Plasmonic Waveguides: Challenges and Perspectives**
S. BOZHEVOLNYI, Department of Technology and Innovation, University of Southern Denmark, Odense M, Denmark
- 10.00 **E-6:IL02 Transformation Optical Applications with Pseudo-magnetic Field**
JENSEN LI, University of Birmingham, School of Physics and Astronomy, Birmingham, UK
- 10.30 **E-6:IL03 Imaging and Spectroscopy of Plasmonic and Phonon Polariton Modes with the Photothermal Induced Resonance (PTIR) Technique**
A. CENTRONE, National Institute of Standard and Technology, Gaithersburg, MD, USA

Session E-8 - Novel Concepts and Applications of Metasurfaces and Metadevices

- 10.50 **E-8:IL02 Photonic Spin Hall Effect with nearly 100% Efficiency based on Gradient Metasurface**
SHULIN SUN¹, WEIJIE LUO², SHIYI XIAO², QIONG HE^{2,3}, LEI ZHOU^{2,3}, ¹Shanghai Engineering Research Center of Ultra-Precision Optical Manufacturing, Green Photonics and Department of Optical Science and Engineering, Fudan University, Shanghai, China; ²State Key Lab. of Surface Physics and Key Laboratory of Micro and Nano Photonic Structures (Ministry of Education), Fudan University, Shanghai, China; ³Collaborative Innovation Center of Advanced Microstructures, Fudan University, Shanghai, China

WEDNESDAY JUNE 8 MORNING

Room: ORVIETO

Chair: Paolo SAMORI¹, France

Session F-3 - Synthesis, Processing and Integration of Graphene and other 2D Layered Compounds

- 9.00 **F-3:L07 Direct Fabrication of Functionalized Graphenes and their Hybrids Inks via Submerged Liquid Plasma [SLP] and Electrochemical Exfoliation [ECE] under Ambient Conditions**
M. YOSHIMURA, J. SENTHILNATHAN, K. SANJEEVARAO, Promotion Centre for Global Mats Res. (PCGMR), Dept. of Material Science and Eng., National Cheng Kung University, Tainan, Taiwan
- 9.30 **F-3:L09 How the Nanostructure of Layered Titanates Influences the Mechanical Properties**
P. GONZALEZ², W. LETTE³, D.J. SCHIPPER³, J.E. TEN ELSHOF², ¹Materials innovation institute (M2i), Delft, the Netherlands; ²Inorganic Materials Science Group, MESA+ Institute for Nanotechnology, University of Twente, Enschede, Netherlands; ³Faculty of Engineering Technology, University of Twente, Enschede, Netherlands
- 9.50 **F-3:L11 Lessons learned from Carbon Nanotube Growth can be applied to Graphene: 100% Reproducibility and Improved Graphene Quality by Preheating Precursor Gases using Thermal Chemical Vapor Deposition**
G.D. NESSIM, Bar Ilan University, Dept. of Chemistry and Center for Nanotechnology and Advanced Materials, Ramat Gan, Israel

Session F-1 - General Physical and Chemical Properties

- 10.10 **F-1:L07 Emission and Detection of THz Radiation in Double-graphene-layered van der Waals Heterostructures via Photon-assisted Plasmonic Resonant Tunneling**
TAIICHI OTSUJI, Research Institute of Electrical Communication, Tohoku University, Sendai, Japan

10.40 *Break*

Chair: Eugenio CORONADO, Spain

Session F-3 - Synthesis, Processing and Integration of Graphene and other 2D Layered Compounds

- 11.10 **F-3:L12 One-pot Electrochemical Exfoliation and Functionalization of Graphene Sheets**
D.B. OSSONON, D. BELANGER, Université du Québec à Montréal, Département de Chimie, Montréal, Canada
- 11.30 **F-3:L14 Selective Modification of as-grown CVD Graphene on Cu by Oxygen Plasma for Flexible Electronics Applications**
A.M. ALEXEEV, M.D. BARNES, V.K. NAGAREDDY, M.F. CRACIUN, C.D. WRIGHT, College of Engineering, Mathematics and Physical Sciences, University of Exeter, Exeter, UK
- 11.50 **F-3:L15 Langmuir-Blodgett Films of 2D Oxide Nanosheets for Oriented and Epitaxial Growth of Functional Oxide Thin Films**
J.E. TEN ELSHOF, HUIYU YUAN, M. NIJLAND, M. NGUYEN, G. RIJNDERS, G. KOSTER, MESA+ Institute for Nanotechnology, University of Twente, Enschede, the Netherlands

Session F-4 - Synthesis and Processing of Composites

- 12.10 **F-4:L04 A Polymer Chemistry of Graphenes: Synthesis, Processing, Applications**
K. MUELLEN, Max Planck Inst. for Polymer Research, Mainz, Germany

WEDNESDAY JUNE 8 MORNING

Room: **SALA RELATORI**

Chair: Berndt WITZIGMANN, Germany

Session G-3 - Modeling and Simulation of 1-D Nano-structures

- 9.30 G-3:L01 **Electronic Transport in 1D Nanostructures**
J. LI, Y.M. NIQUET, Univ. Grenoble Alpes & CEA Grenoble, France;
C. DELERUE, IEMN, Lille, France
- 10.00 G-3:L02 **Theoretical Study of Ordered III-V Nanowire Arrays for Light Emission and Detection**
B. WITZIGMANN, University of Kassel, Kassel, Germany
- 10.30 G-3:L04 **Influence of the Arsenic Flux on the Formation of Axial Heterostucture in (Al,Ga,In)As Nanowires**
N. SIBIREV^{1,2}, A. KORYAKIN¹, V. DUBROVSKII^{1,2}, ¹Saint-Petersburg Academic University, ITMO University, Russian Federation; ²Saint-Petersburg State University, Russian Federation

10.50 *Break*

Session G-2 - Structure and Properties of 1-D Nano-structures

- 11.20 G-2:L13 **Unraveling Size Effect of Metallic Nanowires towards Ultra-strong Metal Nanostructured Material**
IN-SUK CHOI, High Temperature Energy Materials Research Center, Korea Institute of Science and Technology, Seoul, Rep.of Korea

Session G-5 - 1-D Nanostructures-based Applications

- 11.40 G-5:L02 **Gallium Arsenide Nanowire Lasers**
C. JAGADISH, Department of Electronic Materials Engineering, Research School of Physics and Engineering, Australian National University, Canberra, A.C.T., Australia

WEDNESDAY JUNE 8 MORNING

Room: SALA STAMPA

Session H-4 - Applications of EAPs

Chair: Ray BAUGHMAN, USA

- 9.00 **H-4:IL01 Organic Bionics Enabled by 3D Printing**
G.G. WALLACE, ARC Centre of Excellence for Electromaterials Science, Intelligent Polymer Research Institute, University of Wollongong, Wollongong, NSW, Australia
- 9.30 **H-4:IL02 Elastomer Transducers**
S.A. CHIBA, Chiba Science Institute, Tokyo, Japan; M. WAKI, Wits Inc., Tochigi, Japan; Y. TANAKA, N. TSURUMI, K. OKAMOTO, K. NAGASE, ROHM Co., Ltd., Kyoto, Japan; M. HOMMA, H. YOKOTA, K. ODAGIRI, H. SATO, T. SAIKI, J. KANEKO, ADEKA Corp., Tokyo, Japan
- 10.00 **H-4:IL03 Electroactive Polymer and its Nanocomposites: Theory, Experiment and Applications**
YANJU LIU¹, LIWU LIU¹, JINSONG LENG², ¹Department of Astronautical Science and Mechanics, Harbin Institute of Technology, Harbin, China; ²Centre for Composite Materials and Structures, Harbin Institute of Technology, Harbin, China
- 10.30 **H-4:L04 A Viscoelastic Soft Dielectric Elastomer Generator Operating in an Electrical Circuit**
R. DENZER, Division of Solid Mechanics, Lund University, Lund, Sweden; E. BORTOT, Department of Civil, Environmental and Mechanical Engineering, University of Trento, Trento, Italy; M. GEI, School of Engineering, Cardiff University, Cardiff, Wales, UK; A. MENZEL, TU Dortmund University, Dortmund, Germany and Division of Solid Mechanics, Lund University, Lund, Sweden
- 10.50 Break

Session H-5 - Advances in SMPs

Chair: Seiki A. CHIBA, Japan

- 11.20 **H-5:IL01 Rewritable Shape Memory Polymers – Materials with Latent Ability to Change Permanent Shapes by Photo-irradiation**
C.N. BOWMAN, Department of Chemical and Biological Engineering, University of Colorado, Boulder, CO, USA
- 11.50 **H-5:L02 Fractional Calculus Approach to Viscoelastic Behavior of Amorphous Shape Memory Polymers**
CHANGQING FANG, HUIYU SUN, State Key Laboratory of Mechanics and Control of Mechanical Structures, Nanjing University of Aeronautics and Astronautics, Nanjing, China; JIANPING GU, Department of Materials Engineering, Nanjing Institute of Technology, Nanjing, China
- 12.10 **H-5:L03 Light-matter Concepts in Azobenzene-based Photo-responsive Polymers**
W. OATES, J. BIN, Florida State University, Tallahassee, FL, USA

Session I-2 - Understanding Fundaments of Photo-induced Processes and Charge Transport

Room: ASSISI A

Chair: Guido MUL, The Netherlands

- 9.30 **I-2:IL09 Charge Transport and Recombination in Nanostructured Materials for Photoelectrochemical and Solar Cells**

G. OSKAM¹, J. VILLANUEVA-CAB², J.A. ANTA³, ¹Department of Applied Physics, CINVESTAV-IPN, Mérida, Yucatán, México; ²Instituto de Física, Benemérita Universidad Autónoma de Puebla, Puebla, Pue., México; ³Área de Química Física, Departamento de Sistemas Físicos, Químicos y Naturales, Universidad Pablo de Olavide, Sevilla, Spain

- 10.00 **I-2:IL11 Photocatalytic Activation of Biomaterials**

K.H. CHEUNG, P. KOSHY, M.B. PABBRUWE, **C.S. SORRELL**, School of Materials Science and Engineering, UNSW Australia, Sydney, NSW, Australia

- 10.30 *Break*

Chair: Gerko OSKAM, Mexico

- 11.00 **I-2:IL12 Analysis of the Dynamics in Composition of Pt and Ni/NiO promoted SrTiO₃ in Overall Water Splitting**

G. MUL, Mesa+ Institute for Nanotechnology, University of Twente, Enschede, The Netherlands

- 11.30 **I-2:IL13 Metal Oxides for Photoelectrochemical Water Splitting and Environmental Remediation**

S. CARAMORI, V. CRISTINO, N. DALLE CARBONARE, F. RONCONI, C.A. BIGNOZZI, G. LONGOBUCCO, L. PASTI, A. MOLINARI, Department of Chemical and Pharmaceutical Sciences, University of Ferrara, Ferrara, Italy; R. ARGAZZI, CNR/ISOF c/o Department of Chemical and Pharmaceutical Sciences, University of Ferrara, Ferrara, Italy

- 12.00 **I-2:IL14 Organic Photoelectrochemical Cells for Selective Redox Reactions**

A. GUERRERO, Institute of Advanced Materials (INAM), Universitat Jaume I, Castelló, Spain

- 12.30 **I-2:IL15 Band Engineering of Titanium Dioxide Relevant to Solar Cells and Photocatalysis**

L. KAVAN, J. Heyrovsky Institute of Physical Chemistry, Prague, Czech Republic

WEDNESDAY JUNE 8 MORNING

Room: **NORCIA**

Session J-3 - Nanometal-based Gas Sensors; Polymer-based Gas Sensors

Chair: Ralf RIEDEL, Germany

- 9.30 **J-3:IL01 Template-assisted Fabrication of Metal Nanostructures for Gas Sensing Applications**
Z.Z. OZTURK, Gebze Technical University, Dept. of Physics, Çayırova Campus, Gebze, Kocaeli, Turkey
- 10.00 **J-3:IL02 Ultra-pure Organically-functionalised Gold Nanoparticles Nano-assemblies for Schottky-diode Gas Sensors**
R. IONESCU, T.G. WELEAREGAY, G. PUGLIESE, Rovira i Virgili University, Tarragona, Spain; U. CINDEMIR, L. ÖSTERLUND, Uppsala University, Uppsala, Sweden and Molecular Fingerprint Sweden AB, Uppsala, Sweden

10.30 *Break*

Session J-4 - Nanocomposite/Hybrid/Heterostructure-based Gas Sensors

Chair: Yasuhiro SHIMIZU, Japan

- 11.00 **J-4:IL01 Nanostructured Hybrid Thin Films for Gas Sensing**
R. RIEDEL, TU Darmstadt, Darmstadt, Germany
- 11.30 **J-4:L03 Plasmon Enhanced MOX Gas Sensor**
N. CATTABIANI, C. BARATTO, G. FAGLIA, E. COMINI, G. SBERVEGLIERI, Sensor Lab, CNR-INO and University of Brescia, Brescia, Italy
- 11.50 **J-4:L04 Organic and Inorganic Photosensitizers for Visible Light Activated MOS Gas Sensors**
M.N. RUMYANTSEVA, A.S. CHIZHOV, A.V. MARCHEVSKY, E.V. PODOLKO, E.V. LUKOVSKAYA, O.A. FEDOROVA, A.M. GASKOV, Moscow State University, Moscow, Russia
- 12.10 **J-4:L05 Green Synthesis of Biopolymer-silver Nanoparticles Composites for Gas Sensing**
S.A. PANDE, Laxminarayan Institute of Technology, Nagpur, India

WEDNESDAY JUNE 8 MORNING

Room: **MAGIONE A**

Session K-4 - Memristive Materials, Devices and Emerging Applications

Chair: Sabina SPIGA, Italy

- 9.30 **K-4:IL01 Recent Investigations on the Response of a Tantalum Oxide Memristor to Different Excitations**

R. TETZLAFF, Chair of Fundamentals of Electrical Engineering, Institute of Circuits and Systems, Faculty of Electrical and Computer Engineering, Technische Universität Dresden, Germany

- 10.00 **K-4:IL02 Memory Loss in a Tantalum Oxide Memristor**

A. ASCOLI, R. TETZLAFF, Institut fuer Grundlagen der Elektrotechnik und Elektronik, TUD, Dresden, Germany; L.O. CHUA, Department of Electrical Engineering and Computer Sciences, University of California Berkeley, Berkeley, CA, USA; J.P. STRACHAN, R.S. WILLIAMS, Hewlett Packard Labs, Palo Alto, CA, USA

- 10.20 **K-4:IL04 RRAM for New Computing Paradigms Beyond von Neumann Architecture**

BIN GAO, J.F. KANG, Institute of Microelectronics, Peking University, Beijing, China

10.50 *Break*

Session K-3 - Magnetic, Ferroelectric and Multiferroic Materials for Memory Devices

Chair: Bernard DIENY, France

- 11.20 **K-3:IL10 Advances and Challenges in STT-MRAM Technology**

V. NIKITIN, D. APALKOV, R. CHEPULSKYY, R. BEACH, S. SCHAFER, V. VOZNYUK, Z. DUAN, M. KROUNBI, Samsung Electronics, Semiconductor R&D Center, San Jose, CA, USA

- 11.50 **K-3:IL11 Magnetic Ratchet for Three-dimensional Spintronic Memory and Logic**

D. PETIT, R. LAVRIJSEN, J.-H. LEE, R. MANSELL, A. FERNANDEZ-PACHECO, R.P. COWBURN, University of Cambridge, Cambridge, UK

- 12.20 **K-3:IL12 Controlling Domain Wall Motion by Electric Field in CoFeB-MgO Devices with Perpendicular Anisotropy**

D. RAVELOSONA¹, L. HERRERA DIEZ¹, Y. LIU¹, W. LIN¹, J.P. ADAM¹, N. VERNIER¹, G. AGNUS¹, B. OCKER², J. LANGER², E.E. FULLERTON³, ¹Institut d'Electronique Fondamentale, Université Paris-Sud - CNRS, UMR8622, Orsay, France; ²Singulus Technologies AG, Kahl am Main, Germany; ³Center for Magnetic Recording Research, University of California San Diego, La Jolla, CA, USA

Session L-3 - Functionality, Manufacturing, Application

Room: **MONTEFALCO**

Chair: Vincenzo GUARINO, Italy

- 9.30 L-3:L01 Aulana® and NgaPure®: Nanogold coloured and Antimicrobial Silver Woollen Textiles – A Journey from Discovery to Commercialisation**

J.H. JOHNSTON, School of Chemical and Physical Sciences, Victoria University of Wellington, Wellington, New Zealand

- 10.00 L-3:L02 Reliable Fabric-based Organic Light-emitting Diodes**
KYUNG CHEOL CHOI, SEONIL KWON, WOOHYUN KIM, HYUN CHEOL KIM, SEUNGYEOP CHOI, School of Electrical Engineering, KAIST, Republic of Korea

10.30 Break

Chair: James JOHNSTON, New Zealand

- 11.00 L-3:L03 Resorbable Fibrous Polymers in Terms of Forensic Engineering of Advanced Polymeric Materials**

M. KOWALCZUK, Polish Academy of Sciences, Centre of Polymer and Carbon Materials, Zabrze, Poland; School of Biology, Chemistry and Forensic Science, Faculty of Science and Eng., University of Wolverhampton, UK

- 11.30 L-3:L06 Design of Instructive Fibre Platforms for Tissue Engineering and Drug Delivery Applications**

V. GUARINO, V. CIRILLO, R. ALTOBELLINI, L. AMBROSIO, Institute of Polymers, Composites & Biomaterials and Department of Chemical Sciences & Materials Technology, National Research Council of Italy, Naples, Italy

Session L-4 - End Uses, Commercial and Applications

- 12.00 L-4:L09 Soft Condensed Matter Hybrid Fiber Sensors for Motion Detection and Vital Functions**

M. MELNYKOWYCZ, **F. CLEMENS**, Empa Materials Science and Technology, Dubendorf, Switzerland; M. TSCHUDIN, STBL Medical Research AG, Wilen, Switzerland

SYMPORIUM M

NEXT GENERATION MICRO/NANO SYSTEMS

Room: **BUSINESS**

Chair: Leandro LORENZELLI, Italy (*Programme Chair*)

8.55 Welcome

Session M-1 - Physical MEMS/NEMS

9.00 M-1:L01 Fluidic Physical Sensors and Sensor Systems

B. JAKOBY, Institute for Microelectronics and Microsensors
Johannes Kepler University Linz, Austria

9.30 M-1:L02 Nanophotonic Structures made from Diamond

W. PERNICE, P. RATH, University of Muenster, Muenster, Germany

10.00 M-1:L03 Emerging MEMS Devices and Exploitations in the Internet of Things Scenario

J. IANNACCI, G. SORDO, Fondazione Bruno Kessler-FBK, MicroSystems Technology-MST, Research Unit Center for Materials and Microsystems-CMM, Povo, Trento, Italy

10.30 M-1:L04 Coupled Effects in Low Dimensional Nanosystems and their Applications

R.V.N. MELNIK^{1,2}, S. PRABHAKAR¹, ¹MS2Discovery Interdisciplinary Research Institute, Wilfrid Laurier University, Waterloo, ON, Canada; ²BCAM, Bilbao, Basque Country, Spain

10.50 Break

Session M-2 - Chemical Micro/Nano-sensors and Systems

Chair: Bernhard JAKOBY, Austria

11.20 M-2:L01 Chemical Microsensors and Microsystems for the Food Industry

C. JIMENEZ-JORQUERA, Instituto de Microelectrónica de Barcelona (IMB-CNM), CSIC. Campus UAB, Bellaterra, Spain

11.50 M-2:L03 Fabrication of Micro Three Dimensional Structures by Two Photon Polymerization with SiO/Resin

M.G. del R. HERRERA-SALAZAR, H. AKIYAMA, T. NAKAYAMA, H. SUEMATSU, T. SUZUKI, Y. YOSHITAKE, N. YAMADA, T. TAKAHASHI, K. NIIHARA, Nagaoka University of Technology, Nagaoka, Niigata, Japan

12.10 M-2:L04 Nanosized Drug Delivery Biosensors

H.A. DEHGHANIAN¹, N. HOSSEINABADI², ¹Dept. of Materials Engineering, Islamic Industrial University, Isfahan, Iran; ²Dept. of Materials Engineering and Metallurgy, Faculty of Engineering, Shiraz branch, Islamic Azad University, Iran

12.30 M-2:L05 Transparent Optical Temperature Mo⁴⁺/V³⁺ co doped Si-Ga-based Nano Glass Ceramics Sensors

N. HOSSEINABADI¹, H.A. DEHGHANIAN², A. RABIEEZADEH¹, S.A. KHOSRAV FAROOGI¹, ¹Dept. of Materials Engineering and Metallurgy, Faculty of Engineering, Shiraz branch, Islamic Azad University, Shiraz, Iran; ²Dept. of Materials Engineering, Isfahan University of Technology, Isfahan, Iran

WEDNESDAY JUNE 8 MORNING

Room: MAGIONE B

Session O-5 - Biologically Inspired Systems and Robotics

Chair: Claudia FLECK, Germany

- 9.00 **O-5:L01 Bioinspired Micro- and Nanoswimmers**
P. FISCHER, Max Planck Institute for Intelligent Systems, Stuttgart, and Institute of Physical Chemistry, Univ. of Stuttgart, Germany
- 9.30 **O-5:L02 Biologically Inspired Robots**
P. MANOONPONG, The Maersk Mc-Kinney Moller Institute, Odense, Denmark
- 10.00 **O-5:L03 Biological Fundaments on Biomimetics of Gecko Locomotion**
ZHENDONG DAI, Institute of Bio-inspired Structure and Surface Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, China
- 10.30 **O-5:L04 Three-dimensional Needle Steering for Neurosurgery - A Biologically Inspired Approach**
R. SECOLI, F.M. RODRIGUEZ Y BAENA, Dept. Mechanical Eng., Imperial College London, London, UK
- 11.00 **O-5:L05 Auto-Gopher II – Wireline Deep Sampler driven by Percussive Piezoelectric Actuator and Rotary EM Motors**
Y. BAR-COHEN¹, K. ZACNY², M. BADESCU¹, H.J. LEE¹, S. SHERRIT¹, X. BAO¹, G.L PAULSEN², L. BEEGLE¹, ¹Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA; ²Honeybee Robotics Spacecraft Mechanisms Corporation, Pasadena, CA, USA
- 11.20 **O-5:L06 A Climbing Robots based Claws Interlocking with Flexible Material**
AIHONG JI, ZHIHUI ZHAO, NAN JIANG, ZHENDONG DAI, Institute of Bio-Inspired Structure and Surface Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, China
- 11.40 *Break*

Session O-7 - Biologically Inspired Functional/Smart Structures

Chair: Zhiwu HAN, China

- 12.10 **O-7:L02 Plant Inspired Smart Materials: Pomelos, Nuts and Metal Foams**
C. FLECK¹, P. SCHÜLER¹, M. THIELEN², S. FISCHER³, P. ZASLANSKY⁴, A. BÜHRIG-POLACZEK[§], T. SPECK², ¹Materials Engineering, Institute of Technology Berlin, Germany; ²Botanical Garden & Plant Biomechanics Group, University of Freiburg, Germany; ³Foundry Institute, RWTH Aachen, Germany; ⁴Julius Wolff Institute, Charité Berlin, Germany
- 12.40 **O-7:L05 Bio-inspired Design and Fabrication of Multifunctional Nanocomposites**
QINGWEN LI, Suzhou Institute of Nanotech and Nanobionics, Suzhou, China

Special Session O-10/P-6

BIOMIMETIC MORPHING OF UNMANNED AERIAL VEHICLES

Room: SPOLETO B

Chair: Daniel INMAN, USA (Programme Chair)

8.55 Welcome

9.00 O-10/P-6:IL01 Bio-inspired State Sensing and Awareness for Morphing Fly-by-feel UAVs

F. KOPSAFTOPOULOS, R. NARDARI, YU-HUNG LI, **FU-KUO CHANG**, Department of Aeronautics and Astronautics, Stanford University, Stanford, CA, USA

9.30 O-10/P-6:IL02 Shape Memory Alloy- and Piezoelectric-based Adaptive Structures for Morphing Aircraft and Wind Turbine Rotors

D.A. SARAVANOS, Department of Mechanical Engineering & Aeronautics, University of Patras, Patras, Greece

10.00 O-10/P-6:L03 Vision-based Fuzzy Controller for the Quadrotor Tracking a Ground Target

XUCHAO CHEN¹, ZHIQIANG CAO¹, YUEQUAN YANG², CHAO ZHOU¹, MIN TAN¹, ¹Institute of Automation, Chinese Academy of Sciences, Beijing, China; ²College of Information Engineering, Yangzhou University, China

10.20 O-10/P-6:L04 Parylene Flapping-wings with Self-organized Micro Wrinkles

H. TANAKA, Tokyo Institute of Technology, Tokyo, Japan; Y. SHIMASUE, I. KITAMURA, H. LIU, Chiba University, Chiba, Japan

10.40 Break

Chair: Hiroshi TOKUTAKE, Japan

11.10 O-10/P-6:IL05 Artificial Hair Sensors - Bioinspired Flight Control Feedback

B. DICKINSON, United States Air Force Research Laboratory, Eglin Air Force Base, FL, USA

11.40 O-10/P-6:IL06 Aquatic Micro Aerial Vehicles (AquaMAV): From Diving Birds and Flying Fish to Aerial-aquatic Robots

M. KOVAC, Aerial Robotics Laboratory, Imperial College London, London, UK

12.10 O-10/P-6:L07 Hybrid Fiber Reinforced Composite with Embedded Functionality

M.H. MALAKOOTI, Department of Aerospace Engineering, University of Michigan, Ann Arbor, MI, USA; B.A. PATTERSON, HYUN-SIK HWANG, Department of Materials Science and Engineering, University of Florida, Gainesville, FL, USA; **H.A. SODANO**, Department of Aerospace Engineering, Department of Materials Science and Engineering, University of Michigan, Ann Arbor, MI, USA

12.30 O-10/P-6:L08 Yaw Control of a Smart Morphing Tailless Aircraft Concept

L.L. GAMBLE, **D.J. INMAN**, University of Michigan, Ann Arbor, MI, USA

Session Q-4 - Nanomaterials Systems for Bio-imaging and Therapy

Room: **AUDITORIUM**

Chair: **Sylvie BEGIN-COLIN, France**

- 9.00 **Q-4:IL01 Dynamic Culturing Systems for Cell-seeded Functionalized Implantable Scaffolds**
V. SIKAVITSAS^{1,2}, C. WILLIAMS², A. SIMMONS¹, Z. MUSSETT²,
¹Schools of Chemical, Biological, and Materials Engineering,
²Stephenson School of Biomedical Engineering, The University of Oklahoma, Norman, OK, USA
- 9.30 **Q-4:IL02 Interaction of Noble Nanoparticles of Different Morphology with Human Skin and Skin Cells**
C. GRAF, D. NORDMEYER, E. RÜHL, Freie Universität Berlin, Berlin Germany; F. RANCAN, S. AHLBERG, A. VOGT, J. LADEMANN, Charité - Universitätsmedizin, Berlin, Germany; C. SENGSTOCK, M. KÖLLER, Bergmannsheil University Hospital, Bochum, Germany; J. DIENDORF, M. EPPLER, University of Duisburg Essen, Essen, Germany; J. RAABE, Paul Scherrer-Institut, Villigen, Switzerland
- 10.00 **Q-4:IL03 Stealth Liposomes Conferred with Light-triggered Cargo Release for Theranostic Applications**
D. LUO, K.A. CARTER, A. RAZI, J. GENG, S. SHAO, D. GIRALDO, U. SUNAR, J. ORTEGA, **J.F. LOVELL**, University at Buffalo, State University of New York, Buffalo, NY, USA

10.30 *Break*

Continued on next page

Focused Session Q-5

**BIOMEDICAL APPLICATIONS OF CARBON
NANOTUBES AND GRAPHENE:
OPPORTUNITIES AND CHALLENGES**

Room: AUDITORIUM

Chair: Maurizio PRATO, Italy (Programme Chair)

10.55 Welcome

11.00 Q-5:IL01 Graphene in Biomedical Applications

A. ZURUTUZA, Graphenea S.A., Donostia - San Sebastian, Spain

11.30 Q-5:IL02 Multifunctional Carbon Nanotubes for Anticancer Therapy

C. MENARD-MOYON, L. MUZI, A. BIANCO, CNRS, Institut de Biologie Moléculaire et Cellulaire, Laboratoire d'Immunopathologie et Chimie Thérapeutique, UPR 3572, Strasbourg, France; I. MARANGON, F. GAZEAU, Laboratoire Matière et Systèmes Complexes, UMR 7057 CNRS-Université Paris-Diderot, Paris, France; G. PASTORIN, Department of Pharmacy, National University of Singapore, Singapore

12.00 Q-5:IL03 Graphene Water Dispersions! Preparation and Applications

E. VAZQUEZ, Universidad de Castilla-La Mancha, Ciudad Real, Spain

12.30 Q-5:IL04 Light Weight and Flexible High-performance Sensor Platforms for Medical Diagnostics

M. MEYER¹, L. BARABAN¹, F. PUMP^{1,2}, **G. CUNIBERTI**^{1,2,3}, ¹Institute for Materials Science, TU Dresden, Germany; ²Dresden Center Computational Materials Science, TU Dresden, Germany; ³Center for Advancing Electronics Dresden (cfaed), TU Dresden, Germany

WEDNESDAY JUNE 8 AFTERNOON

Session A-7 - Pharmaceutical and Medical Applications of Smart Polymers

Room: SPELLO

Chair: Moshe GOTTLIEB, Israel

- 15.00 A-7:IL02 **Medical Applications of Nature-inspired Adhesive Polymers**
HAESHIN LEE, Department of Chemistry, Korea Advanced Institute of Science & Technology, South Korea
- 15.30 A-7:L04 **Cold Plasma Reticulation of Shape Memory Polymer Embolic Tissue Scaffolds**
L.D. NASH, N.C. RIVERA, K.P. EZELL, J.K. CARRROW, S.M. HASAN, A.K. GAHARWAR, D.J. MAITLAND, Texas A&M University, College Station, TX, USA
- 15.50 A-7:L05 **A Bioactive “Self-fitting” Shape Memory Polymer (SMP) Scaffold to Treat Craniomaxillofacial (CMF) Bone Defects**
M.A. GRUNLAN^{1,2}, DAWEI ZHANG¹, M.S. HAHN³, J.E. MARINO³,
¹Texas A&M University, Department of Biomedical Engineering,
²Texas A&M University, Department of Materials Science and Engineering, ³Rensselaer Polytechnic Institute, Department of Biomedical Engineering, College Station, TX, USA

Session B-3 - Functional Properties

Room: ASSISI B

Chair: Eduard CESARI, Spain

- 14.30 **B-3:L11 Microstructural Evaluation of NiMnGa Ferromagnetic Shape Memory Alloy Particles Embedded in Polymer Using X-ray Computed Tomography**
H. HOSODA, H. KAWABE, P. SRATONGON, T. INAMURA, Precision and Intelligence Laboratory, Tokyo Institute of Technology, Yokohama, Japan; V.A. CHERNENKO, BCMaterials & Dpto de Electricidad y Electronica, Universidad del Pais Vasco UPV/EHU, Bilbao, Spain, Ikerbasque, Basque Foundation for Science, Bilbao, Spain
- 15.00 **B-3:L12 Superelasticity and Shape Memory Effect in Laser Welded NiTi Shape Memory Alloys**
J.P. OLIVEIRA, F.M. BRAZ FERNANDES, CENIMAT/I3N, Faculdade de Ciéncia e Tecnologias, Universidade Nova de Lisboa, Portugal; R.M. MIRANDA, UNIDEMI, Faculdade de Ciéncia e Tecnologias, Universidade Nova de Lisboa, Portugal
- 15.20 **B-3:L13 Functional Degradation in Novel Shape Memory Alloys: On the Role of Dislocation Formation and Diffusion During Thermomechanical Cycling**
P. KROOSS¹, M. VOLLMER¹, P.M. KADLETZ², C. SOMSEN³, Y.I. CHUMLYAKOV⁴, H.J. MAIER⁵, T. NIENDORF⁶, ¹Institut für Werkstofftechnik, TU Bergakademie Freiberg, Freiberg, Germany; ²Applied Crystallography, Dept. of Earth and Environmental Sciences, Ludwig Maximilians Universität, Munich, Germany; ³Institut für Werkstoffe, Ruhr-Universität Bochum, Bochum, Germany; ⁴Tomsk State University, Siberian Physical Technical Institute, Tomsk, Russia; ⁵Institut für Werkstoffkunde, Leibniz Universität Hannover, Garbsen, Germany; ⁶Institut für Werkstofftechnik, Metallische Werkstoffe, Universität Kassel, Kassel, Germany
- 15.40 **B-3:L14 Functional Properties and Structure of Ti-Ni SMA After Multi-Axial Isothermal Quasi-continuous Deformation**
I.Yu. KHMELEVSKAYA¹, V.S. KOMAROV¹, R. KAWALLA², S.D. PROKOSHIN¹, G. KORPALA², ¹NUST "MISIS", Moscow, Russia; ²Freiberg University of Technology and Mining, Germany
- 16.00 **B-3:L15 A Large Elastic Deformation of a Partly Ordered Iron-Platinum Shape Memory Alloy**
T. YAMAGUCHI, T. FUKUDA, T. KAKESHITA, Osaka University, Suita, Osaka, Japan

16.20 *Break*

Session B-5 - Engineering

Room: ASSISI B

Chair: Manfred KOHL, Germany

- 16.50 **B-5:IL01 Design of Multifunctional SMA Devices Using Finite Element Simulation Methods**
T. BEN ZINEB, LEMTA Université de Lorraine CNRS, Vandoeuvre les Nancy, France
- 17.20 **B-5:IL02 Environmentally Assisted Fatigue of NiTi**
P. SITTNER, J. RACEK, B. MARESOVA, L. KADERAVEK, L. HELLER, Institute of Physics of the ASCR, Prague, Czech Republic
- 17.50 **B-5:L04 High Speed Smart Soft Composite (SSC) Structure Actuator with Large Deformation**
SUNG-HYUK SONG, J.Y. LEE, H. RODRIGUE, S.H. AHN, Department of Mechanical & Aerospace Engineering, Seoul National University, Seoul, Korea
- 18.10 **B-5:L05 Structural Effects of Thermomechanical Processing on the Static and Dynamic Responses of Powder Metallurgy Fe-Mn-Si Based Shape Memory Alloys**
E. MIHALACHE, B. PRICOP, R.I. COMANECI, M.G. SURU, N.M. LOHAN, M. MOCANU, **L.G. BUJOREANU**, "Gheorghe Asachi" Technical University of Iasi, Romania; B. ÖZKAL, Istanbul Technical University, Istanbul, Turkey

WEDNESDAY JUNE 8 AFTERNOON

Room: **SPOLETO A**

Session C-5 - Domain Walls and Dynamics of Multiferroics

Chair: Junling WANG, USA

14.30 C-5:L01 Domain Walls and Magnetism in BiFeO₃ – Redux

L.W. MARTIN, Department of Materials Science and Engineering, University of California, Berkeley and Material Science Division, Lawrence Berkeley National Laboratory, Berkeley, CA, USA

15.00 C-5:L02 Spiral Magnets in Thin Film Form

B. NOHEDA, J.A. HEUVER, Zernike Institute for Advanced Materials, University of Groningen, Groningen, The Netherlands; S. FAROKHIPOOR, Device Materials group, University of Cambridge, Cambridge, UK; C.J.M. DAUMONT, University of Tours, Tours cedex, France

15.30 C-5:L03 Scrutinizing Electronic Excitations of Multiferroics by Resonant Raman Scattering

M.C. WEBER, M. GUENNOU, **J. KREISEL**, Luxembourg Institute of Science and Technology (LIST), Department Materials Research and Technology, Belvaux, Luxembourg

16.00 C-5:L04 Broadband Dielectric Studies of Cobalt Ferrite and Nb-doped Lead Zirconium Titanate Multiferroic Composites

R. GRIGALAITIS¹, A. SAKANAS¹, **J. BANYS**¹, C.E. CIOMAGA², L. MITOSERIU², ¹Department of Radiophysics, Faculty of Physics, Vilnius University, Vilnius, Lithuania; ²Faculty of Physics, University "Al. I. Cuza" Iasi, Romania

16.20 Break

Session C-6 - New Effects

Chair: Beatriz NOHEDA, The Netherlands

16.50 C-6:L01 Room-temperature Ferroelectricity in Atomically Thin 2D CuInP₂S₆

LU YOU¹, FUCAI LIU¹, KYLE L. SEYLER², XIAODONG XU², ZHENG LIU¹, **JUNLING WANG**¹, ¹School of Materials Science and Engineering, Nanyang Technological University, Singapore, Singapore; ²Department of Physics, University of Washington, Seattle, Washington, USA

17.20 C-6:L03 Temperature Dependent Polarization Reversal Mechanism in (Bi_{1/2}Na_{1/2})TiO₃-based Relaxor Ceramics

J. GLAUM, J. DANIELS, M. HOFFMAN, School of Materials Science and Engineering, UNSW Australia, NSW, Australia; H. SIMONS, Department of Physics, Technical University of Denmark, Kgs. Lyngby, Denmark; M. ACOSTA, Institute of Materials Science, Ceramics Group, Technische Universität Darmstadt, Germany

Session D-7 - New Synthesis and Processing Methods

Room: **DERUTA**

Chair: **Jan TALBOT, USA**

- 14.30 D-7:L01 Activator-doped Amorphous Materials for Luminescent Application**
HIROKAZU MASAI, Institute for Chemical Research, Kyoto University, Uji, Kyoto, Japan
- 15.00 D-7:L03 Silicon Oxycarbides with Transparency and Photoluminescence**
MASAKI NARISAWA, H. INOUE, Graduate School of Eng., Osaka Prefecture University, Sakai, Japan; F. FUNABIKI, Material Research Center of Elemental Strategy, Tokyo Institute of Technology, Yokohama, Japan; T. KAWAI, Graduate School of Science, Osaka Prefecture University, Sakai, Japan; H. HOSONO, Materials and Structure Lab., Tokyo Institute of Technology, Yokohama, Japan
- 15.20 D-7:L04 Three Primary Color Emission Up-conversion Phosphors for 3D Volume Display**
KOJI TOMITA, S. TAMURA, M. TANAKA, Tokai University, Kanagawa, Japan; Y. SATO, Okayama University of Science, Okayama, Japan; M. KOBAYASHI, M. KAKIHANA, Tohoku University, Miyagi, Japan
- 15.50 D-7:L05 Growth Kinetics of Colloidal CdSe Nanocrystals: Size and Size Distribution Control**
E.A. SLEJKO, V. LUGHI, University of Trieste, Department of Engineering and Architecture, Trieste, Italy

16.10 Break

Chair: **Hirokazu MASAI, Japan**

- 16.40 D-7:L06 Large-area Luminescent Phosphor Sheets for Lighting and Display Applications**
H. MENKARA, PhosphorTech, Kennesaw, GA, USA
- 17.10 D-7:L07 Review of Phosphor Identification and Synthesis Methods**
J. McKITTRICK¹, JUNGMIN HA², ZHENBIN WANG³, G.A. HIRATA⁴, O.A. GRAEVE¹, SHYUE PING ONG³, ¹Dept. of Mechanical and Aerospace Engrg and Materials Science and Engrg Program, University of California, La Jolla, CA, USA; ²Materials Science and Engineering Program, University of California, La Jolla, CA, USA; ³Dept. of Nanoengineering and Materials Science and Engrg Program, University of California, La Jolla, CA, USA; ⁴Center for Nanoscience and Nanotechnology, Ensenada, B.C. México
- 17.40 D-7:L08 Fabricating Glasses with High Refractive Index and Strong Upconversion Luminescence using Containerless Processing**
J. YU, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, P.R. China
- 18.00 D-7:L09 Synthesis of Ce:YAG Nanoparticles via the Formation of Urea Complexes**
M.L. SALADINO^{1,2}, F. ARMETTA², C. GIORDANO³, E. CAPONETTI^{1,2}, ¹Dipartimento Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche - STEBICEF, Università di Palermo, Palermo, Italy; ²Centro Grandi Apparecchiature-UniNetLab, Università di Palermo, Palermo, Italy; ³Stranski-Laboratorium für Physikalische und Theoretische Chemie, Institut für Chemie, Technische Universität Berlin, Berlin, Germany

WEDNESDAY JUNE 8 AFTERNOON

Room: **CORCIANO**

Session E-5 - Applications of Metamaterials and Metadevices

Chair: Jensen LI, UK

- 14.30 **E-5:IL01 Optomechanical Metamaterials**
E. VERHAGEN, FOM Institute AMOLF, Amsterdam, The Netherlands
- 15.00 **E-5:IL02 Metamaterial based Nanobiosensors and Nanophotodetectors**
E. OZBAY, Nanotechnology Research Center, Bilkent University, Bilkent, Ankara, Turkey
- 15.30 **E-5:IL03 Metamaterials as a Platform to study Localised and Propagating Toroidal Excitations**
N.I. ZHELUDOV, V.A. FEDOTOV, N. PAPASIMAKIS, V. SAVINOV, **T.A. RAYBOULD**, University of Southampton, Southampton, UK
- 16.00 **E-5:L06 High Temperature Stability of Oxide Photonic Structures**
R. JANSSEN¹, R. PASQUARELLI¹, P.N. DYACHENKO², A. PETROV², M. EICH², ¹Institute of Advanced Ceramics and ²Institute of Optical and Electronic Materials, Technische Universität Hamburg-Harburg, Germany
- 16.20 *Break*

Session E-6 - Antenna, Nanoantenna and Waveguide Applications, Transformation Optics, Superlenses

Chair: Ekmel OZBAY, Turkey

- 16.50 **E-6:IL04 Optical Antennas**
M. AGIO, Laboratory of Nano-Optics, University of Siegen, Siegen, Germany
- 17.20 **E-6:IL05 Integrated Hyperlens in the Visible Spectral Range**
N.M. LITCHINITSER, JINGBO SUN, M.I. SHALAEV, University at Buffalo, The State University of New York, Buffalo, NY, USA
- 17.50 **E-6:L06 Nanoantenna-based Stokes Polarimeter on a Silicon Chip**
A. ESPINOSA-SORIA, Nanophotonics Technology Center, Universitat Politècnica de València, Valencia, Spain; F.J. RODRÍGUEZ-FORTUÑO, King's College London, London, UK; A. GRIOL, A. MARTÍNEZ, Nanophotonics Technology Center, Universitat Politècnica de València, Valencia, Spain

WEDNESDAY JUNE 8 AFTERNOON

Room: ORVIETO

Session F-5 - Novel Characterizations

Chair: Cinzia CASIRAGHI, UK

- 15.00 **F-5:KL Electronic and Optoelectronic Physics in the van der Waals Heterojunctions**

PHILIP KIM, Department of Physics, Harvard University, Cambridge, MA, USA

- 15.40 **F-5:IL01 Photoconductivity in 2D Layers of Transition Metal Dichalcogenides**

S. TALAPATRA, Department of Physics, Southern Illinois University, Carbondale, IL, USA

- 16.10 *Break*

Session F-6 - Application of Graphene and other 2D Layered Materials and Composites

Chair: Anupama KAUL, USA

- 16.40 **F-6:L11 Alkali Metal Insertion in TiO₂- and Li₄Ti₅O₁₂-graphene Composites for Battery Applications**

M. ZUKALOVA, A. ZUKAL, B. PITNA LASKOVA, L. KAVAN, J. Heyrovský Institute of Physical Chemistry, v.v.i., AS CR, Prague, Czech Republic

- 17.00 **F-6:L12 Failure of Self Lubricating Properties of MoS₂: Oxidation or Water Molecules Adsorption?**

E. SERPINI^{1,2}, A. ROTA², D. MARCETTO^{1,2}, S. VALERI^{1,2,3}, ¹Dipartimento di Scienze Fisiche, Informatiche e Matematiche - Università di Modena e Reggio Emilia, Modena, Italy; ²Istituto CNR-NANO S3, Modena, Italy; ³Centro Interdipartimentale per la Ricerca Applicata e i Servizi nella Meccanica Avanzata e nella Motoristica Intermech-Mo.Re., Università di Modena e Reggio Emilia, Modena, Italy

- 17.20 **F-6:L14 Graphene Lubrication of Steel-steel Contacts**

D. MARCETTO¹, P. RESTUCCIA¹, C. RIGHI², S. VALERI^{1,2,3}, ¹Dipartimento di Scienze Fisiche, Informatiche e Matematiche, Università di Modena e Reggio Emilia, Modena, Italy; ²Istituto CNR-NANO S3, Modena, Italy; ³Centro Interdipartimentale per la Ricerca Applicata e i Servizi nella Meccanica Avanzata e nella Motoristica Intermech-Mo.Re., Università di Modena e Reggio Emilia, Modena, Italy

Session I-3 - Design Approaches for Advanced Applications

Room: ASSISI A

Chair: Hyunwoong PARK, Korea

- 14.30 I-3:IL01 Efficient Solar Driven Water Splitting using a Bipolar Membrane to enable pH-gradients**

D.A. VERMAAS, W.A. SMITH, Delft University of Technology, Department of Chemical Engineering, Materials for Energy Conversion and Storage (MECS). Delft, The Netherlands

- 15.00 I-3:IL02 Development of Photocatalyst Sheet for Unassisted Sunlight-driven Water Splitting**

T. HISATOMI, K. DOMEN, The University of Tokyo, Tokyo, Japan; Japan Technological Research Association of Artificial Photosynthetic Chemical Process (ARPChem)

- 15.30 I-3:IL03 Quasi-1D Black Titanium Oxide Nanostructures for Water Splitting Applications**

L. MASCARETTI, S. FERRULLI, P. MAZZOLINI, C.S. CASARI, V. RUSSO, A. LI BASSI, Micro and Nanostructured Materials Laboratory, Politecnico di Milano, Milano, Italy; R. MATARRESE, I. NOVA, Laboratory of Catalysis and Catalytic Processes, Politecnico di Milano, Milano, Italy

- 15.50 Break**

Chair: David VERMAAS, The Netherlands

- 16.20 I-3:IL04 A Stand Alone Artificial Photosynthesis of Formate from Carbon Dioxide and Water**

HYUNWOONG PARK, School of Energy Engineering, Kyungpook National University, Daegu, Korea

- 16.50 I-3:IL05 Sculpting Photocatalysts on the Nano Scale**

L. AMIRAV, Schulich Faculty of Chemistry, Technion - Israel Institute of Technology, Haifa, Israel

- 17.10 I-3:IL08 Reduction of Small Molecules in Photocatalytic Systems**

W. MACYK, Faculty of Chemistry, Jagiellonian University, Kraków, Poland

Session J-4 - Nanocomposite/Hybrid/Heterostructure-based Gas Sensors

Room: **NORCIA**

Chair: Camilla BARATTO, Italy

- 15.00 **J-4:IL06 Nanoscale Metal Oxide-based Heterojunctions for Gas Sensing**
D.R. MILLER, S.A. AKBAR, P.A. MORRIS, Department of Materials Science and Engineering, The Ohio State University, Columbus, OH, USA
- 15.30 **J-4:IL07 Sensing Properties of Diode-type Gas Sensors**
Y. SHIMIZU, T. HYODO, Graduate School of Engineering, Nagasaki University, Nagasaki, Japan
- 16.00 **J-4:IL08 MIP-nanoparticle Composites and Core-shell Nanoparticles leading to Materials with Strongly Enhanced Sensitivity**
P. LIEBERZEIT¹, G. MUSTAFA^{1,2}, W. CUYPERS¹, M. ZEILINGER¹, K. NAVAKUL^{1,3}, C. SANGMA³, ¹University of Vienna, Faculty for Chemistry, Department of Analytical Chemistry, Vienna, Austria; ²Quaid-e-Azam University, Islamabad, Pakistan; ³Kasetsart University, Faculty of Sciences, Department of Chemistry, Bangkok, Thailand

WEDNESDAY JUNE 8 AFTERNOON

Room: MAGIONE A

Session K-3 - Magnetic, Ferroelectric and Multiferroic Materials for Memory Devices

Chair: Vladimir NIKITIN, USA

- 14.30 **K-3:L13 Integrating MTJ Devices into a 130nm CMOS Process Flow**
M. BUCHBINDER, TowerJazz, Migdal Ha'emek, Israel
- 15.00 **K-3:L14 Multibit Self-referenced Thermally Assisted MRAM**
Q. STAINER^{1,2}, L. LOMBARD¹, K. MACKAY¹, C. DUCRUET¹, S. BANDIERA¹, R.C. SOUSA², G. VINAY², I.L. PREJBEANU², **B. DIENY**²,
¹Crocus Technology SA, Grenoble, France; ²SPINTEC, CEA/INAC, CNRS, Univ.Grenoble Alpes, Grenoble, France
- 15.30 **K-3:L15 Toward Sub-20 nm Magnetic Tunnel Junction for Embedded Cache Memory**
TOSHIHIRO SUGII, HIDEYUKI NOSHIRO, YUICHI YAMAZAKI, CHIKAKO YOSHIDA, YOSHIHISA IBA, Fujitsu Limited, Atsugi, Japan
- 15.50 *Break*

Session K-1 - Resistance Switching Memories (ReRAM)

Chair: Dan RITTER, Israel

- 16.20 **K-1:L12 Different Applications of Memristors Enabled by Selector Devices**
J. JOSHUA YANG, University of Massachusetts, Amherst, MA, USA
- 16.50 **K-1:L13 Switching Kinetics of Ta₂O₅-based ReRAM: Limiting Processes and Ultimate Switching Speed**
S. MENZEL¹, A. MARCHEWKA², B. RÖSGEN¹, W. KIM¹, V. HAVEL², K. FLECK², V. RANA¹, U. BÖTTGER², D. WOUTERS¹, R. WASER^{1,2},
¹Forschungszentrum Jülich, Peter Grünberg Institut (PGI-7), Jülich, Germany; ²RWTH Aachen, Institut für Werkstoffe der Elektrotechnik (IWE 2), Aachen, Germany
- 17.10 **K-1:L14 Engineering Defect Levels and Strain Fields as Functional Oxide Building Blocks for Novel ReRAM Architectures**
R. SCHMITT, E. SEDIVA, R. KOROBKO, F. MESSERSCHMITT, S. SCHWEIGER, M. KUBICEK, J.L.M. RUPP, ETH Zurich, Department of Materials, Electrochemical Materials, Zurich, Switzerland
- 17.40 **K-1:L16 The Resistive Switching Behavior of ZnO Films Depending on Li Dopant Concentration and Electrode Materials**
A. IGITYAN, Y. KAFADARYAN, N. AGHAMALYAN, S. PETROSYAN, Institute for Physical Research of NAS of Armenia, Ashtarak, Armenia

Session L-3 - Functionality, Manufacturing, Application

Room: **MONTEFALCO**

Chair: **Kyung Cheol CHOI, Korea**

- 15.00 **L-3:L08 Manufacturing Nanoyarns for Conventional and Technical End Uses**
G.K. STYLIOS, Heriot Watt University, Scotland, UK
- 15.30 **L-3:L09 Fabrication of Silver-zinc “Battery Fabric” for Applications in SMART Textiles**
A.M. ZAMARAYEVA, I. DECKMAN, CH. CHANG, A.C. ARIAS, Department of Electrical Engineering and Computer Sciences, University of California at Berkeley, Berkeley, CA, USA; M. WANG, D.A. STEINGART, Mechanical and Aerospace Engineering, Andlinger Center for Energy and the Environment, Princeton University, Princeton, NJ, USA
- 15.50 **L-3:L10 New Nanogold Colours for Textiles**
E.G. WRIGGLESWORTH, J.H. JOHNSTON, School of Chemical and Physical Sciences, Victoria University of Wellington, Wellington, New Zealand
- 16.10 **L-3:L11 The Incorporation of Phase Change Material into Soft Armour Inserts: Achieving a Level of Cooling without Compromising Ballistic Protection**
K.C. NG, A.P. HUNG, P. TAN, H. BILLON, M.F. LING, Defence Science and Technology Group, Department of Defence, Melbourne, VIC, Australia
- 16.30 **L-3:L12 Airbrushed Liquid Crystal/Polymer Fibers for Responsive Textiles**
J.L. WEST, J. WANG, A. JAKLI, Liquid Crystal Institute, Kent State University, Kent, OH, USA

WEDNESDAY JUNE 8 AFTERNOON

Room: **BUSINESS**

Session M-3 - MOEMS / NOEMS

Chair: Ervin PEINER, Germany

- 14.30 **M-3:IL01 Optical MEMS for Telecom Application**
M. NAKAJIMA, J. YAMAGUCHI, NTT Device Technology Laboratories, Atsugi-shi, Kanagawa, Japan
- 15.00 **M-3:IL02 Optofluidic Sensors and Actuators**
M.J. VELLEKOOP, M. OELLERS, University of Bremen, Inst. for MicroSensors, -Actuators and -Systems, MCB, Bremen, Germany
- 15.30 **M-3:L03 Advanced Protective Coatings by Low Temperature Atomic Layer Deposition of HfO₂ on Al Surfaces for Micro-mirror Applications**
C. WIEMER, E. CIANCI, A. LAMPERTI, G. TALLARIDA, Laboratorio MDM, IMM-CNR, Agrate Brianza (MB), Italy; M. BERDOVA, S. FRANSSILA, Aalto University, Department of Materials Science and Engineering, Espoo, Finland; M. ZANUCCOLI, C. FIEGNA, Department of Electrical, Electronic and Information Engineering (DEI), Università di Bologna and IUNET, Cesena (FC), Italy; L. LAMAGNA, S. LOSA, S. ROSSINI, R. SOMASCHINI, S. GIOVENI, STMicroelectronics, Agrate Brianza (MB), Italy
- 15.50 **M-3:L04 Optical MEMS Technologies for Infrared Spectroscopy, Sensing and Imaging**
D. SILVA, J. ANTOSZEWSKI, A. KEATING, J. DELL, **L. FARAOONE**, The University of Western Australia, Crawley, WA, Australia
- 16.10 *Break*

Session M-4 - Smart Micro-nano System and Components Integration

Chair: Cecilia JIMENEZ-JORQUERA, Spain

- 16.30 **M-4:IL01 Giant Piezoelectric Materials for Microelectromechanical Systems**
M.S. RZCHOWSKI, Physics Department, University of Wisconsin-Madison, Madison, WI, USA
- 17.00 **M-4:IL02 MEMS Sensor for Personal Nanoparticle Monitoring**
H.S. WASISTO, W. WU, **E. PEINER**, TU Braunschweig, Inst. of Semiconductor Technology and LENA, Braunschweig, Germany; E. UHDE, Fraunhofer-WKI, MAIC, Braunschweig, Germany
- 17.30 **M-4:L03 Effect of Interfacial Incompatibility on the Stability of 3D Electronic Packages containing Through Silicon Vias (TSV)**
I. DUTTA, H. YANG, M. UPADHYAYULA, L. MEINSHAUSEN, T.K. LEE*, School of Mechanical and Materials Engineering, Washington State University, Pullman, WA, USA; *Dept. of Mechanical and Materials Engineering, Portland State University, Portland, OR, USA
- 17.50 **M-4:L04 Artificial Intelligence integrated Multiscale, Multiphysics Computational Methods for Smart and Multifunctional Materials**
A. MIYAMOTO, P. BONNAUD, R. MIURA, A. SUZUKI, N. MIYAMOTO, N. HATAKEYAMA, M. HARIYAMA, Tohoku University, Sendai, Miyagi, Japan
- 18.10 **M-4:L05 Shape Memory in Micro-patterned Thiol-ene Thermoset Pillars**
W. VOIT, J. SALAZAR, A. JOSHI-IMRE, The University of Texas at Dallas, Richardson, TX, USA

SYMPORIUM N

**PROGRESS IN WEARABLE/WIRELESS AND
IMPLANTABLE BODY SENSOR NETWORKS
FOR HEALTHCARE APPLICATIONS**

Room: **SALA STAMPA**

Chair: Dermot DIAMOND, Ireland (*Programme Chair*)

14.30 Welcome

Session N-1 - Advances in Sensing Devices for Biomedical Monitoring

14.35 N-1:IL01 A Multisensor Platform for Metabolomics

D.R.S. CUMMING, M. AL-RAWHANI, B.C. CHEAH, C. MARTIN, School of Engineering, Rankine Building, University of Glasgow, Glasgow, UK; M.P. BARRETT, A.I. MACDONALD, Institute of Infection, Immunity and Inflammation, Sir Graeme Davies Building, University of Glasgow, Glasgow, UK

15.05 N-1:IL02 Carbon-ceramic Micro Electrodes for Pace Makers and Similar Biomedical Applications

G. BLUGAN¹, F. DALCANALE¹, J. GROSSENBACHER², H. TEVAEARAI³, J. BRUGGER², T. GRAULE¹, J. KUEBLER¹, ¹Empa, Swiss Federal Labs for Materials Science and Technology, Lab. for High Performance Ceramics, Duebendorf, Switzerland; ²EPFL, Microsystems Lab. LMIS1, Lausanne, Switzerland; ³Bern University Hospital, Dept. of Cardiovascular Surgery, Bern, Switzerland

15.35 N-1:IL03 Tailoring Surfaces' Properties to Produce Materials for Sensitive Signalling of Binding Events

S.E.J. BELL, School of Chemistry and Chem. Eng., Queen's University, Belfast, UK

16.05 N-1:IL04 Wearable Healthcare Devices based on Flexible Electronic Skins

HYUNHYUB KO¹, HEON SANG LEE², MIN PARK³, GEON-WOONG LEE⁴, ¹School of Energy and Chemical Eng., Ulsan National Inst. of Science and Tech. (UNIST), Ulsan Metropolitan City, Rep.of Korea; ²Dept. of Chemical Eng., Dong-A University, Busan, Rep. of Korea; ³Photo-Electronic Hybrids Research Center, Korea Inst. of Science and Technology, Seoul, Rep.of Korea; ⁴Nano Carbon Materials Research Group, Korea Electrotechnology Research Inst., Changwon, Rep.of Korea

16.25 Break

Session N-2 - Smart Fabrics and Wearable Patches

Chair: Toshiyo TAMURA, Japan

16.45 N-2:IL01 The Development of Screen, Inkjet and Dispenser Printing Techniques for Smart Fabric Applications

R. TORAH, Y. WEI, Y. LI, K. YANG, M. DE VOS, S. BEEBY, J. TUDOR, Dept. of Electronics and Computer Science, University of Southampton, Southampton, UK

17.15 N-2:IL02 Sensing Garments for Body Segments Reconstruction and Motion Capture

A. TOGNETTI, Research Center "E. Piaggio" and Information Engineering Department, University of Pisa, Italy

17.45 N-4:IL03 Smart Implants for Monitoring Surgical Site Infection
GUANG-ZHONG YANG, Hamlyn Centre, Imperial College London, UK

Session O-6 - Bio-inspired Optics and Photonics

Room: **MAGIONE B**

Chair: Peer FISCHER, Germany

- 14.30 **O-6:IL05 Morpho-colored Materials having High Reflectance in Wide Angle without Color-change: Multi-developments for Practical Applications**
AKIRA SAITO, Osaka University & RIKEN (SPRING-8), Osaka, Japan
- 15.00 **O-6:IL06 Cellulose Photonics: From Nature to Applications**
S. VIGNOLINI, **O. ONELLI**, Department of Chemistry, University of Cambridge, Cambridge, UK
- 15.30 **O-6:IL07 Bioinspired Materials Templates by Nature Species**
DI ZHANG, JIAJUN GU, WANG ZHANG, QINGLEI LIU, SHENMING ZHU, HUILAN SU, State Key Lab of Metal Matrix Composites, Shanghai Jiao Tong University, Shanghai, China

WEDNESDAY JUNE 8 AFTERNOON

Special Session O-10/P-6 Biomimetic Morphing of Unmanned Aerial Vehicles

Room: **SPOLETO B**

Chair: Daniel INMAN, USA

15.00 O-10/P-6:IL09 Bioinspired Morphing Systems and Multi-functionality

J. KUDVA, NextGen Aeronautics, Inc., Torrance, CA, USA; G. SPEDDING, University of Southern California; R. KORNBLUH, SRI International

15.30 O-10/P-6:IL10 Morphing Aircraft Skin Based on a Woven Strip Structure

H. TOKUTAKE, Kanazawa University, Kanazawa, Japan

Session P-3 - Smart Structures and Integrated Systems

Room: SPOLETO B

Chair: Benede Jose RODELLAR, Spain

- 16.30 **P-3:L07 Mobile Wireless Sensor Networks for the Assessment of Civil Infrastructure System Performance: Truck and UAV-based Sensing Systems**
J.P. LYNCH, Department of Civil and Environmental Engineering, Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI, USA
- 17.00 **P-3:L08 Sparse Solution Techniques in Load and Damage Monitoring Systems**
C.-P. FRITZEN, D. GINSBERG, Dept. of Mechanical Engineering, University of Siegen, Siegen, Germany
- 17.30 **P-3:L09 Wind Turbine Fault Detection through Principal Component Analysis and Statistical Hypothesis Testing**
F. POZO, Y. VIDAL, CoDALab, Departament de Matemàtiques, Escola Universitària d'Enginyeria Tècnica Industrial de Barcelona (EUETIB), Universitat Politècnica de Catalunya (UPC), Barcelona, Spain

Focused Session Q-5

Biomedical Applications of Carbon Nanotubes and Graphene: Opportunities and Challenges

Room: **SALA RELATORI**

Chair: **Gianaurelio CUNIBERTI**, Germany

- 14.30 Q-5:L05 **Immunosensor based on Carbon Nanotubes and Graphene**
M. HOLZINGER, Département de Chimie Moléculaire, University of Grenoble-Alpes, Grenoble, France
- 15.00 Q-5:L06 **Towards NanoMRI with Mechanical Resonators based on Nanotubes and Graphene**
A. BACHTOLD, ICFO - The Institute of Photonic Sciences, Castelldefels (Barcelona), Spain
- 15.30 Q-5:L07 **Graphene-based Optoelectronic Liquid Sensing Platform**
M. STEINER¹, M. ENGEL², R. GIRO¹, P.W. BRYANT¹, R.F. NEUMANN¹, P. AVOURIS², C. FEGER², ¹IBM Research, Rio de Janeiro, Brazil; ²IBM Research, Yorktown Heights, NY, USA
- 16.00 Q-5:L09 **Graphene and Graphene Oxide Sensors for Monitoring Chronic Wounds**
N. CALISI, B. MELAI, P. SALVO, C. PAOLETTI, R. FUOCO, V. MOLLICA, **F. DI FRANCESCO**, Department of Chemistry and Industrial Chemistry, University of Pisa, Pisa, Italy

(Session Q-5 continues in Room “AUDITORIUM”)

WEDNESDAY JUNE 8 AFTERNOON

Room: **AUDITORIUM**

Session Q-2 - Multifunctional Materials in Tissue Engineering and Regenerative Medicine

Chair: Tom TROCZYNSKI, Canada

14.30 Q-2:L01 Engineering Anisotropy at Nano- to Macroscale: Towards Bioactive Biomaterials

S. SANT, Department of Pharmaceutical Sciences, Department of Bioengineering, McGowan Institute for Regenerative Medicine, Pittsburgh, PA, USA

15.00 Q-2:L10 Synthesis and Characterization of an Innovative Radially-compliant Scaffold for Large Osteochondral Defects: The Honey

F. SCALERA, B. PALAZZO, A.N. CANCELLI, S. SCIALLA, A. SANNINO, **F. GERVASO**, University of Salento, Lecce, Italy; D. IZZO, Dhitech S.c.a.r.l, Lecce, Italy; A. BARCA, IRCCS San Raffaele Scientific Institute (Section of Lecce), Lecce, Italy; G. PERETTI, IRCCS Istituto Ortopedico Galeazzi, Milan, Italy

15.20 Q-2:L11 Preparation of Gradient-type Decellularized Tissue-polymer Complex for Soft Tissue-polymer Interlinking Device

A. KISHIDA, Y. ZHANG, K. NAM, T. KIMURA, Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University, Tokyo, Japan

15.40 Q-2:L12 Collagen Fiber Bio-composite Laminates and Constructs

M. SHARABI, R. HAJ-ALI, The Fleischman Faculty of Engineering, D. BENAYAHU, Sackler School of Medicine, Y. BENAYAHU, George S. Wise Faculty of Life Sciences, Tel Aviv University, Tel Aviv, Israel

16.00 Break

Focused Session Q-5

Biomedical Applications of Carbon Nanotubes and Graphene: Opportunities and Challenges

Chair: Maurizio PRATO, Italy

16.45 Q-5:L10 Carbon Nanohorns for Targeted Therapy

EIJIRO MIYAKO, Nanomaterial Research Institute (NMRI), National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan

17.15 Q-5:L11 Carbon-based Substrates for Stem Cell Differentiation

T. NAYAK, C. ZHAO, H. ANDERSEN, H.K. HO, B. OEZYILMAZ, **G. PASTORIN**, National University of Singapore, Pharmacy Department, Singapore

17.45 Q-5:L12 Anodic-electrophoretic Deposited Graphene Oxide onto Anodized Titanium for Orthopaedic Applications

S. SIRIVISOOT, Biological Engineering Program, Faculty of Engineering, King Mongkut's University of Technology Thonburi, Bangkok, Thailand

THURSDAY JUNE 9 MORNING

Session A-5 - Multifunctional Surfaces

Room: SPELLO

Chair: Philippe POULIN, France

9.30 A-5:L01 **Block Copolymers at Interfaces – Statics, Kinetics and Rheology**

L. LAUFER, M. ARMON, **M. GOTTLIEB**, Chemical Engineering Department, Ben Gurion University, Beer Sheva, Israel

10.00 A-5:L02 **Self-healing Fluoropolymer Brushes as Anti-fouling Coatings**

ZHANHUA WANG, H. ZUILHOF, Wageningen University, Wageningen, The Netherlands

10.20 A-5:L04 **Smart Surfaces for Directing Nanoparticle Formation**

N. YONET-TANYERI, Department of Biomedical Engineering, Istanbul Medipol University, Istanbul, Turkey; P.V. BRAUN, Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA

10.40 *Break*

11.10 A-5:L05 **Interplay of Morphology and Degradation in Two-dimensional Polymer Films at the Air-water Interface**

B. SCHULZ, A.-C. SCHOENE, A. LENDLEIN, University of Potsdam, Institute of Chemistry, Potsdam, Germany; and Institute Biomaterial Science and Berlin-Brandenburg Centre for Regenerative Therapies (BCRT), Teltow, Germany

11.40 A-5:L06 **Optically Tunable Mechanical and Functional Properties of Azo-polymer Thin Films**

F. FABBRI¹, L. SORELLI², D.-V. AHN³, J. FRECH-BARONET², M. FAFARD², Y. LASSAILLY³, K. LAHIL³, L. MARTINELLI³, T. GACOIN³, J. PERETTI³, ¹Institut d'Electronique Fondamentale, Université Paris-Sud/CNRS, Orsay, France; ²Département de Génie Civil, Université Laval, Québec, Canada; ³Laboratoire de Physique de la Matière Condensée, Ecole Polytechnique/CNRS, Palaiseau, France

THURSDAY JUNE 9 MORNING

Room: ASSISI B

Session B-4 - Thin Films and Micro Nano-systems

Chair: Kari ULLAKKO, Finland

- 9.30 **B-4:IL07 Nucleation and Growth of Martensite by In-situ Experiments**

R. NIEMANN^{1,2}, A. DIESTEL¹, B. SCHLEICHER^{1,2}, S. KAUFFMANN-WEISS^{1*}, C. BEHLER^{1,2}, A. BACKEN^{1**}, U.K. RÖSSLER¹, H. SEINER³, O. HECKKO⁴, S. HAHN⁵, M.F.-X. WAGNER⁵, L. SCHULTZ^{1,2}, S. FÄHLeR^{1,2}, ¹IFW Dresden, Dresden, Germany; ²Technische Universität Dresden, Dept. of Physics, Institute for Solid State Physics, Dresden, Germany; ³Institute of Thermomechanics, Academy of Sciences of Czech Republic, Prague, Czech Republic; ⁴Institute of Physics, Academy of Science of the Czech Republic, Prague, Czech Republic; ⁵Technische Universität Chemnitz, Institute of Materials Science and Engineering, Chemnitz, Germany; *now at KIT, Karlsruhe, Germany; **now at CNRS, Grenoble, France

- 10.00 **B-4:IL09 Recent Advances in Magnetic Shape Memory Thin Films**

S. FABBRICI, P. RANZIERI, M. CAMPANINI, L. NASI, F. CASOLI, E. BUFFAGNI, R. CABASSI, V. GRILLO, F. ALBERTINI, IMEM-CNR, Parma, Italy; C. MAGÉN, Instituto de Nanociencia de Aragón, Zaragoza, Spain; F. CELEGATO, G. BARRERA, P. TIBERTO, INRIM, Torino, Italy

10.30 Break

Session B-6 - Applications

Chair: Hideki HOSODA, Japan

- 11.00 **B-6:L01 Shape Memory Alloy Rods with Variable Flexural Stiffness for Spine Correction: Manufacturing, Modeling and Biomechanical Evaluation**

V. BRAILOVSKI, Y. FACCHINELLO, M. BRUMMUND, Y. PETIT, Ecole de Technologie Supérieure, Montreal, Quebec, Canada; J-M. MAC-THIONG, Department of Surgery, Faculty of Medicine, University of Montreal, Montreal, Quebec, Canada

- 11.20 **B-6:L02 A New Design of a Nitinol Ring-like Wire for Suturing in Deep Surgical Field**

A. NESPOLI¹, V. DALLOLIO², **E. VILLA**¹, F. PASSARETTI¹, ¹Consiglio Nazionale delle Ricerche, Istituto per l'Energetica e le Interfasi (CNR-IENI), Lecco, Italy; ²ProMev, Lecco, Italy

- 11.40 **B-6:L03 Manufacturing and Processing of New Ni-free SMA for Biomedical Implants**

S. DUBINSKIY¹, V. BRAILOVSKI², S. PROKOSHIN¹, K. INAEKYAN², YU. ZHUKOVA¹, V. SHEREMETYEV¹, A. KONOPATSKIY¹, ¹National University of Science and Technology "MISIS", Moscow, Russia; ²Ecole de Technologie Supérieure, Montreal, Quebec, Canada

THURSDAY JUNE 9 MORNING

Session C-7 - Devices and Applications

Room: SPOLETO A

Chair: Gopalan SRINIVASAN, USA

9.30 C-7:IL02 **Multiferroic and Magnetoelectric Nanocomposites for Data Processing**

W. KLEEMANN, H. WENDE, Universität Duisburg-Essen, Duisburg, Germany; P. BORISOV, West Virginia University, Morgantown, USA; C. SCHMITZ-ANTONIAK, FZ Jülich, Germany; L. HENRICH, University of Leeds, UK

10.00 C-7:L04 **Permanent Ferroelectric Retention in BiFeO₃ Mesocrystal**

YING-HUI HSIEH¹, FEI XUE², TIANNAN YANG², YEN-CHIN HUANG³, YI-CHUN CHEN³, CHUN-GANG DUAN⁴, LONG-QING CHEN², QING HE⁵, YING-HAO CHU^{1,6}, ¹Dept. of Materials Science and Engineering, National Chiao Tung University, Hsinchu, Taiwan; ²Dept. of Materials and Engineering, Pennsylvania State University, University Park, PA, USA; ³Dept. of Physics, National Cheng Kung University, Tainan, Taiwan; ⁴Key Lab of Polar Materials and Devices, Ministry of Education, East China Normal University, Shanghai, China; ⁵Dept. of Physics, Durham University, Durham, UK; ⁶Institute of Physics, Academia Sinica, Taipei, Taiwan

10.20 Break

10.50 C-7:IL06 **Voltage-controlled Exchange Bias in Lithographically Patterned Heterostructures**

C. BINEK, W. ECHTENKAMP, X. HE, M. STREET, A. MAHMOOD, J. WANG, K. BELASHCHENKO, P. DOWBEN, Department of Physics & Astronomy and Nebraska Center for Materials and Nanoscience, University of Nebraska-Lincoln, USA

11.20 C-7:IL07 **Multiferroic Technology for Advanced Magnetic Data Storage**

M.M. VOPSON, University of Portsmouth, Faculty of Science, SEES, Portsmouth, UK; S. LEPADATU, T. MERCER, University of Central Lancashire, School of Computing, Engineering and Physical Sciences, Preston, UK; M. SPREITZER, Institute Jožef Stefan, Ljubljana, Slovenia

THURSDAY JUNE 9 MORNING

Room: DERUTA

Session D-8 - Advances in Characterization Techniques; Light Management for Active Applications

Chair: Hisham MENKARA, USA

- 9.00 **D-8:L01 Energy Transfer Probing of Nd³⁺ Doped Fluorescent Nanoparticles as an Agent for Near IR Bioimaging**
Y. ORLOVSKII^{1,2}, A. VANETSEV¹, K. KALDVEE¹, E. SAMSONOVA¹, I. SILDOS¹, ¹Institute of Physics, University of Tartu, Tartu, Estonia; ²Prokhorov General Physics Institute RAS, Moscow
- 9.20 **D-8:IL02 Autocorrelation Analysis for the Unbiased Determination of Power-Law Exponents in Single-Quantum-Dot Blinking**
J. HOUEL, G. LEDOUX, D. AMANS, A. AUBRET, C. DUJARDIN, F. KULZER, Institut Lumière-Matière, CNRS UMR5306, Université Lyon 1, Université de Lyon, Villeurbanne CEDEX, France; Q.T. DOAN, T. CAJFINGER, A. DOMINJON, S. FERRIOL, R. BARBIER, Institut de Physique Nucléaire de Lyon, CNRS UMR5822, Université Lyon 1, Université de Lyon, Villeurbanne Cedex, France; M. NASIOWSKI, E. LHUIILLIER, B. DUBERTRET, ESPCI ParisTech, PSL Research University, CNRS, Sorbonnes Université, UPMC Paris VI, Paris, France
- 9.50 **D-8:IL03 Simultaneous Vibrational and Optical Spectroscopy for the Study of the Local Structure and Optical Properties of Luminescent Ions in Phosphors**
M. KARLSSON, Chalmers University of Technology, Goteborg, Sweden
- 10.20 **D-8:IL04 Photon Management with Luminescence Structures**
S. NORMANI, M. SALHI, A. BRAUD, J.L. DOUALAN, R. MONCORGÉ, G. BRASSE, **P. CAMY**, CIMAP, Caen, France
- 10.50 **D-8:L05 Synthesis and Luminescence Properties of Ce doped LiCaPO₄ Phosphor for Radiation Dosimetry**
S.K. OMANWAR, C.B. PALAN, N.S. BAJAJ, Department of Physics, Sant Gadge Baba Amravati University, Amravati, India
- 11.10 Break

Session D-9 - Methods to Integrate Luminescent Materials in a Device

Chair: Yurii ORLOVSKII, Russia

- 11.40 **D-9:IL01 Electrophoretic Deposition of Phosphors for Solid-state Lighting**
J.B. TALBOT, Dept. of NanoEngineering, University of California, San Diego, La Jolla, CA, USA
- 12.10 **D-9:IL03 Temperature Sensing via Downconversion Luminescence of Lanthanide Doped Metal Oxides**
M.D. DRAMICANIN, University of Belgrade, Vinča Institute of Nuclear Sciences, Belgrade, Serbia

THURSDAY JUNE 9 MORNING

Session E-7 - Acoustic and Mechanical Metamaterials

Room: CORCIANO

Chair: Natalia M. LITCHINITSER, USA

- 9.30 **E-7:L02 Direct Observation of Ultrasonic Cut-off Frequency for Holes with Pressure-release Walls**

T. GRAHAM, Department of Physics and Astronomy, University of Exeter, Exeter, UK

- 9.50 **E-7:L03 Nonlinear Vibration Damping in Mechanical/Electrical Periodic Structures Featuring Switched Piezoelectric Elements**

BIN BAO, M. LALLART, D. GUYOMAR, Laboratoire de Génie Electrique et Ferroélectricité, INSA de Lyon, Villeurbanne Cedex, France

- 10.10 **E-7:L04 Mechanical Metamaterials with Hierarchical Structure**

A. KRUSHYNSKA, M. MINIACI, F. BOSIA, Department of Physics, University of Torino, Torino, Italy; B. MORVAN, LOMC UMR CNRS 6294, Université du Havre, Le Havre, France; N.M. PUGNO, Laboratory of Bio-Inspired & Graphene Nanomechanics, Department of Civil, Environmental and Mechanical Engineering - University of Trento, Trento, Italy

- 10.30 *Break*

- 11.00 **E-7:IL05 Parity-time Synthetic Phononic Media**

J. CHRISTENSEN, M. WILLATZEN, DTU, Kgs. Lyngby, Denmark

- 11.30 **E-7:L06 Boundary Layer Effects on Acoustic Transmission Through Narrow Slit-cavities**

G.P. WARD, R.K. LOVELOCK, A.R.J. MURRAY, A.P. HIBBINS, J.R. SAMBLES, J.D. SMITH, Exeter University, Exeter, Devon, UK

THURSDAY JUNE 9 MORNING

Session F-6 - Application of Graphene and other 2D Layered Materials and Composites

Room: **ORVIETO**

Chair: **Philip KIM, USA**

- 9.30 F-6:KL Origin and Impact of Noise in Multifunctional 2D Electronics**

A. GHOSH, Department of Physics, Indian Institute of Science, Bangalore, India

- 10.10 F-6:IL01 Strong Light-matter Interactions at Graphene-heterostructures for Photonics and Photovoltaics**

CHUN-WEI CHEN¹, CHIA-CHUN CHEN², PO-HSUN HO¹,
¹Department of Materials Science and Engineering, National Taiwan University, Taipei, Taiwan; ²Department of Chemistry, National Taiwan Normal University, Taipei, Taiwan

THURSDAY JUNE 9 MORNING

Session G-4 - Processing, Characterization and Modeling of 1-D Nanostructure-polymer/metal/ceramics Composites

Room: SALA RELATORI

Chair: Yit-Tsong CHEN, Taiwan

- 9.30 G-4:L01 **Selective Lateral 1D Epitaxy: III-V Planar Nanowire Growth, Doping, and Transistors**

XIULING LI, Department of Electrical and Computer Engineering, Micro and Nanotechnology Laboratory, University of Illinois, Urbana, IL, USA

- 10.00 G-4:L02 **Observation of Metal to Insulator Transitions and Ferroelectric Domain Switching in Phase Change Materials Prior to Amorphization**

R. AGARWAL, Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, USA

- 10.30 Break

Chair: Paola PRETE, Italy

- 11.00 G-4:L04 **Biodegradable Inorganic Nano-architectures to avoid Accumulation in Excretory System Organs**

D. CASSANO^{1,2}, D. ROTA MARTIR¹, G. SIGNORE¹, V. PIAZZA¹, **V. VOLIANI**¹, ¹Center for Nanotechnology Innovation @NEST, Istituto Italiano di Tecnologia, Pisa, Italy; ²NEST-Scuola Normale Superiore, Pisa, Italy

- 11.20 G-4:L05 **Boron Nitride Nanotube: Synthesis, Functionalization, and Nanocomposites**

C.M. HOMENICK, Y. MARTINEZ-RUBI, K.S. KIM, M.B. JAKUBINEK, C.T. KINGSTON, B. SIMARD, Security and Disruptive Technologies Portfolio, National Research Council Canada, Ottawa, Canada; B. ASHRAFI, Aerospace Portfolio, National Research Council Canada, Montreal, Canada

- 11.40 G-4:L06 **Fabrication of Y₂Ti₂O₇/SiC Functionally Graded Materials by Magnetic Field Application**

S.T. NGUYEN, T. NAKAYAMA, H. SUEMATSU, T. SUZUKI, S. TANAKA, Y. NAGASAWA, K. NIIHARA, Nagaoka University of Technology, Nagaoka, Niigata, Japan

THURSDAY JUNE 9 MORNING

Room: SALA STAMPA

Session H-5 - Advances in SMPs

Chair: Gordon WALLACE, Australia

- 9.00 **H-5:L05 A Thermomechanical Constitutive Model for Shape Memory Polymer Composites**
HUIYU SUN, **JIANFENG GU**, State Key Laboratory of Mechanics and Control of Mechanical Structures, Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu, China
- 9.30 **H-5:L06 Stereolithography 3D Printing of Shape Memory Polymers**
M. LAYANI, M. ZAREK, D. COHN, S. MAGDASSI CASALI, Center for Applied Chemistry, Institute of Chemistry, The Hebrew University of Jerusalem, Jerusalem, Israel
- 9.50 **H-5:L07 Shape Memory Behavior in a Blend of Zinc-neutralized Carboxyl terminated Polybutadiene and Poly(styrene-co-4-vinylpyridine)**
FANG XIE¹, **F. A. WEISS²**, **JINSONG LENG³**, **YANJU LIU¹**, ¹Department of Astronautical Science and Mechanics, Harbin Institute of Technology, Harbin, China; ²Department of Polymer Engineering, The University of Akron, Akron, OH, USA; ³Center for Composite Materials and Structures, Harbin Institute of Technology, Harbin, China
- 10.10 **H-5:L08 Characterization for Carbon Fiber Reinforced Epoxy based Shape Memory Polymer Composite**
FENGFENG LI¹, **JIANGUO CHEN¹**, **LIWU LIU¹**, **YANJU LIU¹**, **JINSONG LENG²**, ¹Department of Astronautical Science and Mechanics, Harbin Institute of Technology (HIT); ²Centre for Composite Materials and Structures, Science Park of Harbin Institute of Technology (HIT), Harbin, P.R. China
- 10.30 **H-5:L09 From Programming Smart Materials to Growing Shapes**
S.K. SMOUKOV, Active and Intelligent Materials Lab, University of Cambridge, Cambridge, UK
- 11.00 Break

Session H-6 - Applications of SMPs and their Composites

Chair: Christopher N. BOWMAN, USA

- 11.20 **H-6:L01 Novel Behavior in Smart Polymeric Materials: Stress Memory and its Potential Applications**
JINLIAN HU, H. NARAYANA, Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong
- 11.50 **H-6:L02 Form-filling ADP/Chitosan/Ceramic (ACC) Sponge for Potential Use in Bone Defects**
K. JAHAN, M. MEKHAIL, M. TABRIZIAN, McGill University, Montreal, Quebec, Canada
- 12.10 **H-6:L05 Elastomers with High Elastic Energy Storage Capacity and Shape-actuating Ability**
M. ANTHAMATTEN, YUAN MENG, JISU JIANG, JEY-CHANG YANG, University of Rochester, Rochester, NY, USA

Session I-3 - Design Approaches for Advanced Applications

Room: ASSISI A

Chair: Gabriele CENTI, Italy

- 9.30 **I-3:L07 Bioinspired Photoelectrode Designs for Solar Fuel Generation**

K. RAJESHWAR, University of Texas, Dept of Chemistry & Biochemistry, Arlington, TX, USA

- 10.00 **I-3:L10 Superhydrophilic and Photocatalytic Active Ceramic Glazes for Sanitary Ware**

F. KNIES^{1,2}, K. SCHRANTZ¹, C. ANEZIRIS^{1,2}, **T. GRAULE**^{1,2}, ¹EMPA-Swiss Federal Labs for Materials Science and Technology, Laboratory for High Performance Ceramics, Duebendorf, Switzerland; ²TU Bergakademie Freiberg, Institute for Ceramics, Glass and Building Materials, Freiberg, Germany

- 10.20 *Break*

- 10.50 **I-3:L12 Mechanistic Studies of Charge Carriers in Materials for Artificial Photosynthesis**

A.J. COWAN, M. FORSTER, University of Liverpool, Department of Chemistry, Liverpool, UK

- 11.20 **I-3:L13 Artificial Photosynthesis Device Development for CO₂ Photocatalytic Conversion**

J.F. THOMPSON, BIN CHEN, J. MINUZZO, N. LONDONO, NASA Ames Research Centre, Mountain View, CA, USA; G. WHITING, Palo Alto Research Center (PARC)

- 11.40 **I-3:L14 Photocatalytic Ag/AgCl Polymer Composites**

E.W. TATE, J.H. JOHNSTON, School of Chemical and Physical Sciences, Victoria University of Wellington, Wellington, New Zealand

THURSDAY JUNE 9 MORNING

Room: MAGIONE A

Session K-1 - Resistance Switching Memories (ReRAM)

Chair: Antony KENYON, UK

- 9.00 **K-1:L18 Study of the Resistive Switching Effect using a Three Terminal Bipolar Device**
E. YALON, Technion, Israel Institute of Technology, Haifa, Israel, Current address: Stanford University, Stanford, CA, USA; **D. RITTER**, Technion, Israel Institute of Technology, Haifa, Israel
- 9.30 **K-1:L19 Understanding of the Combined Threshold and Memory-Type Resistive Switching Behavior in Pt/NbO_x/Ti/Pt Cells built from Amorphous Nb₂O₅ Films**
S. HOFFMANN-EIFERT¹, **C. FUNCK**^{1,2}, N. ASLAM¹, S. MENZEL¹, E. LINN², R. WASER^{1,2}, ¹Forschungszentrum Juelich, PGI-7, and JARA-FIT, Juelich, Germany; ²Institute of Materials in Electrical Engineering and Information Technology, RWTH Aachen University, Germany
- 9.50 **K-1:L20 Morphology-assisted Electrical Memory Performances of Well-defined Brush Polymers**
MOONHOR REE, SUNGJIN SONG, JINSEOK LEE, DONGWOO WI, YONGJIN KIM, HOYEOL LEE, BRIAN J. REE, POSTECH, Dept. of Chemistry, Div. of Advanced Materials Science, Pohang Accelerator Lab., and Polymer Research Institute Pohang, Rep.of Korea
- 10.20 Break

Session K-4 - Memristive Materials, Devices and Emerging Applications

Chair: Martin SALINGA, Germany

- 10.50 **K-4:L06 Learning Synapses and Neuromorphic Circuits using Oxide-based Resistive RAM**
D. IELMINI, DEIB, Politecnico di Milano, Italy
- 11.20 **K-4:L07 HfO₂-based Memristive Device for Neuromorphic Computation**
S. BRIVIO¹, E. COVI¹, M. FANCIULLI^{1,2}, S. SPIGA¹, ¹Laboratorio MDM, IMM-CNR, Agrate Brianza, Italy; ²Dipartimento di Scienza Dei Materiali, Università di Milano Bicocca, Milano, Italy
- 11.40 **K-4:L08 Synaptic Functionality of Nanoscale HfO₂ based Memristors in Crossbars**
Yu. MATVEYEV, R. KIRTAEV, A. FETISOVA, D. NEGROV, A. ZENKEVICH, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow Region, Russia
- 12.00 **K-4:L09 Emulation of Neural Dynamics with Memristive Devices**
M. ZIEGLER¹, M. HANSEN¹, M. IGNATOV¹, A. PETRARU¹, K. OCHS², H. KOHLSTEDT¹, ¹Nanoelektronik, Technische Fakultät, Christian-Albrechts-Universität zu Kiel, Kiel, Germany; ²Ruhr-Universität Bochum, Bochum, Germany
- 12.20 **K-4:L10 Bismuth Ferrite Thin Films with Mobile and Fixed Donors for Novel Memory Applications**
H. SCHMIDT¹, TIANGUI YOU¹, NAN DU¹, D. BÜRGER¹, I. SKORUPA^{1,2}, T. MIKOLAJICK³, O.G. SCHMIDT^{1,4}, ¹Material Systems for Nanoelectronics, TU Chemnitz, Germany; ²HZDR Innovation GmbH, Dresden, Germany; ³NaMLab gGmbH, Dresden, Germany; ⁴Institute for Integrative Nanosciences, IFW Dresden, Germany

Session L-4 - End Uses, Commercial and Applications

Room: **MONTEFALCO**

Chair: **Cosimo CARFAGNA, Italy**

- 9.30 **L-4:L01 Practical Application of Side Emitting Optical Fibres**
J. MILITKY, D. KREMENAKOVA, R. MISHRA, Textile Faculty, Dept. of Material Engineering, Liberec, Czech Republic
- 10.00 **L-4:L02 Investigation of the Wetting Behaviour of Nanofunctionalised Wool Fabrics**
M.J. COOK, J.H. JOHNSTON, School of Chemical and Physical Sciences, Victoria University of Wellington, Wellington, New Zealand
- 10.20 **L-4:L03 Composites based on Graphene Nanoplatelets in Screen-printable Textiles Electronics**
A. KURCZEWSKA, M. SŁOMA, Central Institute for Labour Protection-National Research Institute, Lodz, Poland
- 10.40 **L-4:L04 Color Tuning in Electroluminescent Textiles**
E. LEMPA, C. GRASSMANN, M. RABE, Niederrhein University of Applied Sciences, Research Institute for Textile and Clothing, Moenchengladbach, Germany; A. KITZIG, E. NAROSKA, Niederrhein University of Applied Sciences, Institute for Pattern Recognition, Krefeld, Germany
- 11.00 **L-4:L05 Design Proposal of Space Clothes that Supports Lives in the Future Space Tourism Era**
M. OHKUBO¹, M. YAMAMURA², J. KANEBAKO², L. ISHIGAMI², M. XUE¹, T. NOJIMA¹, S. YAMAGUCHI³, H. UCHIYAMA², N. YAMAZAKI^{2,4}, ¹University of Electro-Communications, Japan; ²Joshibi University of Art and Design, Japan; ³Filmmaker; ⁴Astronaut

THURSDAY JUNE 9 MORNING

Room: **BUSINESS**

Chair: Mark RZCHOWSKI, USA

Session M-5 - Radio Frequency MEMS

9.30 M-5:IL01 RF MEMS Applications to RF Tuneable Circuits

R. SORRENTINO, University of Perugia, Perugia, Italy; A. CAZZORLA, P. FARINELLI, L. PELLICCIA, RF Microtech s.r.l. Perugia, Italy

Session M-6 - Energy Harvesting and Power Supply MEMS

10.00 M-6:IL01 Single-use Paper Fuel Cells

N. SABATE, Institució Catalana de Recerca i Estudis Avançats (ICREA) and Institut de Microelectrònica de Barcelona (IMB-CNM-CSIC), Campus UAB, Bellaterra-Barcelona (Spain); J.P. ESQUIVEL, Department of Bioengineering, University of Washington, Seattle, WA, USA

10.30 M-6:IL02 Alternative Power Sources for Microdevices

P.D. MITCHESON, Imperial College London, London, UK

11.00 M-6:IL03 Comparison between MEMS and Meso Scale Piezoelectric Energy Harvesters

A.D.T. ELLIOTT, L.M. MILLER; E. HALVORSEN; P.K. WRIGHT; P.D. MITCHESON, Department of Electrical and Electronic Engineering, Imperial College London, London, UK; Alphabet Energy, Hayward, CA, USA; Buskerud and Vestfold University College, Drammen, Norway; University of California, Berkeley, CA, USA; Department of Electrical and Electronic Engineering, Imperial College London, London, UK

THURSDAY JUNE 9 MORNING

Room: NORCIA

Session N-3 - Wearable and Implantable Sensor Integration

Chair: David CUMMING, UK

- 9.00 **N-3:IL01 Smart Eyeglasses for Everyday Life**
O. AMFT, University of Passau, Passau, Germany
- 9.30 **N-3:IL02 Advances in Bioelectronics for Retinal Prostheses**
W. MOKWA, Institute of Materials in Electrical Engineering I, RWTH Aachen University, Aachen, Germany
- 10.00 **N-3:IL03 Implantable Brain Pressure Sensors: State-of-the-art**
S. LEONHARDT, Philips Chair or Medical Information Technology, RWTH Aachen University, Aachen, Germany
- 10.30 *Break*

Session N-5 - Materials Chemistry/Biology and Rapid Prototyping/3D Printing Additive Fabrication Technologies

Chair: Steffen LEONHARDT, Germany

- 11.00 **N-5:IL01 From Finger Prick Sampling to On-body and Ultimately Implantable Chem/Bio-sensors: The Key Role of Active Fluidics in Realising the Long-term Functional Platforms of the Future**
L. FLOREA, D. BRUEN, W. FRANCIS, A. DUNNE, S. COLEMAN, A. BENAZOUZ, **D. DIAMOND**, INSIGHT Centre for Data Analytics, National Centre for Sensor Research, Dublin City University, Dublin, Ireland
- 11.30 **N-5:IL02 Soft Composite Materials in Bioengineering for Hard Problems in Biomedicine**
JAE-WOONG JEONG, Department of Electrical, Computer, and Energy Engineering, University of Colorado, Boulder, CO, USA
- 12.00 **N-5:IL03 Multimaterial and Multiscale Biofabrication Process for the Future Development of Patient Specific Tissues**
G. VOZZI^{1,2}, F. MONTEMURRO², C. DE MARIA², ¹Dipartimento di Ingegneria dell'Informazione, University di Pisa, Pisa, Italy; ²Research Center "E. Piaggio", University of Pisa, Pisa, Italy

Session N-4 - Low Power Electronics, Energy Harvesting, Sensor Network Architecture

- 12.30 **N-4:IL01 Energy Harvesting for Wearable Sensors**
Z. LUO, J. SHI, **S.P. BEEBY**, Department of Electronics and Computer Science, University of Southampton, Southampton, UK

THURSDAY JUNE 9 MORNING

Special Session O-9/P-5

BIOMIMETIC DESIGN AND MOTION CONTROL IN AUTONOMOUS AND REMOTELY OPERATED UNDERWATER VEHICLES

Room: MAGIONE B

Chair: Cecilia LASCHI, Italy (Programme Chair)

9.25 Welcome

- 9.30 O-9/P-5:IL02 Robotic Fish Development for the Next Generation Underwater Vehicle**
IKUO YAMAMOTO, Nagasaki University, Graduate School of Engineering, Nagasaki, Japan

- 10.00 O-9/P-5:IL07 An Octopus-inspired Robot**
M. CIANCHETTI, C. LASCHI, The BioRobotics Institute, Scuola Superiore Sant'Anna, Pisa, Italy

- 10.30 O-9/P-5:IL08 Bionic Sonar Structure and Skin Material inspired by Dolphins**
QIJUN LIU, ZHIMING LIU, JIE YU, ZIXUAN ZHANG, **WENJIAN WU**, National University of Defense Technology, Changsha, Hunan, China

11.00 Break

- 11.30 O-9/P-5:IL10 Inspired by Fish: Evolving, Building, and Controlling Flapping Flexible Propulsive Structures for Aquatic Robots**
J.H. LONG Jr., Vassar College, Poughkeepsie, New York, USA

- 12.00 O-9/P-5:IL11 Propulsive Performance of Dolphin Based on Numerical Simulation of Standing Swimming**
K. ISOGAI, Kyushu University, Fukuoka, Japan

Session P-3 - Smart Structures and Integrated Systems

Room: **SPOLETO B**

Chair: Hui LI, China

- 9.30 P-3:IL14 Piezoelectrically Actuated Bimorph Deformable Mirrors for Adaptive Optics**

A. PREUMONT, D. ALALUF, Université Libre de Bruxelles, ULB, Brussels, Belgium

- 10.00 P-3:IL11 On-line Monitoring of High Speed Rail Systems**

YI-QING NI, Hong Kong Branch of National Rail Transit Electrification and Automation Engineering Technology Research Center, Hong Kong; Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

- 10.30 P-3:IL12 Adapting Fault-tolerant Control to Integration**

J. RODELLAR, Ch. TUTIVEN, Y. VIDAL, L. ACHO, Universitat Politècnica de Catalunya, Department of Mathematics, Barcelona College of Industrial Engineering, Control Dynamics and Applications Research Group (CoDAlab), Barcelona, Spain

11.00 Break

Chair: Piervincenzo RIZZO, USA

- 11.30 P-3:L16 Data Evaluation in Smart Sensor Networks using Inverse Methods and Artificial Intelligence (AI): Towards Real-time Capability and Enhanced Flexibility**

S. BOSSE, Department of Mathematics and Computer Science, University of Bremen, Bremen, Germany; A. LECHLEITER, Center for Industrial Mathematics (ZeTeM), University of Bremen, Bremen, Germany; **D. LEHMHUS**, ISIS Sensorial Materials Scientific Centre, University of Bremen, Bremen, Germany

- 11.50 P-3:L17 Integrated Sensing, Monitoring and Healing of Composite Systems**

O.S. KUPONU, V. KADIRKAMANATHAN, The University of Sheffield, Sheffield, UK; B. BHATTACHARYA, Indian Institute of Technology Kanpur, Kanpur, India; S.A. POPE, The University of Sheffield, Sheffield, UK

- 12.10 P-3:L18 Controllable Truss-frame Nodes in Semi-active Damping of Vibrations**

B. POPLAWSKI, C. GRACZYKOWSKI, L. JANKOWSKI, Institute of Fundamental Technological Research (IPPT PAN), Warsaw, Poland

THURSDAY JUNE 9 MORNING

Room: AUDITORIUM

Focused Session Q-5

Biomedical Applications of Carbon Nanotubes and Graphene: Opportunities and Challenges

Chair: Maurizio PRATO, Italy

- 9.30 Q-5:IL13 **Fate of Functionalized Carbon Nanotubes In the Brain: From the in Vitro Interactions to the in Vivo Response**
C. BUSSY, Centre for Tissue Injury and Repair, Faculty of Biology, Medicine and Health & National Graphene Institute, University of Manchester, Manchester, UK
- 10.00 Q-5:IL15 **Risk of Altered Respiratory Immunity Associated with Exposure to Carbonaceous Nanomaterials**
A.A. SHVEDOVA, CDC/NIOSH and Dept. Physiology & Pharmacology, WVU, Morgantown, WV, USA; V.E. KAGAN, University of Pittsburgh, Pittsburgh, PA, USA

10.30 Break

Session Q-4 - Nanomaterials Systems for Bio-imaging and Therapy

Chair: Jonathan F. LOVELL, USA

- 11.00 Q-4:IL04 **15 Years of Commercializing Nanomedicine into Real Medical Products**
T.J. WEBSTER, Department of Chemical Engineering, Northeastern University, Boston, MA, USA, and Center of Excellence for Advanced Materials Research, King Abdulaziz University, Jeddah, Saudi Arabia
- 11.30 Q-4:IL05 **Dendrimer-nanoparticle Conjugates as Efficient Tools for in Vivo Cancer Targeting**
S. BEGIN-COLIN, D. FEIDER-FLESCH, Institut de Physique et Chimie des Matériaux de Strasbourg, IPCMS UMR CNRS-UdS-ECPM 7504, Strasbourg cedex, France
- 12.00 Q-4:L07 **Functional Nanoparticles for Tumor Imaging**
MINGYUAN GAO, Institute of Chemistry, Chinese Academy of Sciences, Beijing, China
- 12.20 Q-4:L08 **Fluorescent Nanoparticles of Silicon and Carbon for Breast Cancer Imaging**
J.S. KANATHASAN, **V. SWAMY**, U.D. PALANISAMY, Monash University Malaysia, Bandar Sunway, Selangor, Malaysia; A.K. RADHAKRISHNAN, International Medical University, Bukit Jalil, Kuala Lumpur, Malaysia

Session A-6 - Multifunctional Polymer Systems for Energy Storage and Flexible Electronics

Room: SPELLO

Chair: Andreas LENDLEIN, Germany

14.30 A-6:IL01 Carbon Nanotube Fibre Microelectrodes

P. POULIN, Centre de Recherche Paul Pascal - CNRS Université de Bordeaux, Pessac, France

15.00 A-6:IL03 Soft Matter Containing Ionic Liquid as Solvent

MASAYOSHI WATANABE, Yokohama National University Yokohama, Japan

15.30 A-6:L04 Electroactive Polymer Based Conducting, Magnetic, and Luminescent Triple Composites

A.V. KUKHTA, A.G. PADDUBSKAYA, P.P. KUZHIR, S.A. MAKSIMENKO, Research Institute for Nuclear Problems, Belarusian State University, Minsk, Belarus; S.A. VOROBYOVA, Research Institute for Physical and Chemical Problems, Belarusian State University, Minsk, Belarus; S. BELLUCCI, National Institute of Nuclear Physics, Frascati National Laboratory, Frascati, Italy; P.K. KHANNA, Defense Institute of Advanced Technology, Deemed University, Pune, India

THURSDAY JUNE 9 AFTERNOON

Session B-6 - Applications

Room: ASSISI B

Chair: Franca ALBERTINI, Italy

- 15.00 **B-6:IL05 Advances in Single Crystal Technology of Magnetic Shape Memory Materials**
E. PAGOUNIS, ETO MAGNETIC GmbH, Stockach, Germany
- 15.30 **B-6:IL06 A Magnetic Shape Memory Micropump and Other Applications**
K. ULLAKKO, A. SAREN, D. MUSIIENKO, A. SOZINOV, J. TELLINEN, Lappeenranta University of Technology, Material Physics Laboratory, Savonlinna, Finland

Session D-10 - Medical Applications and Bioimaging

Room: **DERUTA**

Chair: **Marta CERRUTI**, Canada

15.00 D-10:IL02 Design, Functionalization and Use of Persistent Luminescence Nanocrystals

E. TESTON, T. MALDINEY, J. SEGUIN, N. MIGNET, D. SCHERMAN, **C. RICHARD**, Unité de Technologies Chimiques et Biologiques pour la Santé; UMR 8258 CNRS; U 1022 Inserm; Université Paris Descartes, Faculté des Sciences Pharmaceutiques et Biologiques, Paris, France; Chimie-ParisTech, Paris, France

15.30 D-10:IL04 Photoluminescent Color Center-based Lithium Fluoride Radiation Detectors for Proton Beam Diagnostics

M. PICCININI, A. AMPOLLINI, L. PICARDI, C. RONSIVALLE, M. VADRUCCI, F. BONFIGLI, S. LIBERA, E. NICHELATTI, M.A. VINCENTI, R.M. MONTEREALI, ENEA, C.R. Frascati, FSN-TECFIS, Frascati (RM), Italy

Session E-8 - Novel Concepts and Applications of Meta-surfaces and Metadevices

Room: **CORCIANO**

Chair: Mikhail LAPINE, Australia

- 14.30 E-8:IL01 Photonic Topological Insulators: Guiding Electromagnetic Waves Around Sharp Corners**

TZUHSUAN MA, KUEIFU LAI, G. SHVETS, University of Texas at Austin, Austin, TX, USA

- 15.00 E-8:IL03 Topological Notions and Pseudo-spin in Electromagnetic Waves**

W.-J. CHEN¹, M. XIAO¹, Z.-Q. ZHANG¹, J.-W. DONG², C.T. CHAN¹,
¹Department of Physics and the Institute for Advanced Study, The Hong Kong University of Science and Technology, Hong Kong, China; ²State Key Laboratory of Optoelectronic Materials and Technologies and School of Physics and Engineering, Sun Yat-Sen University, Guangzhou, China

- 15.30 E-8:L04 Metastructures for Passive Broadband Vibration Suppression and Energy Harvesting**

J.D. HOBECK, D.J. INMAN, University of Michigan, Department of Aerospace Engineering, Ann Arbor, MI, USA

Session F-6 - Application of Graphene and other 2D Layered Materials and Composites

Room: **ORVIETO**

Chair: **Swastik KAR, USA**

- 14.30 F-6:IL04 Graphene, 2D Crystals and Hybrid Heterostructures: The Road to Applications**
F. BONACCORSO, Istituto Italiano di Tecnologia, Graphene Labs, Genova, Italy
- 15.00 F-7:IL05 Highly Efficient Photocatalytic CO₂ Conversion to Selective Hydrocarbons using Graphene Oxides and Related 2D Hybrids**
LI-CHYONG CHEN, Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan; **KUEI-HSIEN CHEN**, Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan
- 15.30 F-6:IL06 The Route to the Silicene Field Effect Transistor**
A. MOLLE¹, E. CINQUANTA¹, C. GRAZIANETTI¹, L. TAO², D. AKINWANDE², ¹CNR-IMM, Laboratorio MDM, Agrate Brianza (MB), Italy; ²The University of Texas at Austin, TX, USA
- 16.00 F-6:IL07 Light Detection from Nanocrystal Sensitized Graphene Photodetectors at kHz Frequencies**
D. SPIRITO, S. KUDERA, R. KRAHNE, Istituto Italiano di Tecnologia, Nanochemistry department and Graphene Labs, Genoa, Italy; V. MISEIKIS, C. COLETTI, Istituto Italiano di Tecnologia, Center for Nanotechnology Innovation and Graphene Labs, Pisa, Italy; C. GIANSANTE, Center for Biomolecular Nanotechnologies @ UNILE, Istituto Italiano di Tecnologia and CNR NANOTEC-Istituto di Nanotecnologia, Lecce, Italy
- 16.20 F-6:IL09 Epitaxial Graphene on SiC as a Platform for Extremely Sensitive and Selective Gas Sensors**
J. ERIKSSON, C. STRANDQVIST, R. GUNNARSON, S. EKEROTH, U. HELMERSON, I.G. IVANOV, R. YAKIMOVA, A. LLOYD SPETZ, Linköping University, Linköping, Sweden; C. STRANDQVIST, Graphensic AB, Linköping, Sweden

THURSDAY JUNE 9 AFTERNOON

Session G-5 - 1-D Nanostructures-based Applications

Room: SALA RELATORI

Chair: Xiuling LI, USA

15.00 G-5:IL03 Artificial Photosynthesis on Metal-nitride Nanowire Arrays

ZETIAN MI, MD G. KIBRIA, B. ALOTAIBI, S. FAN, Y. WANG, S. VANKA, Department of Electrical and Computer Engineering, McGill University, Montreal, Quebec, Canada

15.30 G-5:IL05 Nanowire Field-effect Transistor-based Biosensors: A Tool for Life Science

YIT-SONG CHEN, Department of Chemistry, National Taiwan University, Taipei, Taiwan and Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan

Session K-4 - Memristive Materials, Devices and Emerging Applications

Room: **MAGIONE A**

Chair: Daniele IELMINI / Sabina SPIGA, Italy

- 14.30 **K-4:IL11 Phase Change Materials for Neuromorphic Computing**
M. SALINGA, RWTH Aachen University, Aachen, Germany
- 15.00 **K-4:IL12 Non-von Neumann Computing using Phase Change Devices**
A. SEBASTIAN, IBM Research - Zurich, Rüschlikon, Switzerland
- 15.30 **K-4:IL13 Artificial Synapses based on Ferroelectric Tunnel Junctions**
V. GARCIA¹, S. BOYN¹, G. LECERF², B. XU³, S. FUSIL¹, L. BELLAICHE³, M. BIBES¹, A. BARTHÉLÉMY¹, S. SAÏGHI², J. GROLLIER¹, ¹Unité Mixte de Physique, CNRS, Thales, Univ. Paris-Sud, Université Paris-Saclay, Palaiseau, France; ²Univ. Bordeaux, IMS, UMR 5218, Talence, France; ³Department of Physics and Institute for Nanoscience and Engineering, University of Arkansas, Fayetteville, Arkansas, USA
- 16.00 **K-4:IL14 Ferroelectric Memristors for Neural Network Applications**
Y. NISHITANI, Y. KANEKO, M. UEDA, Panasonic Corporation, Seika, Kyoto, Japan

THURSDAY JUNE 9 AFTERNOON

Session L-4 - End Uses, Commercial and Applications

Room: MONTEFALCO

Chair: George K. STYLIOS, UK

- 15.00 **L-4:L07 Electrospun Drug-loaded Textiles for Biomedical and Healthcare Applications**

I. BONADIES, Institute for Polymers, Composites and Biomaterials (IPCB), CNR, Pozzuoli (Na), Italy

- 15.30 **L-4:L08 Electroluminescent Textile for Therapeutic Applications**

C. GRASSMANN, E. LEMPA, M. RABE, Niederrhein University of Applied Sciences, Research Institute for Textile and Clothing, Moenchengladbach, Germany; A. KITZIG, E. NAROSKA, Niederrhein University of Applied Sciences, Institute for Pattern Recognition, Krefeld, Germany; B. NEUKIRCH, Niederrhein University of Applied Sciences, Faculty of Health Care, Krefeld, Germany

THURSDAY JUNE 9 AFTERNOON

Room: **BUSINESS**

Chair: Leandro LORENZELLI, Italy

Session M-7 - Micro(nano)fluidics and Lab on Chip; Bio-MEMS/NEMS

- 14.30 **M-7:IL02 Soft-interface Design for Highly Sensitive Biosensor**
MADOKA TAKAI, The University of Tokyo, Tokyo, Japan
- 15.00 **M-7:L04 Gas Supply through Agarose Walls in Cell Culturing Microchips**
F. BUNGE, S. VAN DEN DRIESCHE, M.J. VELLEKOOP, Institute of Microsensors, -actuators and –systems (IMSAS), MCB, University of Bremen, Germany

Session M-8 - Flexible Sensors Technology

- 15.20 **M-8:IL02 Flexible Solution-processed Photodetectors and their Use in X-ray Medical Imagers'**
A. KUMAR¹, D. MOET¹, J.-L. VAN DER STEEN¹, **A. VAN BREEMEN¹**, S. SHANMUGAM¹, J. GILOT¹, R. ANDRIESSSEN¹, M. SIMON², W. RÜTTEN², A. DOUGLAS², R. RAAIJMAKERS³, P.E. MALINOWSKI⁴, K. MYNY⁴, **G.H. GELINCK^{1,5}**, ¹Holst Centre/TNO, Eindhoven, The Netherlands; ²Philips Research, Eindhoven, The Netherlands; ³Philips Healthcare, Best, The Netherlands; ⁴Department of Large Area Electronics, imec vzw, Leuven, Belgium; ⁵Applied Physics Department, TU Eindhoven, Eindhoven, The Netherlands

Session N-6 - Applications in Healthcare and Personal Health Monitoring

Room: NORCIA

Chair: Dermot DIAMOND, Ireland

- 14.30 **N-6:IL01 The Role of Wearable Monitor for Healthcare**
TOSHIYO TAMURA, Waseda University, Tokyo, Japan
- 15.00 **N-6:LO2 Monitoring of Firefighter's Physiological Parameters by using Advanced Wired Textiles**
G. TARTARE, H.N.M. NGO, L. KOEHL, X. ZENG, GEMTEX, Roubaix, France
- 15.20 **N-6:LO3 Simplified 3d Mapping System for Biofied Building using Microsoft Kinect V2 mounted on a Mobile Robot following People**
M. DESTRAC, A. MITA, Department of System Design Engineering, Keio University, Yokohama, Japan
- 15.40 **N-6:LO5 Extraction of Stair Walking Parameters in Living Space by using Kinect v2**
AMI OGAWA, A. YOROZU, A. MITA, M. TAKAHASHI, Graduate School of Science and Technology, Keio University, Kanagawa, Japan; T. BOCK, Chair of Building Realization and Robotics, Technical University of Munich, Germany
- 16.00 **N-6:IL06 Smart Wearable Systems for Enhanced Monitoring and Mobility**
R.A. SHOURISHI, New York Institute of Technology, New York, USA; J.-R. RIZZO, T.E. HUDSON, Department of Physical Medicine & Rehabilitation; and Department of Neurology, NYU School of Medicine, New York, NY, USA; Tactile Navigation Tools, LLC, New York, NY, USA

THURSDAY JUNE 9 AFTERNOON

Room: **MAGIONE B**

Chair: Julian VINCENT, UK

Session O-2 - Bio-inspired and Bio-enabled Materials and Manufacturing

- 15.00 **O-2:IL03 UV-absorbing Materials based on Natural Marine Sunscreens and Biopolymers**

S.C.M. FERNANDES¹, V. BULONE^{1,2}, ¹Division of Glycoscience, School of Biotechnology, Royal Institute of Technology (KTH), AlbaNova University Center, Stockholm, Sweden; ²ARC Centre of Excellence in Plant Cell Walls, School of Agriculture, Food and Wine, University of Adelaide, Waite Campus, South Australia, Australia

Session O-8 - Ongoing and Perspective Applications of Bio-inspired Technologies

- 15.30 **O-8:IL01 Discovery of New peptide Polymers that Display Aqueous Phase Behavior**

A. CHILKOTI, Department of Biomedical Engineering, Duke University, Durham NC, USA

Session P-7 - Security Devices

Room: **SPOLETO B**

Chair: Clemente FUGGINI / Luca VITTUARI, Italy

- 14.30 **P-7:L01 SPARTACUS: Enabling Space Technologies in Security Research**
C. FUGGINI, I. TESFAI, D'Apollonia, Milan, Italy
- 14.50 **P-7:L02 SPARTACUS: Positioning Units for Critical Asset Tracking and Emergency Management**
L. VITTUARI, B. PAVKOVIC, A. GUINAMARD, F. CASCIATI, M. ZANZI, A. GHETTI, L. BERBAKOV, M. VECE, University of Bologna, Bologna, Italy
- 15.10 **P-7:L03 Satellite and Inertial Navigation Solution in Crises Management Operation for First Responders Applications**
A. GHETTI, L. VITTUARI, M. ZANZI, University of Bologna, Bologna, Italy
- 15.30 **P-7:L04 Satellite and Inertial Navigation Solution in Crises Management Operation for Transport and Relief Goods Applications**
F. CASCIATI, S. CASCIATI, L. FARAVELLI, M. VECE, UNIVERSITY OF PAVIA, PAVIA, ITALY

15.50 *Break*

Session P-4 - Ongoing and Perspective Applications

Chair: Fu-Kuo CHANG, USA

- 16.20 **P-4:IL04 New Directions of Health Monitoring for Building Structures**
AKIRA NISHITANI, PING XIANG, SHOHEI MARUTANI, Waseda University, Tokyo, Japan; TOMOHIKO HATADA, RYUUTA KATAMURA, Kajima Corporation, Japan
- 16.50 **P-4:IL06 Adaptive Self-protection against Shock and Vibrations**
L. JANKOWSKI, C. GRACZYKOWSKI, P. PAWLOWSKI, G. MIKULOWSKI, B. POPLAWSKI, R. FARAJ, J. HOLNICKI-SZULC, Institute of Fundamental Technological Research (IPPT PAN), Warsaw, Poland

Session Q-4 - Nanomaterials Systems for Bio-imaging and Therapy

Room: **AUDITORIUM**

Chair: Thomas WEBSTER, USA

- 14.30 Q-4:L10 **Design of Functionalized Iron Oxide Nanoparticles for Theranostics**
D. FELDER-FLESCH, D. MERTZ, **S. BEGIN**, IPCMS UMR CNRS Unistra 7504, Strasbourg Cedex, France
- 15.00 Q-4:L11 **3D Chiral Nanostructure for High-sensitivity Molecular Imaging with Optical Coherence Tomography**
NANGUANG CHEN, KALPESH MEHTA, PENGFEI ZHANG, Department of Biomedical Engineering, National University of Singapore, Singapore
- 15.30 Q-4:L15 **Relaxor Single-crystal Plates with Nano Size Ferroelectric Domains Applied to Ultrasonic Probe for Medical Uses**
TOSHIO OGAWA, TAIKI IKEGAYA, Department of Electrical and Electronic Engineering, Shizuoka Institute of Science and Technology, Fukuroi, Japan
- 15.50 Q-4:L13 **Ultrasensitive in Vivo Detection of Primary Gastric Tumor and Lymphatic Metastasis Using Upconversion Nanoparticles**
R.R. QIAO¹, C.H. LIU², K.C. WU², M.Y. GAO¹, ¹INSTITUTE OF CHEMISTRY, THE CHINESE ACADEMY OF Sciences, Beijing, China; ²State Key Laboratory of Cancer Biology, Xijing Hospital of Digestive Diseases, Fourth Military Medical University, Xi'an, China
- 16.10 Q-4:L14 **A Protease-activated Ratiometric Fluorescent Probe for pH-mapping of Malignant Tumor**
YI HOU¹, J. ZHOU¹, ZHENYU GAO², X.Y. SUN¹, C.Y. LIU¹, D.H. SHANGGUAN¹, W.S. YANG², M.Y. GAO¹, ¹Institute of Chemistry, the Chinese Academy of Sciences, Zhong Guan Cun, Beijing, China, ²College of Chemistry, Jilin University, Changchun, China

POSTER PRESENTATIONS

POSTER DISCUSSION

THURSDAY JUNE 9: 16.00 - 18.00

Posters desmounting:

(Soon after the poster discussion)

SYMPORIUM A

STIMULI RESPONSIVE AND MULTIFUNCTIONAL POLYMERS: PROGRESS IN MATERIALS AND APPLICATIONS

A:P02 The Reversible Shape-memory Behavior of Crosslinked Poly(ϵ -caprolactone) under Stress and Stress-free Conditions

O. DOLYNCHUK, Leibniz-Institut für Polymerforschung Dresden e.V., Dresden, Germany; I. KOLESOV, Martin Luther University Halle-Wittenberg, Center of Engineering Sciences, Hale (Saale), Germany, Polymer Service GmbH Merseburg, Merseburg, Germany; D. JEHNICHEN, Leibniz-Institut für Polymerforschung Dresden e.V., Dresden, Germany; H.-J. RADUSCH, Polymer Service GmbH Merseburg, Merseburg, Germany

A:P05 Nanocomposites Spray Quantum Resistive Sensors (sQRS) for Structural Health Monitoring of Composite Wind Blades

A. LEMARTINEL, M. CASTRO, J.F. FELLER, Smart Plastics Group, Université Européenne de Bretagne (UEB), LIMATB-UBS, Lorient, France; J. DE LUCA, Institut de Recherche Technologique Jules Verne, Bouguenais, France

A:P09 Flexible Strain Sensors with Stretchable Electrodes

TAKAHIRO KONDO, M. SATO, H. OKUZAKI, University of Yamanashi, Kofu, Yamanashi, Japan

A:P10 Nanocomposites of Aged Pseudoboehmite with Nylon 6,12

A.L. NASCIMENTO, A.H. MUNHOZ JR., C. DENUZZO, G.C. GOMES, L.F. MIRANDA, M.V. ROSSI, University Presbyterian Mackenzie, São Paulo, SP, Brazil

A:P12 Influence of Concentration of the Nanofiller Pseudoboehmite in Thermal and Mechanical Properties in Polystyrene Compounds

L.F. DE MIRANDA, A.H. MUNHOZ Jr., T.J. MASSON, M.V. ROSSI, Universidade Presbiteriana Mackenzie, São Paulo, Brazil

A:P13 Effect of Al₂O₃ Nano Filler on Conductivity and Optical Properties of PEI-Based Composite Polymer Electrolytes for Electrochromic Windows

O. SAKARYA¹, S. KURAMA², G. GUNKAYA³, ¹Anadolu University, Faculty of Engineering, Dept. of Materials Science and Engineering, Eskisehir, Turkey; ²Anadolu University, Faculty of Aeronautics and Astronautics, Eskisehir, Turkey; ³Anadolu University, Faculty of Fine Arts, Dept. of Ceramic and Glass, Eskisehir, Turkey

A:P19 Site-specific Photo-rewritable Surfaces

LEI LI, X. DU, W.Q. FENG, P.A. LEVKIN, Institute of Toxicology and Genetics, Karlsruhe Institute of Technology, Karlsruhe, Germany

A:P20 All-organic Supercapacitors Using PEDOT/PSS Flexible Electrodes

HARUKI SAITO, H. TAKEZAWA, H. OKUZAKI, University of Yamanashi, Kofu, Yamanashi, Japan

A:P23 Fabrication and Properties of Naproxen Transdermal Patches Using Deproteinized Natural Rubber for Electric Field Controlled Drug Delivery

R. KAEWCHINGDUANG, A. SIRIVAT, The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok, Thailand

A:HP26 Emerging π -conjugated Stretched and Contracted Helices and their Stimuli Induced Mutual Conversions of Substituted Polyacetylenes Prepared using an Organo-rhodium Catalyst

MASAYOSHI TABATA, YASUTERU MAWATARI, Center of Environmental Science and Disaster Mitigation for Advanced Research, Muroran Institute of Technology, Muroran, Hokkaido, Japan; Faculty of Science and Technology, Department of Applied Chemistry and Bioscience, Chitose Institute of Science and Technology, Chitose, Hokkaido, Japan

A:HP27 Patterning Wrinkles by Shape Memory Polymer

JING ZHONG, School of Civil Engineering, Harbin Institute of Technology, Harbin, P.R. China

SYMPOSIUM B

STATE-OF-THE-ART RESEARCH AND APPLICATIONS OF SHAPE MEMORY ALLOYS

B:P01 Experimental Study and Modeling of Pseudoelastic Systems for the Design of a Complex Passive Damper

A. NESPOLI¹, **D. RIGAMONTI**², M. RIVA³, E. VILLA¹, F. PASSARETTI¹, ¹Consiglio Nazionale delle Ricerche - Istituto per l'Energetica e le Interfasi (CNR-IENI) Unità di Lecco, Lecco, Italy; ²Politecnico di Milano, Italy; ³INAF, Osservatorio di Merate, Lecco, Italy

B:P02 Mechanical and Superelastic Properties of Au-51Ti-18Co Biomedical Shape Memory Alloy Heat-treated at 1173K to 1373K

T. BUASRI, H. SHIM, M. TAHARA, T. INAMURA, K. GOTO, H. HOSODA, Tokyo Institute of Technology, Yokohama, Kanagawa, Japan; H. KANETAKA, Tohoku University, Sendai, Miyagi, Japan; Y. YAMABE-MITARAI, National Institute for Materials Science, Tsukuba, Ibaraki, Japan

B:P03 Influence of Intermediate Layer Formation on Properties of Bimetallic Shape Memory Alloy Composites Produced by Explosion Welding

S. BELYAEV, N. RESNINA, E. DEMIDOV, I. LOMAKIN, O. MEDVEDEV, Saint Petersburg State University, Saint Petersburg Russia; V. RUBANIK, V. RUBANIK Jr., Institute of Technical Acoustics NAS of Belarus, Vitebsk, Belarus Vitebsk State Technological University, Vitebsk, Belarus

B:P05 On the Nanostructures Gradation in Thermomechanically Treated Ti-Ni SMA

S. PROKOSHIN¹, V. BRAILOVSKI², S. DUBINSKIY¹, K. INAEKYAN², A. KREITCBERG², ¹National University of Science and Technology "MISIS", Moscow, Russia; ²Ecole de Technologie Sup., Montreal, Quebec, Canada

B:P06 The Magnetic States of Co and Cr Ni-Co-Mn-In(Sn) Heusler Alloys

V. BUCHELNIKOV¹, V.V. SOKOLOVSKIY¹, P. ENTEL², ¹Chelyabinsk State University, Chelyabinsk, Russia; ²University of Duisburg-Essen, Duisburg, Germany

B:P08 Contributions to Transformation Entropy Change in Magnetic Shape Memory Alloys

C. SEGUI, E. CESARI, Dept. de Física, Universitat de les Illes Balears, Palma de Mallorca, Spain

B:P10 Calorimetric Study of Hysteresis Effects on the Magnetocaloric Effect in Ni-Co-Mn-Sn Alloys

B. EMRE¹, E. STERN-TAULATS², S. YUCE³, N. BRUNO⁴, A. PLANES², L. MAÑOSA², I. KARAMAN^{4,5}, ¹Ankara University, Faculty of Eng., Dept. of Eng. Phys., Ankara, Turkey; ²Dept. ECM. Fstat. Física. Universitat de Barcelona, Barcelona, Catalonia; ³Ondokuz Mayıs University, Faculty of Arts&Science, Dept. Phys., Samsun, Turkey; ⁴Dept. of Mechanical Engineering, Texas A&M University, College Station, TX, USA; ⁵Dept. of Materials Science and Engineering, Texas A&M University, College Station, TX, USA

B:P12 Design and Experimental Testing of a NiTi-based, High Frequency, Centripetal Multiple Actuator

E. BORLANDELLI, D. SCARSELLI, P. BETTINI, G. SALA, M. QUADRI, Politecnico di Milano, Milano, Italy; A. NESPOLI, D. RIGAMONTI, E. VILLA, CNR IENI, Lecco, Italy

B:P14 Mechanical Properties of Nanoceramic Zirconia Coatings on Superelastic NiTi Strips

N.I.A. LOPES, V.T.L. BUONO, UFMG, Belo Horizonte, MG, Brazil

B:P15 Application of TiNi Alloy Coils as a Filtration Rating Controller for Three Dimensional Filter Made of a Stainless Steel Wire

YOICHI KISHI, Z. YAJIMA, Advanced Materials Systems Research and Development Center, Kanazawa Institute of Technology, Hakusan, Ishikawa, Japan; C. SHIOMI, T. MATSUMOTO, T. OHIGASHI, Y.NISHIMOTO, Fuji Filter Manufacturing Co. Ltd., Tokyo, Japan

B:P17 Intelligent Shape Memory Device for Clipping Vessels

E.P. RYKLINA, A.V. KOROTITSKIY, I.YU. KHMELEVSKAYA, S.D. PROKOSHIN, National University of Science and Technology "MISIS", Moscow, Russia; M.V. SOUTORINE, A.N. CHERNOV, Globetek 2000 PTY LTD, Brighton, Victoria, Australia

SYMPORIUM C

RECENT ADVANCES IN MULTIFERROIC AND MAGNETOELECTRIC MATERIALS AND APPLICATIONS

C:P05 Technology and Properties of PMN-PT-ferrite Multiferroic Ceramic Composite Materials

R. SKULSKI, D. BOCHENEK, P. NIEMIEC, A. CHROBAK, University of Silesia, Faculty of Computer Science and Materials Science, Institute of Technology and Mechatronics, Sosnowiec, Poland

C:P08 Ferromagnetic and Ferroelectric Properties of Bi0.95La0.05Fe0.99Ti0.01O3 Nano Ceramics Sintered by the Two-step Method

Y.H. TIAN, Q.Y. FU, D.X. ZHOU, Z.P. ZHENG, W. LUO, YUNXIANG HU, School of optical and electronic information, Huazhong University of Science and Technology, Wuhan, China

C:P09 A Two-step Method Preparation of Core-shell CoFe2O4@BaTiO3 Multiferroic Composites

L. ZHOU, DONGXIANG ZHOU, Q.Y. FU, Y.X. HU, Z.P. ZHENG, School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan, PR China

C:P11 The Basic Properties of the Ferroelectromagnetic Composites Based on the Ferrite and PZT-type Powders

D. BOCHENEK, P. NIEMIEC, R. SKULSKI, University of Silesia, Faculty of Computer Science and Material Science, Institute of Technology and Mechatronics, Sosnowiec, Poland

C:P13 Effect of Complexing Agent Content on the Formation of Magnesium Ferrite Nanoparticles via Wet Chemical Method

L. SRISOMBAT, J. NONKUMWONG, S. ANANTA, Department of Chemistry, and Department of Physics and Materials Science, Faculty of Science, Chiang Mai University, Chiang Mai, Thailand

C:P14 Synthesis and Characterization of Soft Magnetic Nanocomposite in Fe₂O₃-Al System by Solid State Reaction

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C:P16 Electromagnetic Interference Shielding Response and Photocatalytic Activity of Polyaniline Coated Fe₃O₄@TiO₂ Core-shell Particles

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C:P17 Influence of Mg:Fe Ratio on Chemical Composition of MgFe₂O₄ Nanoparticles Synthesized by Hydrothermal Method

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C:P21 Enhanced Photon Absorption and Photocurrent Generation by Implementing a Hexagonal LuMnO₃-LuFeO₃ Multiferroic Bi-layer Structure

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C:HP22 Electromechanical Properties of Sr and Nb Co-doped Bi_{0.5}Na_{0.5}TiO₃-BaZrO₃ Ceramics

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SYMPOSIUM D

ADVANCES IN INORGANIC LUMINESCENT MATERIALS AND APPLICATIONS

D:P01 FRET between Inorganic Luminescent Quantum Dots and New Novel Organic Fluorescent Derivative

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D:P04 Optically Transparent Ceramics and Phase Relations in the La₂O₃-Y₂O₃-Ln₂O₃ Systems

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D:P06 Effect of Process Parameters on Luminescent Properties of Eu,Tb,Tm Codoped CaMoO₄ Thin Films

A.P.A. MARQUES, A.S.M. CHARALABOPOULOS, F.S. TAVARES, UNIFESP, Diadema, SP, Brasil; F. V. MOTTA, UFRN, Natal, RN, Brasil; M.S. LI, USP, São Carlos, SP, Brasil; E. LONGO, UFSCar, São Carlos, SP, Brasil

D:P08 Luminescent Fluorine Phosphate Glasses Doped with CdS CdSe, PbSe and PbS Molecular Clusters and Quantum Dots for Lighting and Solar Cells Converters

E. KOLOBKOVA, ZH. LIPATOVA, N. NIKONOROV, St. Petersburg, ITMO University, Saint-Petersburg, Russia

D:P21 Crystal Orientation and Grains Morphology in Polycrystalline YAP Ceramics

D. MICHALIK, T. PAWLIK, B. CHMIELA, Silesian University of Technology, Katowice, Poland

D:P26 Solid State Synthesis of SrSi₂O₂N₂:Eu²⁺ Powder in Flowing Nitrogen

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D:P29 Encapsulation of Oxynitride Phosphors into Sintered Na₂O-ZnO-B₂O₃-P₂O₅ Glass Body

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D:P31 Synthesis and Characterization of Lanthanide Metal-organic Frameworks with Perfluorinated Linkers

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D:P33 Synthesis and Characterization of PLD Glass Phosphate Films doped with CdS Powder

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D:P42 YAGG:Cr₃₊ as NIR Persistent Phosphor for In Vivo Imaging

O.Q. DE CLERCQ, J.H. BOUMAN, P.F. SMET, D. POELMAN, Lumilab, Ghent University, Ghent, Belgium; K. BRAECKMANS, Bio-Photonic Imaging Group, Ghent University, Ghent, Belgium

D:HP43 Cd-free Quantum Dot Dispersion in Polymer and their Film Molds

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D:HP44 Study of Crystallization of Tm₂Ti₂O₇ Powder under Non-isothermal Conditions

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D:HP45 Effect of a Confined Environment on the YAG Nanopowder Features

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D:HP46 Luminescence Properties of Ytterbium Activated PLZT Ceramics

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D:HP47 Characterization of Lead Lanthanum Zirconate Titanate Ceramics Co-doped with Lanthanide Ions

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SYMPORIUM E

PROGRESS IN METAMATERIALS RESEARCH

E:P02 Group Velocity Anomaly Modes in Hybrid Bands in Photonic Crystals made of Ferroelectrics

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E:P03 Microwave Surface Waves on Graphene-like Metasurfaces

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SYMPORIUM F

GRAPHENE AND OTHER EMERGING 2D-LAYERED NANOMATERIALS: SYNTHESIS, PROPERTIES AND POTENTIAL APPLICATIONS

F:P02 Electromagnetic Properties in Multilayer Graphene within the Ritus Formalism: Transverse Electrical Conductivity

G. MURGUIA-ROMERO, A. SÁNCHEZ, R. ZAVALETA-MADRID, Facultad de Ciencias, Universidad Nacional Autónoma de México, Distrito Federal, México

F:P03 Nanolayer Graphene Synthesis by Carbon Ion Implantation

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F:P05 Maximizing the Potential of Layered Compounds for Hydrogen Production

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F:P10 Interfacial Engineering for Enhancement of Electrical Characteristics in MoS₂ Field-effect Transistors

DONGRI QIU, EUN KYU KIM, Quantum-Function Research Laboratory and Department of Physics, Hanyang University, Seoul, Korea

F:P12 Nanoperforated Graphenes for Energy Storage Applications

HYUN KYUNG KIM, SEOK WOO LEE, YEON JUN CHOI, KWANG BUM KIM, Department of Material Science and Engineering, Yonsei University, Seoul, Republic of Korea

F:P13 Aerogels Based on Microwave Plasma Torch Synthesized Graphene

F.R. SULTANOV, Z.A. MANSUROV, Institute of Combustion Problems, Almaty, Kazakhstan; **S.C. CHANG, S. XING, F. ROBLES-HERNANDEZ, S.S. PEI**, Center for Advanced Materials University of Houston, Houston, TX, USA; **Y.W. CHI, K.P. HUANG**, Mechanical and Systems Research Laboratories, Industrial Technology Research Institute Chutung, Hsinchu, Taiwan, R.O.C.

F:HP14 Self-assembled α -Fe₂O₃ Mesocrystals/Graphene Nanohybrid for Enhanced Electrochemical Capacitor

LIAN GAO, XUEFENG SONG, PENG ZHANG, LIPING ZHAO, Shanghai Jiao Tong University, School of Material Science and Engineering, Shanghai, China

F:HP15 Hollow Carbon Based Anode Materials for High Performance Lithium Ion Batteries

XUEFENG SONG, ZHUANG SUN, PENG ZHANG, LIAN GAO, Shanghai Jiao Tong University, School of Material Science and Engineering, Shanghai, China

F:HP17 Self-standing Film of Porous Mo2C Nanostructures as Electrodes for Flexible Energy Storage Devices

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SYMPORIUM G

MULTIFUNCTIONAL INORGANIC ONE-DIMENSIONAL NANOSTRUCTURES: STATUS AND POTENTIAL

G:P01 Effect of Buffer Layer on Electrical and Optical Properties based on SnO₂/Ag/SnO₂ Multi Layer Film

JIN-GYUN KIM, **GUN-EIK JANG**, Department of Materials Engineering, Chungbuk National University, Cheongju, Korea

G:P02 Highly Flexible and Transparent Conductive Electrode based on Silver Nanowires

CHANG SU KIM, MYUNGKWAN SONG, DONG-HO KIM, Advanced Functional Thin Films Department, Korea Institute of Materials Science (KIMS), Changwon, Korea

SYMPORIUM H

ELECTROACTIVE POLYMERS AND SHAPE MEMORY POLYMERS: ADVANCES IN MATERIALS AND DEVICES

H:P01 Towards a New Class of Green Hibryd Ionic Polymer-polymer Metal Composites

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H:P03 Conducting Electroactive Polyaniline Thin Films applied as Conductometric pH Sensor

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H:P06 Electrically Responsive Material based on Poly(2-Chloroaniline) and Pectin Hydrogel as Actuator

W. KONKAEW, A. SIRIVAT, The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok, Thailand

H:P07 Efficient Linear Approach for the Closed-loop Control of a Ionic Polymer Bending Actuator

B. TONDU, A. SIMAITE, P. SOUERES, C. BERGAUD, Electrical Engineering Department, INSA, University of Toulouse and LAAS/CNRS, Toulouse, France

H:P10 Two-way Shape Memory Behaviour of Electrospun Non-woven Mats prepared from Sol-gel Crosslinked Poly(ϵ -caprolactone)

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H:P11 Deformation and Recovery Properties of Shape Memory Polymer Composites Tube

TIANZHEN LIU, LIWU LIU, YANJU LIU, JINSONG LENG, Department of Astronautical Science and Mechanics, Harbin Institute of Technology (HIT), Harbin, P.R. China

H:HP13 Shape-memory Polymers: 3D Constitutive Modeling and Simulation of Biomedical Devices

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SYMPOSIUM I

NEW CONCEPTS AND ADVANCES IN PHOTOCATALYTIC MATERIALS FOR ENERGY AND ENVIRONMENTAL APPLICATIONS

I:P04 Hybrid DFT Study of the Fe:NiOOH OER Catalyst and its Interface to BiVO₄

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I:P06 ZnO₂ Thin Films for Polymer Solar Cells

MYUNG-SEOK JEON, DO-HEYOUNG KIM, School of Chemical Engineering, Chonnam National University, GwangJu, Korea

I:P08 Grafting of TiO₂ on PMMA Film and Reusability in Photodegradation of Organic Dye under UV and Visible Light Irradiation

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I:HP10 Ni and Ni-M Nanoparticles Supported on Hierarchical Oxides for Methane Dry Reforming Catalysis

PENG ZHANG, LIAN GAO, QING ZHANG, XUEFENG SONG, School of Materials Science & Eng., Shanghai Jiao Tong University, Shanghai, China

I:HP11 Photocatalytic Semihydrogenation of Triple Bond of Organosilanes without Use of H₂

Y. KOJIMA, K. HASHIMOTO, H. KOMINAMI, A. TANAKA, Department of Applied Chemistry, Kindai University, Higashiosaka, Japan

I:HP12 Chemoselective and Diastereoselective Hydrogenation of Alkynes to Alkenes in an Alcoholic Suspension of a Cu-TiO₂ Photocatalyst without Use of Additives and Reducing Gas

H. KOMINAMI, M. HIGA, T. NOJIMA, T. ITO, K. NAKANISHI, K. HASHIMOTO, K. IMAMURA, Department of Applied Chemistry, Kindai University, Higashiosaka, Japan

I:HP13 Photocatalytic Chemoselective Reduction of Aromatic Aldehydes in an Ethanol Suspension of TiO₂

M. FUKUI, K. HASHIMOTO, A. TANAKA, H. KOMINAMI, Department of Applied Chemistry, Kindai University, Higashiosaka, Japan

I:HP14 Synthesis and Evaluation of Plasmonic Photocatalyst Working under Irradiation of Red Light

R. NISHIJIMA, A. TANAKA, K. HASHIMOTO, H. KOMINAMI, Department of Applied Chemistry, Kindai University, Higashiosaka, Japan

I:HP15 Decoration of Ultra-long Carbon Nanotubes with Cu₂O Nanocrystals: A Hybrid Platform for Enhanced Photoelectrochemical CO₂ Reduction

E. KECSENOVITY, B. ENDRODI, K. HERNADI, C. JANAKY, University of Szeged, Hungary; K. RAJESHWAR, University of Texas at Arlington, TX, USA

I:HP16 Solution Combustion Synthesis of Bi₂Ti₂O₇ and Parallel Bandgap Engineering through Foreign Ion Incorporation

G.F. SAMU, C. JANAKY, University of Szeged, Hungary; K. RAJESHWAR, University of Texas at Arlington, TX, USA

I:HP17 Solution Combustion Synthesis, Characterization, and Photoelectrochemistry of CuNb₂O₆ and ZnNb₂O₆ Nanoparticles

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SYMPOSIUM J

FUNCTIONAL NANOMATERIALS FOR NEW GENERATION SOLID STATE GAS SENSORS

J:P01 Study of Al-ZnO Thin Films Deposited by RF Magnetron Sputtering for Gas Sensor Application

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J:P02 Crystalline Size Dependent Effect on the Gas Sensing Properties of ZnO Films based on Quantum Dots

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SYMPOSIUM K

NON-VOLATILE MEMORY DEVICES: MATERIALS, EMERGING CONCEPTS AND APPLICATIONS

K:P02 Impact of Electrode and Oxide Thicknesses on the ReRAM Performance of Metal/TiO_x/Al₂O₃/Metal Nano Cross-point Structures with Oxides grown by Atomic Layer Deposition

HEHE ZHANG, A. HARDTDEGEN, S. HOFFMANN-EIFERT, Forschungszentrum Juelich, PGI-7, and JARA-FIT, Juelich, Germany

K:P03 Charge Transport and Characterization of Freestanding Ge₁Sb₂Te₄ Platelets integrated in Coplanar Strip Lines

M. MIKULICS¹, M. SCHUCK¹, P. JOST², R. ADAM³, S. RIESS¹, Y.C. ARANGO¹, H. LÜTH¹, D. GRÜTZMACHER¹, H. HARDTDEGEN¹, ¹Peter Grünberg Institute (PGI 9) and JARA – Fundamentals of Future Information Technology, Forschungszentrum Juelich GmbH, Germany; ²I. Physikalisches Institut (IA), RWTH Aachen University; ³Peter Grünberg Institute (PGI 6) and JARA - Fundamentals of Future Information Technology

~~CANCELLED~~
K:P05 Structural, Dielectric and Ferroelectric Behavior in Bi_{1-x}LaxFe_{1-y}Ni_yO₃ ($x = 0.0, 0.1$, $y = 0.0, 0.05$) Multiferroic Ceramics

A. KUMAR¹, P. SHARM², QI LI¹, D. VARSHNEY², ¹Department of Physics, Southeast University, Nanjing, P.R. China; ²School of Physics, Devi Ahilya University, Indore, India

K:P07 Improvement of FeRAM Capacitor Properties: Lead Excess Role and Two-step Crystallization Process

K. VOROTILOV, A. SIGOV, D. SEREGIN, MIREA, Moscow, Russia

K:HP11 Interfacial Phase-change Memory: Effects of Device Structure and Fabrication Conditions

K.V. MITROFANOV, Y. SAITO, N. MIYATA, P. FONS, A. V. KOLOBOV, J. TOMINAGA, Systematic Materials Design Group, Nanoelectronics Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan

K:HP12 Electrochemical Reaction induced Synaptic Plasticity in Solid State Electrochemical Cells

DASHAN SHANG, CHUANGSEN YANG, YISHENG CHAI, LIQIN YAN, BAOGEN SHEN, YOUNG SUN, Institute of Physics, Chinese Academy of Sciences, Beijing, China

K:HP13 In₃Sb₁Te₂ Phase-change Nanowires for Low Power Memory

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SYMPORIUM L

SMART AND INTERACTIVE TEXTILES

L:P04 Smart Fabric Design and Printing Platform

B. POPOV, T. TODOROV, V. MARINOV, S. STOYANOV, V. TODOROV, Grafixoft, Sofia, Bulgaria; R. TORAH, Y. WEI, N. GRABHAM, Y. LI, J. TUDOR, Department of Electronics and Computer Science, University of Southampton, Southampton, UK

SYMPORIUM M

NEXT GENERATION MICRO/NANO SYSTEMS

M:P02 A Wearable Swallowing Detecting Method based on Nanometer Materials Sensor

YI KANG, DONG-YI CHEN, M.L. XIA, SHI-JI HOU, Sichuan, China

M:P05 Sensor Sticker for Detection of Fungi Spore Contamination on Bananas

P. PAPIREDDY VINAYAKA, S. VAN DEN DRIESCHE, R. BLANK, M. KAHALI MOGHADDAM, W. LANG, M.J. VELLEKOOP, Institute for Microsensors, -actuators and -systems (IMSAS), University of Bremen, Bremen, Germany

M:P06 New Electrode Material: Boron-doped Diamond Compacts

YU.V. PLESKOV, M.D. KROTOVA, V.V. ELKIN, E.A. EKIMOV*, Frumkin Institute of Physical Chemistry and Electrochemistry, Russian Academy of Sciences, Moscow, Russia; *Institute for High Pressure Physics, Troitsk, Moscow, Russia

SYMPORIUM O

**MINING SMARTNESS FROM NATURE
FROM BIO-INSPIRED MATERIALS TO
BIONIC SYSTEMS**

O:P04 Catalyst Infiltration of SOFC Electrodes Assisted by a Bio-surfactant

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O:P05 A Two-dimensional Biomimetic Underwater Active Electro-location Position System based on FFT Feature Extraction Cross Localization Algorithm

JIEGANG PENG, School of Automation Engineering and Center for Robotics, University of Electronic Science and Technology of China, Chengdu, Sichuan, PR. China

O:HP06 Observation of Single-nanoparticle Dynamics based on Actively Controllable 2D Supported Lipid Bilayer Platforms

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Q - 11th International Conference

**MEDICAL APPLICATIONS OF NOVEL
BIOMATERIALS AND NANOTECHNOLOGY**

Q:P02 Preparation of Bone-hemostasis Materials with Sugar-containing Hydroxyapatite and Natural Plant-derived Polymer

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Q:P07 Functionalizing Surface Electrical Potential of Hydroxyapatite Coatings

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Q:P09 Sol-gel Synthesis of Biocompatible Glasses: A Study of Particle Growth Kinetics using Dynamic Light Scattering

R. BORGES, **J. MARCHI**, Federal University of ABC, Santo André, Brazil

Q:P21 Use of Nanodiamonds Platforms to Evaluate Gamma Irradiated Red Blood Cells

M. ACOSTA-ELIAS¹, A. ANGULO-MOLINA¹, A. SARABIA-SAINZ¹, E. SILVACAMPA¹, A. BURGARIA-ESTRELLA¹, B. CASTANEDA², K. SANTACRUZ-GOMEZ¹, R. MELENDREZ¹, M. BARBOZA-FLORES¹, D. SOTO-PUEBLA¹, S. ALVAREZ-GARCÍA¹, **M. PEDROZA-MONTERO¹**, ¹Departamento de Investigación en Física, Universidad de Sonora, México; ²Departamento de Física, Universidad de Sonora, México

Q:P23 Magnetic Properties and Relaxivities of Stabilized Colloidal Solutions of Mg-Zn Ferrite as Potential Contrasting Agents for Magnetic Resonance Imaging

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Q:HP24 Enhancing Neurogenesis and Angiogenesis with Target Delivery of Stromal Cell derived Factor-1a using a Dual Ionic pH-sensitive Copolymer

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Q:HP25 Hypoxia-sensitive Block Copolymer Micelles for Triggered Delivery of Doxorubicin

THAVASYAPPAN THAMBI, DOO SUNG LEE, School of Chemical Engineering, Theranostic Macromolecules Research Center, Sungkyunkwan University, Suwon, Rep.of Korea

Q:HP26 Poly(ethylene glycol)-poly(amino-carbonate-urethane) based pH-/temperature-sensitive, Biodegradable and Injectable Hydrogel for Protein Delivery

V.H. GIANG PHAN, DOO SUNG LEE, Theranostic Macromolecules Research Center, Department of Chemical Engineering, Sungkyunkwan University, Suwon, Rep.of Korea

Q:HP27 Sulfamethazine-based pH-sensitive Hydrogels with Potential Application for Transcatheter Arterial Chemoembolization Therapy

JAE SEUNG LYM, QUANG VINH NGUYENA, DA WOON AHN, CONG TRUC HUYNH, HWAN JUN JAE, YOUNG IL KIM, DOO SUNG LEE, Theranostic Macromolecules Research Center, Department of Chemical Engineering, Sungkyunkwan University, Suwon, Rep.of Korea

Q:HP28 pH-responsive Polymer/Gold Nanoparticle Composite for Theranostic Application

QUANG NAM BUI, YI LI, DOO SUNG LEE, Theranostic Macromolecules Research Center, Department of Chemical Engineering, Sungkyunkwan University, Suwon, Rep.of Korea

Q:HP29 Antibacterial Nanocoatings on Ocular Devices

F. BAINO, S. PERERO, M. MIOLA, M. FERRARIS, Applied Science and Technology Department, Politecnico di Torino, Torino, Italy

Q:HP30 Silver Nanoparticles Synthesized with Polyphenols from Cornus Sanguinea Extract. Study of their Biologic Effects

M. PERDE-SCHREPLER, M. POTARA, F. IMRE-LUCACI, L. DAVID, I. BRIE, L. OLENIC, Institute of Oncology "Prof. Dr. I. Chiricuta", Cluj-Napoca, Romania

Q:HP31 Towards New Hybrid Structures for Clinical Applications in Regenerative Medicine

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Q:HP32 Osteoregeneration by Supramolecular Sulfonated Polyrotaxane/BMP-2 Polyelectrolyte Complexes in Mouse Calvarial Defect Model

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Q:HP33 Ex Vivo Evaluation of a Chitosan-based Composite with Potential Use as Bone Adhesive

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Q-6:HP03 E-microscopy of Micro-structured Cell/Biosensor Interface

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Notes









Social Programme

Welcome Party Chiostro di Santa Giuliana

*Monday June 6
20.30 - 23.30*

The St' Giuliana Cloister (Chiostro di Santa Giuliana) is part of the monumental complex of St' Giuliana erected around the year 1253 and now the seat of the School for Foreign Languages of the Italian Army. The splendid cloister by architect Matteo Gattapone constitutes one of highest examples of "circestence" architecture in Italy and is characterized by wide white arches supported by octagonal pillars with pink and white stripes, also including some capitals remnants of previous Roman building.

At the Welcome Party delegates will enjoy a variety of renowned Umbria traditional dishes and drinks in an elegant and friendly environment.



Entrance ticket for non-registered companions: 30.00 EUR

Jazz Concert

"Teatro Morlacchi"

Wednesday June 8

21.30 - 23.00

The jazz concert will be performed by the "Perugia Big Band" in the magnificent Teatro Morlacchi of Perugia. The musical performances of "Perugia Big Band", inspired to the great America's orchestras, offer an extremely enthralling repertoire, ranging from sang jazz to sans vocal rhythmic jazz; from the unique Duke Ellington sound swing, to some of the most renowned hits by Frank Sinatra to the fine arrangements by Bob Minster going through some of the big orchestras milestones by Count Basie, Herbie Hancock, Don Menza&Buddy Rich, Horace Silver by GRP All Star, Gordon Goodwin.

Started at the beginning of the '80s, the "Perugia Big Band" numbers several hundreds performances in festivals, theaters and televisions in Italy and several European Countries.



Entrance ticket for non-registered companions: 20.00 EUR (subjected to place availability)

Conference Dinner

“Carapace”

*Thursday June 9
20.00 - 23.30*

The Closure Dinner of CIMTEC 2016 will take place in a truly unique wine cellar called “Carapace”, created by one of the great masters of contemporary art Arnaldo Pomodoro, in the Montefalco area of the famous Sagrantino wine. The “Carapace”, which challenges the confines between sculpture and architecture, is a unique work in which art and nature, sculpture and wine, come together to emphasize the importance of both the container and the contents.

Inaugurated in the year 2012 the “Carapace” appears as a large dome covered with copper, engraved with cracks that resemble the grooves of the land that embraces us. A sculptural element in the shape of a red arrow that pierces the ground emphasizes the work in the landscape. Entering the “Carapace” means going inside a sculpture by Pomodoro, as immediately signalled by his artistic alphabet, immediately recognizable in the interior vault. The winery elicits emotions, as testified by the building’s creator, Arnaldo Pomodoro. He says: “For the first time in my life I had the thrill of walking, talking and drinking inside one of my works”.



Entrance ticket for non-registered companions: 60.00 EUR (subjected to place availability)

Optional Tours

PERUGIA & DERUTA

Monday June 6, full day

9.30 - 18.30

Perugia (<https://en.wikipedia.org/wiki/Perugia>) is the capital city of the Umbria region in central Italy, crossed by the river Tiber. It is located about 170 km north of Rome, and 150 km south-east of Florence. It covers a high hilltop and part of the valleys around the area.

The history of Perugia goes back to the Etruscan period. Perugia was one of the main Etruscan cities. The city is also known as the universities town, with the University of Perugia founded in 1308 (about 34,000 students), the University for Foreigners (5,000 students), and some smaller colleges such the Academy of Fine Arts "Pietro Vannucci" (Italian: Accademia di Belle Arti "Pietro Vannucci") public athenaeum founded in 1573, the Perugia University Institute of Linguistic Mediation for translators and interpreters, the Music Conservatory of Perugia, founded in 1788, and others Institutes. There are annual festivals and events: the Eurochocolate Festival (October), the Umbria Jazz Festival (July), and the International Journalism Festival (April).

Perugia is a well-known cultural and artistic centre of Italy. The famous painter Pietro Vannucci, nicknamed Perugino, was a native of Città della Pieve near Perugia. He decorated the local Sala del Cambio with a beautiful series of frescoes; eight of his pictures can also be admired in the National Gallery of Umbria. Perugino was the teacher of Raphael, the great Renaissance artist who produced five paintings in Perugia (today no longer in the city) and one fresco. Another famous painter, Pinturicchio, lived in Perugia. Galeazzo Alessi is the most famous architect from Perugia. The city symbol is the griffin, which can be seen in the form of plaques and statues on buildings around the city.

The tour includes:

- Corso Vannucchi (main Perugia street)
- Historical buildings:
 - Palazzo dei Priori and
 - Sala dei Notari
- Cathedral
- Main Fountain (Fontana Maggiore)
- Etruscan Arch
- Mediaeval alleys and panoramic views





Lunch: Restaurant in Deruta

Deruta (<https://en.wikipedia.org/wiki/Deruta>) is a hill town and comune in the Province of Perugia. Long known as a center of refined maiolica manufacture, Deruta remains known for its ceramics, which are exported worldwide.



The production of ceramics, based on local clays, began in the Early Middle Ages, but found its artistic peak in the 15th and early 16th century, with highly characteristic local styles, such as the "Bella Donna" plates with conventional portraits of beauties, whose names appear on fluttering banderoles with flattering inscriptions. The lack of fuel enforced low firing temperatures, but from the beginning of the 16th century, Deruta compensated with its metallic lustre glazes in golds and ruby red. In the 16th century Deruta produced the so-called "Rafaellesque" ware, decorated with fine arabesques and grottesche on a fine white ground.

The historic town center features the Gothic church of San Francesco built in 1388, and the Palazzetto Municipale (Town Hall), which dates from about 1300, located on the Piazza dei Consoli (the "Square of the Consuls"). In addition to the usual governmental offices, the municipal hall houses a Museum of Ceramics, an art gallery (the Pinacoteca), and a spacious atrium in which one can view a variety of archaeological finds, some of which date to Neolithic times.

Meeting point: entrance of the Congress Centre at 9.15. End of tour: 18.30. The participation fee (55 EUR) includes transportation, English speaking hostess and local guides, and lunch.

ORVIETO & TODI

*Tuesday June 7, full day
9.30 - 19.00*

Orvieto, a city and municipality in the Province of Terni, southwestern Umbria, Italy, situated on the flat summit of an enormous butte of volcanic tuff, was founded by Etruscans about the VIII century AC. Orvieto features a large number of

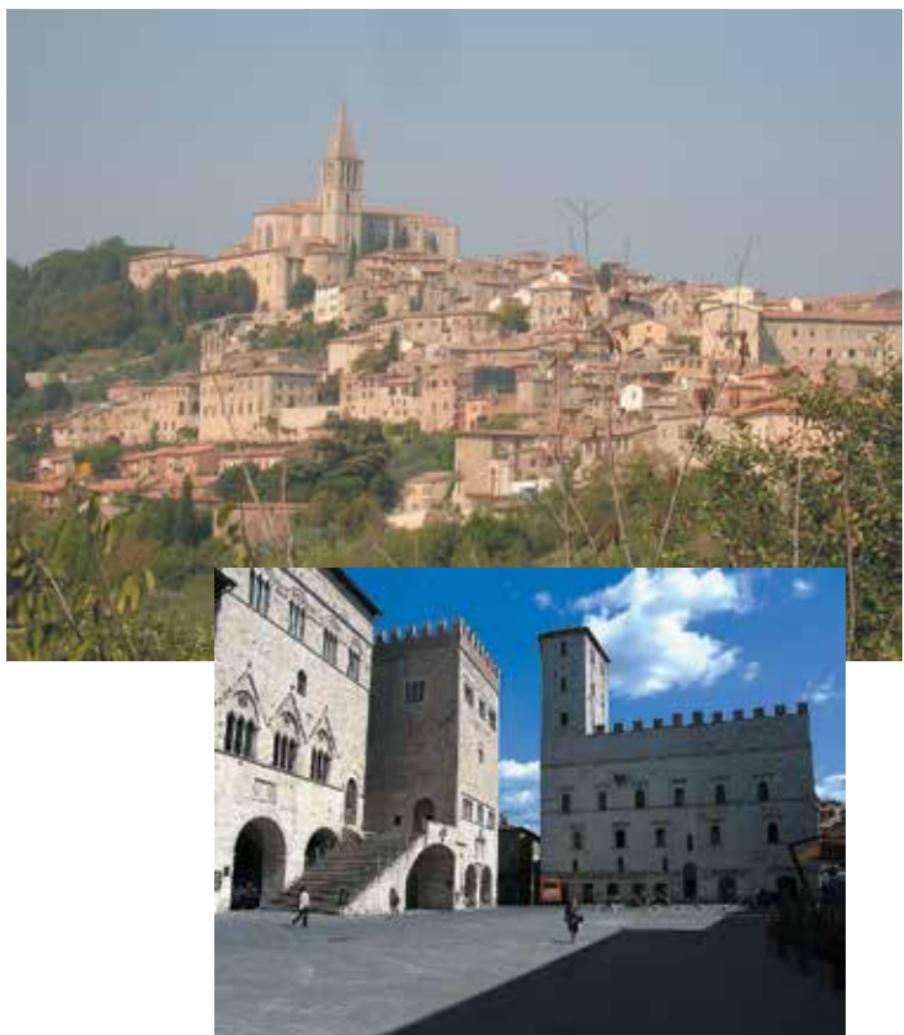


churches (among them the famous Cathedral), middle ages civil architectures and archaeological sites dating from the 5th Century BC (you may visit: <https://en.wikipedia.org/wiki/Orvieto>).

The tour includes:

- The Albornoz fortress (Rocca dell'Albornoz)
- Pozzo di San Patrizio (Well of St. Patrick)
- Belvedere Temple (Tempio del Belvedere)
- The Cathedral and Chapel
- San Andrea's Church
- Medieval public palaces
- Alleys, squares and panoramic views





Lunch: Restaurant in Orvieto

Todi (<https://en.wikipedia.org/wiki/Todi>) is a town and municipality of the province of Perugia. It is perched on a tall two-crested hill overlooking the east bank of the river Tiber, commanding distant views in every direction.

The austere and noble appearance of the town dates from the Middle Ages. The most appealing sites number the “Tempio della Consolazione”, a Renaissance architectural masterpiece, the big Gothic church and the “San Fortunato” church. On the main square of the town, that occupies the space of the ancient Roman forum, there are the Middle Age public buildings (“Palazzo del Popolo”, “Palazzo del Capitano”, “Palazzo del Priore”) and the Romanic Cathedral.

The tour includes:

- Tempio della Consolazione
- San Fortunato Church
- Jacopone da Todi tomb
- MiddleAge public buildings
- Cathedral
- Alleys, squares and panoramic views

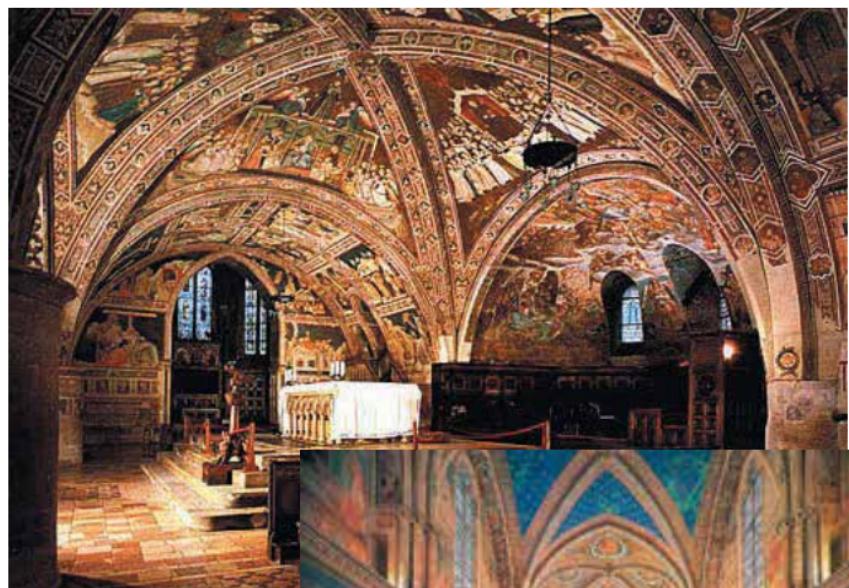
Meeting point: entrance of the Congress Center at 9.15. Return to Perugia at about 19.00.

The participation fee (55.00 EUR) includes transportation, city entrance taxes, English speaking hostess and local guides, and lunch.

ASSISI & SPELLO

*Wednesday June 8, full day
9.30 - 19.00*

Placed on the slope of Subasio Mountain (Monte Subasio), Assisi (<https://en.wikipedia.org/wiki/Assisi>) is without any doubt the most internationally renowned city from Umbria Region its fame mainly deriving from being the birth place of San Francis (San Francesco) the patron saint of Italy. UNESCO collectively designated the Franciscan structures of Assisi as a World Heritage Site in 2000. The city retains vestiges of the Roman age whereas the Middle Ages urban planning remains practically untouched.



The Basilica of San Francesco d'Assisi (St. Francis) is the major sight in Assisi. The Franciscan monastery, il Sacro Convento, and the lower and upper church (Italian: Basilica inferiore and Basilica superiore) of St Francis were begun in 1228, and completed in 1253. The lower church has frescoes by the late-medieval artists Cimabue and Giotto; the upper church houses frescoes of scenes in the life of St. Francis previously ascribed to Giotto, but now thought to be by artists of the circle of Pietro Cavallini from Rome.

The visit includes:

- Basilica di San Francesco (St. Francis Church)
- Piazza del Comune (Town Hall square)
- Tempio della Minerva (Minerva Temple)
- Chiesa Nuova (New Church built over the presumed parental home of St. Francis)
- Oratorio di San Francesco piccolino (Oratory of St. Francis)
- Basilica di Santa Chiara (Basilica of St. Clare)

Lunch: Restaurant in Assisi

Spello (in Antiquity: Hispellum) (<https://en.wikipedia.org/wiki/Spello>) is an ancient town placed on the lower southern flank of Mt. Subasio, about 6 km from Assisi. The old walled town lies on a regularly NW-SE sloping ridge that eventually meets the plain. From the top of the ridge, Spello commands a good view of the Umbrian plain towards Perugia; at the bottom of the ridge, the town spills out of its walls into a small modern section (or Borgo).



Spello remains four monumental gates and a long track of walls of Roman Age, besides the ruins of Roman amphitheatre and holy buildings. The Middle Ages town is one of the more fascinating of the Umbria Region.

The visit includes:

- Porta Urbica (Urbica Gate)
- Mura Romane (Roman Walls)
- Porta Consolare (Consular Gate)
- Chiesa Collegiata di Santa Maria Maggiore (Santa Maria Maggiore Church with Pinturicchio frescoes)
- Palazzo Comunale (Medieval Town Hall)
- Palazzo Cruciali (Cruciali Palace)
- Belvedere (panoramic viewpoint)
- Porta Venere con Torri di Propezzio (Venere Gate and Propezzio Towers)



Meeting point: entrance of the Congress Center at 9.15. Return to Perugia at about 19.00.

The participation fee (55.00 EUR) includes transportation, city entrance taxes, English speaking hostess and local guides, and lunch.

GUBBIO

*Thursday June 9, morning
9.30 - 13.00*

Gubbio (<https://en.wikipedia.org/wiki/Gubbio>), located on the lowest slope of Mt. Ingino, a small mountain of the Apennines, is among the best preserved splendid Middle Ages city of Umbria Region. The city's origins are very ancient. The hills above the town were already occupied in the Bronze Age, followed by Umbrian people and Roman conquest in the 2nd century BC. Gubbio became very powerful in the beginning of the Middle Ages and became part of the Papal States in 1631. The historical centre of Gubbio has a decidedly medieval aspect: the town is austere in appearance because of the dark grey stone, narrow streets, and Gothic architecture. Many houses in central Gubbio date to the 14th and 15th centuries, and were originally the dwellings of wealthy merchants.

Among most important buildings and sites in the city are: Roman Theater and Roman Mausoleum, Palazzo dei Consoli, Duomo, Palazzo Ducale and several others.

The visit includes:

- Chiesa di San Francesco (St. Francis Church)
- Logge (Open galleries)
- Piazza Grande (Main Square)
- Palazzo dei Consoli e Palazzo del Podestà (Middle Ages public palaces)
- Cattedrale (Cathedral)
- Palazzo Ducale (Dukes Palace)
- Middle Ages alleys and panoramic views



Meeting point: entrance of the Congress Center at 9.15. Return to Perugia at about 13.00.

The participation fee (25 EUR) includes transportation, city taxes, English speaking guide.

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Conference Hotels

1. Best Western Hotel Quattrotorri
CONGRESS CENTER
2. Relais Olmo
3. Perugino
4. Meridiana
5. Etruscan
6. Grifone
7. Sangallo
8. Brufani
9. Ilgo
10. Teatro Morlacchi
(Jazz Concert)
11. Chiostro S. Giuliana
(Welcome Reception)
12. Centraill Railway Station
13. Ellera Railway Station
14. Piazza Partigiani
Bus Transfer to/from
Congress Center



Comune di
Perugia



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