

SESSIONS BY DAY

9th Forum on
New Materials



Perugia, Italy • June 25-29, 2022



CIMTEC2022

CIMTEC 2022

<i>Flowsheet</i>	JUNE 25		JUNE 26		JUNE 27		JUNE 28		JUNE 29	
	A.M.	P.M.								
REGISTRATION										
SYMPOSIUM FA				FA	FA	FA	FA	FA	FA	FA
SYMPOSIUM FB					FB			FB	FB	FB
SYMPOSIUM FC				FC			FC			
SYMPOSIUM FD				FD	FD	FD	FD	FD		
SYMPOSIUM FE						FE	FE		FE	
SYMPOSIUM FF				FF	FF			FF		FF
SYMPOSIUM FG				FG	FG		FG	FG	FG	FG
CONFERENCE FH				FH	FH	FH	FH	FH	FH	
SYMPOSIUM FI				FI	FI		FI	FI	FI	FI
SYMPOSIUM FJ					FJ	FJ	FJ			
SYMPOSIUM FK				FK	FK	FK			FK	
SYMPOSIUM FL				FL	FL	FL	FL	FL	FL	
SYMPOSIUM FM				FM				FM	FM	FM
SYMPOSIUM FN				FN		FN				
SYMPOSIUM FO							FO	FO	FO	FO
SYMPOSIUM FP				FP	FP	FP		FP		FP
CONFERENCE FQ				FQ	FQ	FQ	FQ	FQ	FQ	
CONFERENCE FR				FR	FR	FR	FR	FR	FR	FR
POSTER MOUNTING										
POSTER DISCUSSION										
SOCIALS										

9th FORUM ON NEW MATERIALS

PLENARY SESSION



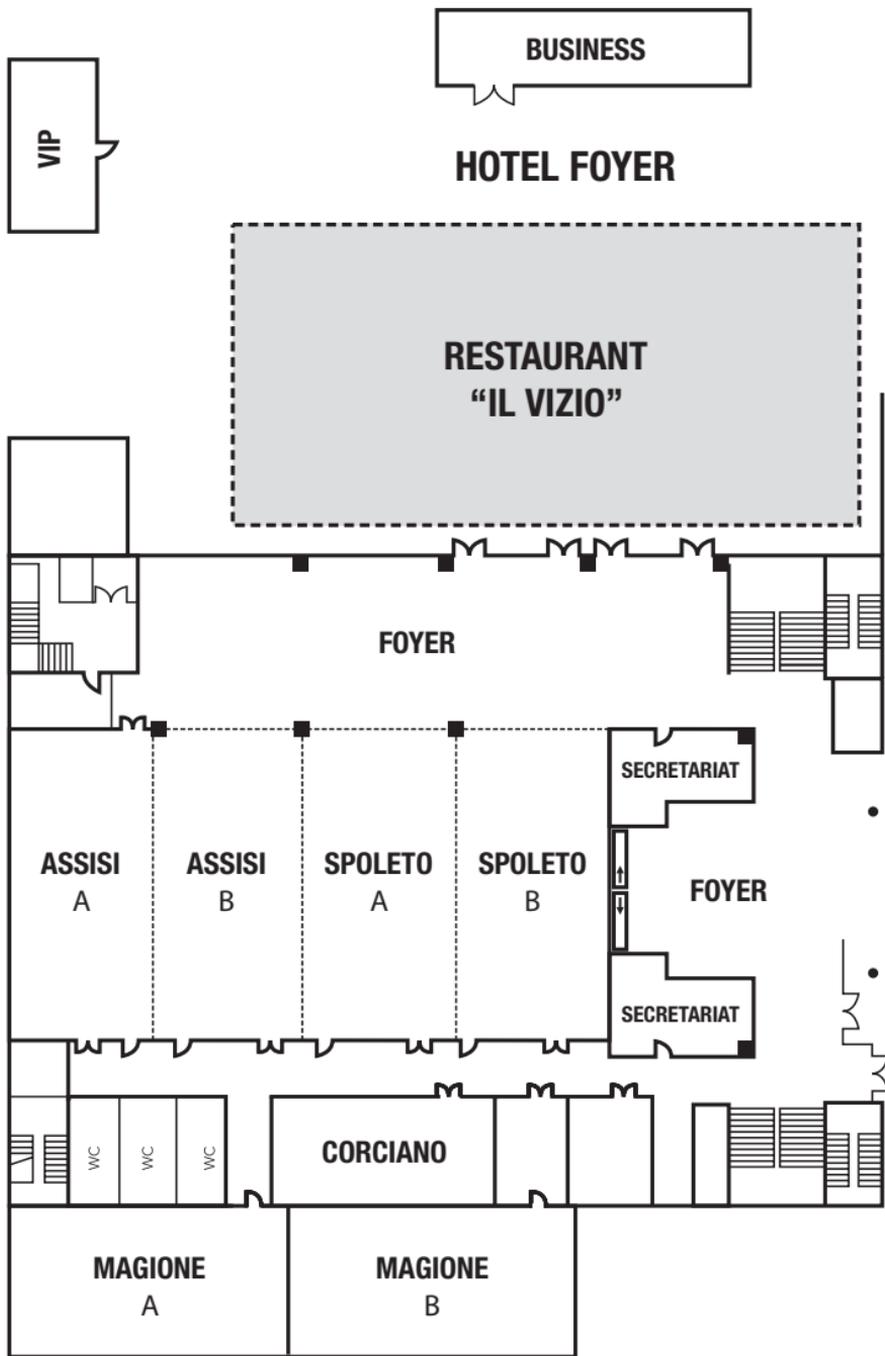
WELCOME RECEPTION



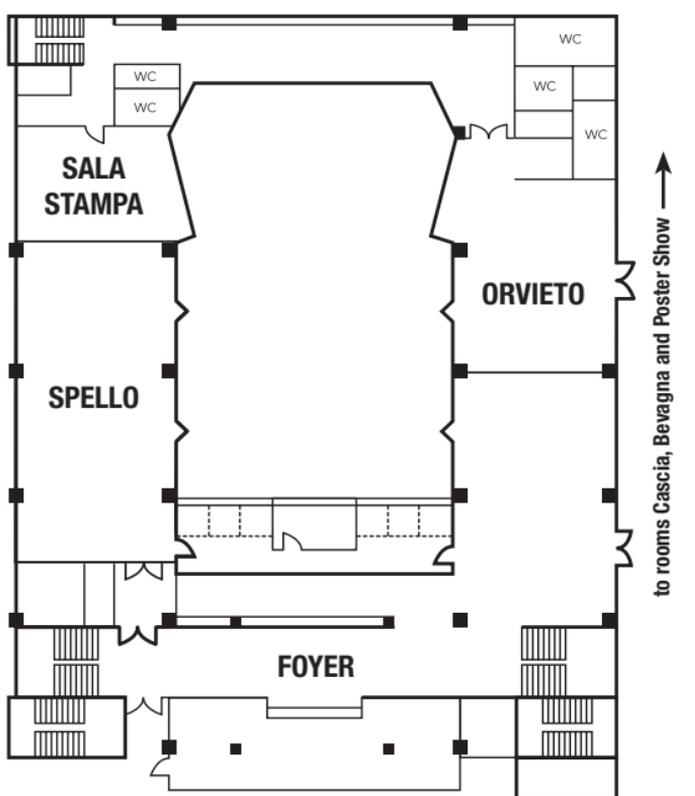
CONFERENCE DINNER

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Ground Floor

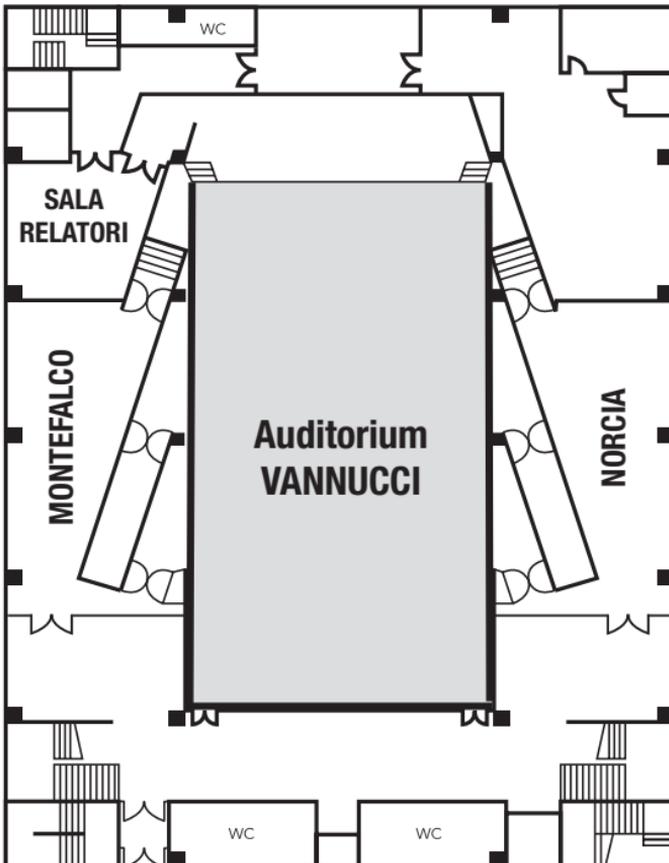


Level -1

**RESTAURANT
"IL VIZIO UNDERGROUND"**

**POSTER
SHOW**

Level -1



Level -2

FORUM OUTLINE

SYMPOSIUM **FA**

3D Printing and Beyond: State-of-the-art and
New Paradigms for Additive Manufacturing
Technologies

SYMPOSIUM **FB**

Flexible and Stretchable Electronics: Materials,
Devices and Applications

SYMPOSIUM **FC**

Research Advances on Micro/Nano Systems and
their Applications

SYMPOSIUM **FD**

Recent Achievements in Multiferroic and
Magnetoelectric Materials

SYMPOSIUM **FE**

Functional Nanomaterials for New Generation
Solid State Chemical Sensors

SYMPOSIUM **FF**

Electromagnetic Metamaterials and
Metasurfaces: Recent Research Achievements
and New Paradigms

SYMPOSIUM **FG**

Advances in Inorganic Luminescent Materials

FH

4th International Conference

Emerging Materials, Technologies and
Applications for Non-volatile Memory Devices

SYMPOSIUM **FI**

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

SYMPOSIUM **FJ**

Advanced Photocatalytic Materials for Energy and
Chemistry in Transition and for the Environment

SYMPOSIUM **FK**

Thermoelectrics: Materials Research and Application Technologies

SYMPOSIUM **FL**

Stimuli Responsive and Multifunctional Polymers: Progress in Materials and Applications

SYMPOSIUM **FM**

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

SYMPOSIUM **FN**

Smart and Interactive Textiles - From Nano-engineered Textile Fibres to Integrated Wearable Systems

SYMPOSIUM **FO**

Embodying Intelligence in Structures and Integrated Systems

SYMPOSIUM **FP**

Biological, Biohybrid and Bioinspired Materials: From Electronics and Photonics to Medicine

FQ

13th International Conference

Advanced Biomaterials and Nano-biotechnology for Medicine

Focused Session **FQ-6**

Next Generation Implantable Neural Interfaces

Focused Session **FQ-7**

Wireless Body Sensor Networks for Healthcare Applications

Focused Session **FA-5/FQ-8**

3D Bioprinting of Soft Tissues and Organs

FR

4th International Conference

Materials Challenges for Sustainable Nuclear Fission and Fusion Technologies

Focused Session **FR-10**

Materials Issues in Radioactive Nuclear Waste Treatment and Disposal

Meeting Rooms by Symposia

OPENING SESSION	AUDITORIUM
Symposium FA	ASSISI B
Symposium FB	SALA RELATORI
Symposium FC	SALA RELATORI
Symposium FD	CORCIANO
Symposium FE	MAGIONE B
Symposium FF.....	MAGIONE B
Symposium FG	MONTEFALCO
Conference FH	ASSISI A
Symposium FI	MAGIONE A
Symposium FJ	NORCIA
Symposium FK	SPELLO
Symposium FL.....	SPOLETO B
Symposium FM	NORCIA
Symposium FN	MONTEFALCO
Symposium FO	SALA STAMPA
Symposium FP	ORVIETO / SPELLO
Conference FQ	ORVIETO / ASSISI B
Conference FR	SPOLETO A
Focused Session FR-10	SPOLETO A

Special Workshop

COSMO Workshop-satellite event of Symposium FH

Saturday June 25 14.30-18.30..... CORCIANO

Events by Day

Saturday June 25

15.00-19.00

REGISTRATION

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

Sunday June 26

Morning: 10.00-12.30

Opening Session

Welcome Addresses

Plenary Lectures (F:PL1-PL3)

Sunday June 26

Afternoon: 14.30-19.00

- Symposium FA (FA-1:IL02-IL03)
(FA-3:IL05)
(FA-5/FQ-8:IL02-IL03+IL11)
- Symposium FC (FC:KL3+FC-1:IL01)
(FC-1:IL02-IL05)
- Symposium FD (FD-1:IL01-IL03)
(FD-1:IL04-IL05)
- Symposium FF (FF-1:IL01-IL02)
(FF-1:L04)
(FF-3:IL03)
- Symposium FG (FG-1:IL04-IL06)
- Symposium FH (FH-1.2:IL18+IL02+L20)
(FH-3:IL01-IL04)
(FH-3:L08-L11)
- Symposium FI (FI-1:IL01-IL06)
- Symposium FK (FK-1:IL01-IL02)
(FK-1:IL03-IL05)
(FK-2:IL05)
- Symposium FL (FL-1:IL01-IL02)
(FL-1:IL03-L05)
- Symposium FM (FM-1:IL01-IL03)
(FM-1:IL05-IL08)
- Symposium FN (FN-2:IL01-IL03)
(FN-2:IL04-IL11)
(FN-3:IL08)
- Symposium FP (FP-1:L02-IL04)
- Conference FQ (FQ:KL+FQ-1:IL03)
(FQ-5:IL01)
(FA-5/FQ-8:IL02-IL03+IL11)
- Conference FR (FR-1:IL02-L05)
(FR-2:IL01-IL03)

14.30-18.30

POSTER MOUNTING

20.30 - 22.00
Welcome Party

Monday June 27

Morning: 9.00-13.00

Symposium FA	(FA-1:IL05-IL08) (FA-5/FQ-8:IL06-L08)
Symposium FB	(FB-1:L05-L09) (FB-1:L10-L13)
Symposium FD	(FD-2:IL02-L03) (FD-2:IL04-IL05)
Symposium FF	(FF-2:IL01-L05) (FF-2:IL06-L07)
Symposium FG	(FG-1:IL07-L09) (FG-1:IL11-L12) (FG-2:IL02)
Conference FH	(FH-1.1:L02-L07) (FH-1.1:IL09-L14)
Symposium FI	(FI-1:IL05-L09) (FI-2:IL05-L09)
Symposium FJ	(FJ-1:IL02-IL04) (FJ-2:IL05-IL06)
Symposium FK	(FK-1:IL13-IL14) (FK-1:L09-IL11)
Symposium FL	(FL-3:IL01-L03) (FL-2:IL01) (FL-6:IL03)
Symposium FP	(FP-2:IL01-IL04)
Conference FQ	(FQ-1:IL05-IL11) (FA-5/FQ-8:IL06-L08)
Conference FR	(FR-3:IL01-IL06) (FR-4:IL02-IL04)

Monday June 27

Afternoon: 14.30-19.00

- Symposium FA (FA-5/FQ-8:IL09-L12)
(FA-5/FQ-8:L13-IL17)
- Symposium FD (FD-3:IL01-IL05)
- Symposium FE (FE-1:IL01-IL05)
- Conference FH (FH-2:IL01-L10)
(FH-2:IL06-L12)
- Symposium FJ (FJ-2:IL07+IL09)
- Symposium FK (FK-1:IL17-IL24)
(FK-1:IL25-IL26)
(FK-3:IL05)
- Symposium FL (FL-3:IL04-IL05)
(FL-4:L01-IL03)
- Symposium FN (FN-1:IL01-L07)
(FN-3:IL01-IL05)
- Symposium FP (FP-1:L05+IL06)
(FP-2:IL05)
(FP-2:IL06-IL09)
- Conference FQ (FA-5/FQ-8:IL09-L12)
(FA-5/FQ-8:L13-IL17)
- Conference FR (FR-10.1:IL01-IL04)
(FR-10.1:IL05-L11)

Tuesday June 28

Morning: 9.00-13.00

- Symposium FA (FA-1:IL12-L14)
(FA-2:IL02-IL04)
- Symposium FC (FC:KL2+FC-2:IL02-IL04)
(FC-3:L02-L04)
(FC-4:IL01)
- Symposium FD (FD-3:IL07-L09)
(FD-3:IL10-IL11)
- Symposium FE (FE-2:IL01-IL05)
(FE-2:IL07-L09)
(FE-3:IL03)
- Symposium FG (FG-3:IL01-IL04)
(FG-4:L01-IL02)
- Conference FH (FH-3:IL12-L17)
(FH-3:IL18-L23)
- Symposium FI (FI-3:IL01-IL05)
(FI-3:L06)
(FI-5:IL03)
- Symposium FJ (FJ-2:IL10-IL12)
(FJ-3:L02-L05)
- Symposium FL (FL-4:IL04-L06)
(FL-5:IL01-IL03)
(FL-7:L03)
- Symposium FO (FO-2:IL05)
(FO-1:IL01-IL02)
(FO-1:L03-IL05)
- Conference FQ (FQ-1:IL12-L16)
(FQ-3:IL01-IL04)
(FQ-4:IL01-L02)
- Conference FR (FR-5:IL01-L04)
(FR-6:IL01-L06)

Tuesday June 28

Afternoon: 14.30-19.00

Symposium FA	(FA-2:L05-L07) (FA-2:IL08-IL10)
Symposium FB	(FB-1:L15-L17) (FB-2:L01-L03)
Symposium FD	(FD-4:IL03-L06) (FD-4:L07+IL10)
Symposium FF	(FF-4:IL02-IL05) (FF-5:IL01+IL05)
Symposium FG	(FG-4:IL03-L05) (FG-5:IL02) (FG-1:IL02)
Conference FH	(FH-3:IL07+L24) (FH-1.2:IL01-L05) (FH-1.2:IL06-L12)
Symposium FI	(FI-3:IL07-L08) (FI-4:IL02)
Symposium FL	(FL-5:IL04-IL05) (FL-6:IL02+IL04)
Symposium FM	(FM-1:IL09-IL12) (FM-1:IL14-L18)
Symposium FO	(FO-2:IL01) (FO-3:L01-L02) (FO-3:L03-IL04)
Symposium FP	(FP-2:IL10-IL11) (FP-3:IL01-IL09)
Conference FQ	(FQ-6:IL01-IL04) (FQ-6:IL05-IL07)
Conference FR	(FR-10.2:IL01-L06) (FR-10.3:IL01-IL06)

Wednesday June 29

Morning: 9.00-13.00

- Symposium FA (FA-2:IL12-L17)
(FA-3:IL01-L03)
- Symposium FB (FB-3:IL02-IL04)
(FB-3:IL09-IL10)
- Symposium FE (FE-4:IL03)
(FE-5:L02+L04)
(FE-5:IL05-IL07)
- Symposium FG (FG-6:IL01-L03)
(FG-6:IL04-L05)
- Conference FH (FH-1.2:IL13-L23)
(FH-3:IL25-L31)
- Symposium FI (FI-6:IL01-L03)
(FI-6:L04-IL06)
- Symposium FK (FK-2:IL02-IL04)
(FK-2:IL06)
(FK-3:L02-L03)
- Symposium FL (FL-7:IL04+IL06)
- Symposium FM (FM-1:IL21-L23)
(FM-3:IL01-IL09)
- Symposium FO (FO-4:IL01-IL02)
(FO-4:L03-IL05)
- Conference FQ (FQ-7:IL02-IL05)
(FQ-7:IL07-IL09)
- Conference FR (FR-6:IL07-L10)
(FR-6:IL13)
(FR-8:IL01-IL02)

Wednesday June 29

Afternoon: 14.30-17.30

- Symposium FA (FA-4:IL01-L02)
- Symposium FB (FB-3:IL11-IL14)
- Symposium FF (FF-5:IL06)
(FF-6:IL02-IL03)
- Symposium FG (FG-7:IL01-IL04)
- Symposium FI (FI-5:IL01+IL04)
- Symposium FM (FM-2:IL01-L06)
- Symposium FO (FO-2:IL02)
- Symposium FP (FP-4:IL02-IL06)
- Conference FR (FR-10.4:IL02-IL05)

14.30-17.30

POSTER DISCUSSION

20.30-23.00

Conference Dinner

SESSIONS FLOWSHEET

June 25-29

9th Forum on

New Materials

Chair

Pietro Vincenzini

World Academy of Ceramics
National Research Council, Italy

Co-Chair

Robert P.H. Chang

Northwestern University, USA
International Union of Materials Research Societies

Conveners

Symposium FA: **Tassilo Moritz**, Germany

Symposium FB: **Mario Prosa**, Italy

Symposium FC: **Leandro Lorenzelli**, Italy

Symposium FD: **Alois Loidl**, Germany

Symposium FE: **Giovanni Neri**, Italy

Symposium FF: **Costantino De Angelis**, Italy

Symposium FG: **Giancarlo C. Righini**, Italy

Conference FH: **Sabina Spiga**, Italy

Symposium FI: **Yury Gogotsi**, USA

Symposium FJ: **Gabriele Centi**, Italy

Symposium FK: **Andrei Kovalevsky**, Portugal

Symposium FL: **Andreas Lendlein**, Germany

Symposium FM: **Franca Albertini**, Italy

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

Symposium FO: **Fabio Casciati**, Italy

Symposium FP: **Gianluca Farinola**, Italy

Conference FQ: **Masahiro Yoshimura**, Taiwan

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

Focused Session FA-5/FQ-8: **Giovanni Vozzi**, Italy

Conference FR: **Massimo Angiolini**, Italy

Focused Session FR-10: **Nadia Cherubini**, Italy

OPENING SESSION

AUDITORIUM

Pietro VINCENZINI
General Chair CIMTEC Conferences

Chair:

Giancarlo RIGHINI, Italy

10.00 - 10.15

Welcome Addresses

Dario DELLA SALA
ENEA, Italian National Agency for New Technologies,
Energy and the Environment

Masahiro YOSHIMURA
World Academy of Ceramics

Plenary Lectures

10.15 - 11.00

F:PL1

Organic Actuators for Living Cell Opto Stimulation
Guglielmo LANZANI

Center for Nano Science and Technology@PoliMi, Istituto
Italiano di Tecnologia, and Department of Physics, Politecnico
di Milano, Milano, Italy

11.00 - 11.45

F:PL2

**Decarbonization of the Energy Sector: Contribution of
Nuclear Power Today and in Perspective**

Stefano MONTI

International Atomic Energy Agency, Vienna International
Center, Vienna, Austria

11.45 - 12.30

F:PL3

**Embodying Intelligence in Structures: Perspectives of
Multifunctional Design Community**

B.-L. ("Les") LEE

Air Force Office of Scientific Research, Arlington, VA, USA

SYMPOSIUM FA
**3D PRINTING AND BEYOND: STATE-
OF-THE-ART AND NEW PARADIGMS
FOR ADDITIVE MANUFACTURING
TECHNOLOGIES**

Room: **ASSISI B**

Chair: Tassilo MORITZ, Germany (*Convener*)

14.25 *Welcome*

14.30 *FA-1:IL02 3D Printing of Hierarchical Porous Ceramics*
A.R. STUDART, A. DUTTO, ETH Zurich, Switzerland

15.00 *FA-1:IL03 Multimaterial 3D Printing of Functional Ceramics for Energy Applications*
M. TORRELL¹, A. PESCE¹, M. NUÑEZ¹, N. KOSTRETSOVA¹, A. MORATA¹,
A. TARANCÓN^{1,2}, ¹Catalonia Institute for Energy Research, Sant
Adrià de Besòs, Barcelona, Spain; ²ICREA, Barcelona, Spain

15.30 *FA-3:IL05 3D Printing of Functional Architectures built from Two-dimensional Materials*
S. BARG, University of Manchester, Manchester, UK

Focused Session FA-5 / FQ-8
**3D Bioprinting of
Soft Tissues and Organs**

(Focused Joint Session with Conference FQ)

Chair: Giovanni VOZZI, Italy (*Convener*)

16.25 *Welcome*

16.30 *FA-5/FQ-8:IL02 Biofabrication: From Additive Manufacturing to Bioprinting and Bioassembly for Regenerative Medicine Applications*
L. MORONI, A. ALDANA, Maastricht University, MERLN Institute for Technology-Inspired Regenerative Medicine, Complex Tissue Regeneration Department, Maastricht, The Netherlands

17.00 *FA-5/FQ-8:IL03 Putting 3D Bioprinting to the Use of Tissue Model Fabrication*
Y. SHRIKE ZHANG, Division of Engineering in Medicine, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Cambridge, MA, USA

17.30 *FA-5/FQ-8:IL11 3D in Vitro Model of the Microbiota-gut-bone Axys*
G. VOZZI, F. BIAGINI, F. MONTEMURRO, C. DE MARIA, Research Center "E. Piaggio" and Dept of Information Engineering, University of Pisa, Pisa, Italy; M. CALVIGIONI, E. GHELARDI, Research and New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy; G. CERQUENI, S. MARCHI, M. MATTIOLI-BELMONTE, DISCLIMO, Università Politecnica delle Marche, Ancona, Italy

SYMPOSIUM FC
RESEARCH ADVANCES ON MICRO/NANO
SYSTEMS AND THEIR APPLICATIONS

Room: **SALA RELATORI**

Chair: Leandro LORENZELLI, Italy (*Convener*)

14.25 *Welcome*

14.30 *FC:KL3* **(Porous) Silicon NanoPhotonics: Applications, Opportunities and Challenges**
G. BARILLARO, Dipartimento di Ingegneria dell'Informazione, Università di Pisa, Pisa, Italy

15.15 *FC-1:IL01* **MEMS Cantilever Sensors**
M. FAHRBACH, J. XU, **E. PEINER**, Technische Universität Braunschweig, Institute of Semiconductor Technology (IHT), and Laboratory for Emerging Nanometrology (LENA), Braunschweig, Germany

15.50 *Break*

Chair: Erwin PEINER, Germany

16.20 *FC-1:IL02* **3D-printing and Wet-metallization for Sensors: a Coriolis Mass Flowmeter Operating in the Mode-split Conditions**
V. ZEGA¹, L. GAFFURI PAGANI², M. INVERNIZZI³, C. CREDI³, R. SURIANO³, R. BERNASCONI³, P. CARULLI², A. FRANGI¹, M. LEVI³, L. MAGAGNIN³, G. LANGFELDER², A. CORIGLIANO¹, ¹DICA, Politecnico di Milano; ²DEIB, Politecnico di Milano; ³CMIC, Politecnico di Milano, Milano, Italy

16.55 *FC-1:IL05* **MEMS and Microsystems for Space Applications**
M. RAIS-ZADEH, NASA Jet Propulsion Laboratory, California Institute of Technology Pasadena, CA, USA

SYMPOSIUM FD
RECENT ACHIEVEMENTS IN
MULTIFERROIC AND MAGNETOELECTRIC
MATERIALS

Room: **CORCIANO**

Chair: Alois LOIDL, Germany (*Convener*)

14.25 *Welcome*

14.30 *FD-1:IL01* **Multiferroics and High Pressure, a Never Ending Story**

D. DELMONTE, E. GILIOLI, Institute of Materials for Electronics and Magnetism (IMEM), CNR, Parma, Italy

15.05 *FD-1:L03* **HP/HT Synthesis and Characterization of Bi₂CuMnO₆, a RT Long-range Ordered Magnetic Perovskite**

C. COPPI, D. DELMONTE, R. CABASSI, E. GILIOLI, Institute of Materials for Electronics and Magnetism (IMEM), CNR, Parma, Italy; F. MEZZADRI, Department of Chemical Sciences, Life and Environmental Sustainability, University of Parma, Parma, Italy; F. CUGINI, M. SOLZI, Department of Mathematical, Physical and Computer Sciences, University of Parma, Parma, Italy

15.30 *Break*

Chair: Davide DELMONTE, Italy

16.00 *FD-1:IL04* **Magneto-ionics in Transition Metal Nitrides and its Potential for Artificial Synapses**

Z. TAN¹, J. DE ROJAS¹, S. MARTINS¹, A. NICOLENCO¹, J.L. COSTA-KRÄMER², A. QUINTANA³, E. MENÉNDEZ¹, **J. SORT**^{1, 4}, ¹Departament de Física, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain; ²IMN-Instituto de Micro y Nanotecnología (CNM-CSIC), Tres Cantos, Madrid, Spain; ³Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, Barcelona, Spain; ⁴Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain

16.35 *FD-1:IL05* **Structural Transitions between Metastable Phases in Bismuth-containing Perovskite Multiferroics**

A.N. SALAK¹, J.P. CARDOSO¹, D. DELMONTE², E. GILIOLI², V.V. SHVARTSMAN³, D.D. KHALYAVIN⁴, ¹Department of Materials and Ceramics Engineering and CICECO - Aveiro Institute of Materials, University of Aveiro, Aveiro, Portugal; ²Institute of Materials for Electronics and Magnetism, Parma, Italy; ³Institute for Materials Science and CENIDE - Center for Nanointegration Duisburg-Essen, University of Duisburg-Essen, Essen, Germany; ⁴ISIS Facility, Rutherford Appleton Laboratory, Chilton, Didcot, Oxfordshire, UK

SYMPOSIUM FF
**ELECTROMAGNETIC METAMATERIALS
AND METASURFACES: RECENT
RESEARCH ACHIEVEMENTS AND NEW
PARADIGMS**

Room: **MAGIONE B**

Chair: Costantino DE ANGELIS, Italy (*Convener*)

14.25 *Welcome*

14.30 *FF-1:IL01* **New Trends for Hybrid Metamaterials and Metasurfaces**
M. LAPINE, University of Technology Sydney, Ultimo, Australia

15.05 *FF-1:IL02* **Around the Plasmonic Nanoparticle Cycle: From a New Chiral Optical Effect to Applications in Quantum Optics**
V.K. VALEV, Department of Physics, University of Bath, Bath, UK

15.40 *Break*

Chair: Stanislav I. MASLOVSKI, Portugal

16.10 *FF-1:L04* **Spatial Multiplexing Method for Multiwavelength Metalens**
SANGWON BAEK¹, J. KIM², Y. KIM², J. RHO², J.-L. LEE¹,
¹Department of Materials Science and Engineering, Pohang University of Science and Technology, South Korea; ²Department of Mechanical Engineering, Pohang University of Science and Technology, South Korea

16.35 *FF-3:IL03* **Multipole Analysis and Tuning of All-dielectric Metasurfaces Supporting High-quality Optical Resonances and Quasi-trapped Mode Responses**
A.B. EVLYUKHIN, Institute of Quantum Optics, Leibniz Universität Hannover, Hannover, Germany

SYMPOSIUM FG
ADVANCES IN INORGANIC
LUMINESCENT MATERIALS

Room: **MONTEFALCO**

Chair: Giancarlo RIGHINI, Italy (*Convener*)

14.25 *Welcome*

14.30 *FG-1:IL04* **The Principles of Luminescence Thermometry – From Applications to Fundamental Questions**

M. SUTA, Inorganic Photoactive Materials, Institute of Inorganic Chemistry, Heinrich Heine University Düsseldorf, Düsseldorf, Germany

15.05 *FG-1:IL06* **Rare-earth Activated SiO₂-SnO₂ Photonic Glass-ceramics**

THI NGOC LAM TRAN^{1, 2, 3}, A. SZCZUREK¹, S. VARAS¹, C. ARMELLINI¹, A. CARPENTIERO¹, A. CHIAPPINI¹, E. IACOB⁴, G. ISCHIA⁵, S. BERNESCHI⁶, G. NUNZI CONTI⁶, G.C. RIGHINI⁶, M. BOLLANI⁷, F. SCOTOGNELLA^{2, 8}, P. GŁUCHOWSKI⁹, A. LUKOWIAK⁹, A. CHIASERA¹, M. FERRARI¹, ¹IFN-CNR CSMFO Lab. and FBK Photonics Unit, Povo, Trento, Italy; ²Department of Physics, Politecnico di Milano, Milano, Italy; ³Department of Materials Technology, Faculty of Applied Science, Ho Chi Minh City University of Technology and Education, Thu Duc District, Ho Chi Minh City, Vietnam; ⁴Fondazione Bruno Kessler, Centre for Materials and Microsystems, Micro Nano Facility, Povo, Trento, Italy; ⁵Department of Industrial Engineering, University of Trento, Povo, Trento, Italy; ⁶MiPLab, IFAC-CNR, Sesto Fiorentino, Italy; ⁷IFN-CNR, P.zza Leonardo da Vinci, Milano, Italy; ⁸Center for Nano Science and Technology@PoliMi, Istituto Italiano di Tecnologia (IIT), Milan, Italy; ⁹Institute of Low Temperature and Structure Research, PAS, Wrocław, Poland

FH - 4th International Conference
**EMERGING MATERIALS, TECHNOLOGIES
AND APPLICATIONS FOR NON-VOLATILE
MEMORY AND MEMRISTIVE DEVICES**

Room: **ASSISI A**

Chair: Sabina SPIGA, Italy (*Convener*)

14.25 *Welcome*

14.30 *FH-1.2:IL18* **Reliability of Redox-based Memristive Elements**
R. WASER^{1,2}, D. WOUTERS¹, S. MENZEL², ¹JARA-FIT & IWE2,
RWTH Aachen University, Aachen, Germany; ²JARA-FIT & PGI-7/-10,
Forschungszentrum Jülich, Jülich, Germany

14.55 *FH-1.2:IL02* **Evaluation Framework Assessing Memristor
Technologies for Neural Network Implementations**
G. BERSUKER, J. FARMER, M. LUENGO-KOVAC, D. VEKSLER,
The Aerospace Corporation, Los Angeles, USA; D.Z. GAO, A.-M.
EL-SAYED, T. DURRANT, A. SHLUGER, Nanolayers Research
Computing LTD, London, UK; T. RUECKES, L. CLEVELAND, H.
LUAN, R. SEN, Nantero Inc., Woburn, USA

15.20 *FH-1.2:L20* **Influence of Different SiO₂ Matrices on the
Properties of Cu/SiO₂/W Devices**
F. MAUDET¹, H. AMARI², D. MARLINA^{1,3}, V. DESHPANDE¹, C.
DUBOURDIEU^{1,3}, ¹Institute Functional Oxides for Energy-Efficient
Information Technology (QM-IFOX), Helmholtz-Zentrum Berlin
für Materialien und Energie, Berlin, Germany; ²Leibniz-Institut für
Kristallzüchtung (IKZ), Berlin, Germany; ³Freie Universität Berlin,
Physical Chemistry, Berlin Germany

15.35 *FH-3:IL01* **Ferroelectric Memories for Neuromorphic Computing**
S. SLESAZECK, NaMLab gGmbH, Dresden, Germany

16.00 *FH-3:IL04* **Organic Spintronic Multilevel Resistive Switching
Devices as Synapses for Neuromorphic Computing**
A. RIMINUCCI, CNR-ISMN, Bologna, Italy

16.25 *Break*

Continued on next page

Continued from preceding page

Chair: Stefan SLESAZECK, Germany

- 16.55 *FH-3:L10* **Storing and Retrieving Data in Mem-Processors**
A. ASCOLI¹, R. TETZLAFF¹, I. MESSARIS¹, S.-M. KANG², L.O. CHUA³, ¹Faculty of Electrical and Computer Engineering, Technische Universität Dresden, Dresden, Germany; ²Jack Baskin School of Engineering, University of California Santa Cruz, Santa Cruz, CA, USA; ³Dept. of Electrical Engineering and Computer Sciences, University of California Berkeley, Berkeley, CA, USA
- 17.10 *FH-3:L08* **Nonlinear Dynamics of Chua's Circuits with Physical Memristor Model**
F. CORINTO, Politecnico di Torino, Torino, Italy; M. DI MARCO, M. FORTI, R. MORETTI, L. PANCIONI, University of Siena, Siena, Italy
- 17.25 *FH-3:L09* **Resistive Switching-based Invariant Manifold Tunable Chua's Circuit Design**
M. ESCUDERO¹, L. PANCIONI², S. SPIGA¹, S. BRIVIO¹, ¹CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy; ²Università degli Studi di Siena, Siena, Italy
- 17.40 *FH-3:L11* **Autonomous Decision Making in Noisy Environment**
D. MOLNAR, T.N. TÖRÖK, L. PÓSA, A. HALBRITTER, Department of Physics, Budapest University of Technology and Economics and MTA-BME Condensed Matter Research Group, Budapest, Hungary

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

Room: **MAGIONE A**

Chair: Yury GOGOTSI, USA (*Convener*)

15.25 *Welcome*

15.30 *FI-1:IL01* **Nanometer-scale Characterization and Control of Two-dimensional Materials with Atomic Force Microscopy**
M.R. ROSENBERGER, University of Notre Dame, Notre Dame, IN, USA

16.05 *FI-1:IL04* **Quantum Hall Effect in Graphite Films**
A. MISHCHENKO, Department of Physics and Astronomy, The University of Manchester, Manchester, UK

16.40 *FI-1:IL06* **2D MXene Organic Dispersions and their Electronic Applications**
CHONG MIN KOO, Materials Architecturing Research Center, Korea Institute of Science and Technology, Seoul, South Korea

**SYMPOSIUM FK
THERMOELECTRICS: MATERIALS
RESEARCH AND APPLICATION
TECHNOLOGIES**

Room: **SPELLO**

Chair: Andrei KOVALEVSKY, Portugal (*Convener*)

14.25 *Welcome*

14.30 *FK-1:IL01* **Synergy between Theory, Calculations, and Experiments: How to Improve it**

M. FORNARI, Department of Physics and Science of Advanced Materials Program, Central Michigan University, Mt. Pleasant, MI, USA

15.05 *FK-1:IL02* **Assessing the Effect of Synthetic Conditions on PEDOT Thermoelectric Properties: A Combination of First Principles and Classical Molecular Dynamics Simulations**

A. CAPPAL, **C. MELIS**, Department of Physics, University of Cagliari, Cittadella Universitaria, Monserrato (CA), Italy; D. NARDUCCI, Department of Materials Science, University of Milano-Bicocca, Milano, Italy

15.40 *Break*

Chair: Marco FORNARI, USA

16.10 *FK-1:IL03* **Ab Initio Calculations of Thermal Transport Properties in Semiconductors and Metals**

L. CHAPUT, Institut Universitaire de France, Paris Cedex, Université de Lorraine, LEMTA, UMR 7563, Vandœuvre-lès-Nancy, France

16.45 *FK-1:IL05* **Recent Advances in Understanding of Resonant States in Thermoelectric Materials**

B. WIENDLOCHA, Faculty of Physics and Applied Computer Science, AGH University of Science and Technology, Krakow, Poland

17.20 *FK-2:IL05* **The Black Metal for Enhanced Thermoelectric Power Generation**

CHUNLEI GUO, University of Rochester, Rochester, NY, USA

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

Room: **SPOLETO B**

Chair: Andreas LENDLEIN, Germany (*Convener*)

14.55 *Welcome*

14.30 *FL-1:IL01* **Self-healing Copolymers via van der Waals Interactions**

M.W. URBAN, Clemson University, Department of Materials Science and Engineering, Clemson, SC, USA

15.05 *FL-1:IL02* **Multifunctional Interpenetrated Polymer Networks**

K. ROHTLAID¹, F. BRAZ RIBEIRO¹, T.M.G. NGUYEN¹, C. SOYER², J.D.W. MADDEN³, E. CATTAN², F. VIDAL¹, **C. PLESSE**¹, ¹CY Cergy Paris Université, LPPI, Cergy, France; ²Univ. Polytechnique des Hauts de France, CNRS, Univ. Lille, Yncrea, Centrale Lille, UMR 8520 - IEMN, DOAE, Valenciennes, France; ³Department of Electrical & Computer Engineering, Advanced Materials & Process Engineering Laboratory, University of British Columbia, Vancouver, Canada

15.40 *Break*

Chair: Marek W. URBAN, USA

16.10 *FL-1:IL03* **Shape-memory Polymer Actuators for Robotics**

A. LENDLEIN, Institute of Biomaterial Science, Helmholtz-Zentrum Geesthacht, Teltow, Germany, & University of Potsdam, Potsdam, Germany

16.45 *FL-1:L04* **Stress-free two-way Shape Memory Effect of Poly(caprolactone)-based Semicrystalline Networks**

S. PANDINI, N. INVERARDI, Department of Mechanical and Industrial Engineering, University of Brescia, Brescia, Italy; M. TOSELLI, Department of Industrial Chemistry "Toso Montanari", University of Bologna, Bologna, Italy; M. MESSORI, Department of Applied Science and Technology, Politecnico di Torino, Torino, Italy; G. SCALET, F. AURICCHIO, Department of Civil Engineering and Architecture, University of Pavia, Pavia, Italy

17.10 *FL-1:L05* **Effect of Build Orientation, Print Parameters, and Thermo-mechanical History on Performance of 3D-printed Biomedical Shape-memory Thermoplastic Polyurethane**

D.L. SAFRANSKI, MedShape Inc., Atlanta, GA, USA; J.S. CONSOLI, Georgia Institute of Technology, Atlanta, GA, USA

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

Room: **NORCIA**

Chair: Franca ALBERTINI, Italy (*Convener*)

14.25 *Welcome*

14.30 *FM-1:IL01* **Multicaloric Heusler Compounds: Review and Prospects**

O. GUTFLEISCH, K. SKOKOV, A. TAUBEL, L. PFEUFFER, F. SCHEIBEL, TU Darmstadt, Materials Science, Functional Materials, Darmstadt, Germany; T. GOTTSCHALL, Helmholtzzentrum Dresden Rossendorf, HZDR, Germany

15.05 *FM-1:IL03* **A First-principles Perspective on the Interplay of Magnetism and Microstructure in Ni-Mn-based Heusler Alloys**

M.E. GRUNER, Faculty of Physics and Center for Nanointegration, CENIDE, University of Duisburg-Essen, Duisburg, Germany

15.40 *Break*

Chair: Oliver GUTFLEISCH, Germany

16.10 *FM-1:IL05* **Elasticity and Microstructures in Shape Memory Alloys: from Highly Mobile Interfaces to Kwinks**

H. SEINER, Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic

16.45 *FM-1:L06* **Age Hardening Behavior of (Ni+Cu)-rich Ti-Ni-Cu Alloys**

TAE-HYUN NAM, JI-HYUN KIM, Gyeongsang National University, Jinju, South Korea

17.10 *FM-1:IL08* **Transition Metals Doping of Ni-Mn-Ga and Comparison of Single Crystals Grown by Different Methods**

O. HECZKO, V. KOPECKÝ, D. MUSIENKO, F. NILSEN, M. RAMEŠ, P. VERTÁT, Š. SUKUP, S. HECZKO, L. STRAKA, FZU - Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic; R. COLMAN, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic

SYMPOSIUM FN
SMART AND INTERACTIVE
TEXTILES - FROM NANO-ENGINEERED
TEXTILE FIBRES TO INTEGRATED
WEARABLE SYSTEMS

Room: **MONTEFALCO**

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

14.25 *Welcome*

14.30 *FN-2:IL01* **Energy Harvesting and Storage with Electronic Textiles**

T. HUGHES-RILEY, A. SATHARASINGHE, N. ABEYWICKRAMA, M. KGATUKE, T. DIAS, Advanced Textiles Research Group, School of Art & Design, Nottingham Trent University, Nottingham, UK

15.05 *FN-2:IL02* **Nanostructured Coatings for the Functionalization of Textiles**

M. AVELLA¹, R. AVOLIO¹, R. CASTALDO¹, M. COCCA¹, F. DE FALCO¹, M.E. ERRICO¹, M. LAVORGNA², **G. GENTILE**¹, ¹Institute for Polymers Composites and Biomaterials - National Research Council of Italy, Pozzuoli (NA), Italy; ²Institute for Polymers Composites and Biomaterials - National Research Council of Italy, Portici (NA), Italy

15.40 *FN-2:IL03* **The Integration of Electronic Sensors and Systems into Textiles to Create the Next Generation of E-Textiles**

R. TORAH, A. KOMOLAFE, K. YANG, Y. LI, J. TUDOR, S. BEEBY, University of Southampton, Southampton, UK

16.15 *Break*

Chair: Theodore HUGHES-RILEY, UK

16.45 *FN-2:IL04* **A Hybrid Textile Electrode for Simultaneous Wireless ECG and Body Motion Measurement**

G.K. STYLIOS, XIANG AN, Heriot Watt University, Research Institute for Flexible Materials, Galashiels, Selkirkshire, UK

17.20 *FN-2:IL11* **Thin-film Electronics on Large-area Plastic Substrates for e-textiles**

N. MÜNZENRIEDER, Faculty of Science and Technology, Free University of Bozen-Bolzano, Bozen, Italy

17.55 *FN-3:IL08* **E-Textiles Technologies and Application - Uniting Electronics and Textiles**

M. VON KRSHIWOBLOZKI, C. KALLMAYER, C. DILS, Fraunhofer IZM, Berlin, Germany; M. SCHNEIDER-RAMELOW, TU Berlin, Berlin, Germany

Special Session FO-5
Workshop on
**“AUTONOMIC, ADAPTIVE AND SELF-
SUSTAINING SYSTEMS: FUTURE
PERSPECTIVES”**

Room: **SALA STAMPA**

Chair: R.H. BAUGHMAN, USA

- 14.30 **Opening Remarks**
R.H. BAUGHMAN, University of Texas at Dallas, Dallas, TX, USA
- 14.35 **Biological Blueprints Towards Next Generation Multiscale Composites**
A. POHL¹, T. WANG¹, W. HUANG¹, P. ZAVATTIERI², **D. KISAILUS**¹,
¹University of California, Riverside, CA, USA; ²Purdue University,
West Lafayette, IN, USA
- 15.10 **Towards Morphogenic Manufacturing: Reaction-diffusion Driven Structure in Thermoset Polymeric Materials**
N. SOTTOS, University of Illinois Urbana Champaign, Urbana, IL, USA
- 15.45 **Developing a Virtual Damage Sensor Using a Coupled Electro-mechanical FE Model of a Piezoelectric Material**
S. GHOSH, P. TARAFDER, S. DAN, Johns Hopkins University, Baltimore, MD, USA
- 16.20 *Break*
- 16.35 **An Active Mechanical Willis Metamaterial with Asymmetric Polarizabilities**
G. HUANG, University of Missouri, Columbia, MO, USA
- 17.10 **Magnetically-activated Morphing Membranes via a Novel 2D Patterning Approach**
G. LANZARA¹, W. LACARBONARA², ¹University of Rome Tre, ²Sapienza University of Rome, Rome, Italy
- 17.45 **Smart Skin for Robots**
C. LIU, X. CHEN, T. TOPAC, **F.K. CHANG**, Stanford University, Stanford, CA, USA
- 18.20 **Announcement**
- 18.30 **Adjourn**

SYMPOSIUM FP
BIOLOGICAL, BIOHYBRID AND
BIOINSPIRED MATERIALS: FROM
ELECTRONICS AND PHOTONICS TO
MEDICINE

Room: **ORVIETO**

Chair: Gianluca M. FARINOLA, Italy (*Convener*)

16.55 *Welcome*

17.00 *FP-1:L02* **Tuning Heating Efficiency of $MnxFe_{3-x}O_4$ MNPs to Trigger Different Biological Effects in Vitro and in Vivo**

G. TOMMASINI¹, S. DEL SOL-FERNÁNDEZ¹, P. MARTÍNEZ-VICENTE¹, P. GOMOLLÓN-ZUECO¹, R.M. FRATILA^{1, 2, 3}, M.P. MORALES⁵, C. TORTIGLIONE⁴, M. MOROS^{1, 2}, ¹Institute of Nanoscience and Materials of Aragon (INMA-CSIC/University of Zaragoza), Zaragoza, Spain; ²Centro de Investigación Biomédica en red en Bioingeniería, Biomateriales y Nanomedicina (CIBER-BBN); Zaragoza, Spain; ³Department of Organic Chemistry, Universidad de Zaragoza, Zaragoza, Spain; ⁴Institute of Applied Sciences and Intelligent Systems (CNR-ISASI), Pozzuoli, Italy; ⁵Institute of Materials Science in Madrid (ICMM-CSIC), Spain

17.25 *FP-1:IL03* **Photosynthetic Enzymes for Energy Conversion**

R. RAGNI, G. BUSCEMI, D. VONA, A. AGOSTIANO, G.M. FARINOLA, Chemistry Department, University of Bari Aldo Moro, Bari, Italy; F. MILANO, M. TROTTA, IPCF CNR, UOS Bari, Bari, Italy

18.00 *FP-1:IL04* **Organic Bioelectronics from a Molecular Design Perspective**

C. NIELSEN, Queen Mary University of London, London, UK

FQ - 13th International Conference
**ADVANCED BIOMATERIALS AND
NANO-BIOTECHNOLOGY FOR MEDICINE**

Room: **ORVIETO**

Chair: Masahiro YOSHIMURA, Taiwan (*Convener*)

14.25 *Welcome*

14.30 *FQ:KL* **Coming to Age with Nanomedicine: Progress and Disappointments Over the Past 30 Years**

T.J. WEBSTER, CSA, Interstellar Therapeutics, USA; Professor, Vellore Institute of Technology, India and Hebei University of Technology, China

15.10 *FQ-1:IL03* **The Processing and Application of Controlled Porous Bioceramic Materials Based on Calcium Phosphates Doped with Different Cations**

Dj. VELJOVIC, R. PETROVIC, Dj. JANACKOVIC, Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia; V. UGRINOVIC, T. MATIC, Innovation Center of the Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia

15.45 *FQ-5:IL01* **Clinical Translation in Regenerative Engineering**

C.T. LAURENCIN, Connecticut Convergence Institute for Translation in Regenerative Engineering, University of Connecticut, Health Center Farmington, CT, USA

Focused Session FA-5 / FQ-8

**3D Bioprinting of
Soft Tissues and Organs**

(Focused Joint Session with Conference FQ)

Chair: Giovanni VOZZI, Italy (*Convener*)

16.25 *Welcome*

16.30 *FA-5/FQ-8:IL02* **Biofabrication: From Additive Manufacturing to Bioprinting and Bioassembly for Regenerative Medicine Applications**

L. MORONI, A. ALDANA, Maastricht University, MERLN Institute for Technology-Inspired Regenerative Medicine, Complex Tissue Regeneration Department, Maastricht, The Netherlands

17.00 *FA-5/FQ-8:IL03* **Putting 3D Bioprinting to the Use of Tissue Model Fabrication**

Y. SHRIKE ZHANG, Division of Engineering in Medicine, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Cambridge, MA, USA

17.30 *FA-5/FQ-8:IL11* **3D in Vitro Model of the Microbiota-gut-bone Axys**

G. VOZZI, F. BIAGINI, F. MONTEMURRO, C. DE MARIA, Research Center "E. Piaggio" and Dept of Information Engineering, University of Pisa, Pisa, Italy; M. CALVIGIONI, E. GHELARDI, Research and New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy; G. CERQUENI, S. MARCHI, M. MATTIOLI-BELMONTE, DISCLIMO, Università Politecnica delle Marche, Ancona, Italy

FR - 4th International Conference
**MATERIALS CHALLENGES FOR
SUSTAINABLE NUCLEAR FISSION AND
FUSION TECHNOLOGIES**

Room: **SPOLETO A**

Chair: Massimo E. ANGIOLINI, Italy (*Convener*)

14.25 *Welcome*

14.30 *FR-1:IL02* **Discrete and Continuum Models for Body Forces for Virtual Tokamak Reactor Simulations**

S.L. DUDAREV, M. BOLEININGER, M.R. GILBERT, P.-W. MA, D.R. MASON, L. REALI, UKAEA, Culham Science Centre, Oxfordshire, UK

15.00 *FR-1:IL03* **Rapid, Combinatorial Down-selection of Materials for Fusion Power**

M. SHORT¹, B. DACUS¹, K. WOLLER¹, G. WALLACE¹, E. BOTICA ARTALEJO¹, K. HATTAR², C. DENNETT³, W. ZHOU¹, A. PETERKIN¹, W. CAIRANG¹, Y. YANG⁴, A. MINOR⁵, G. ZHENG¹, ¹Massachusetts Institute of Technology, Cambridge, MA, USA; ²Sandia National Lab., USA; ³Idaho National Lab., USA; ⁴Penn State University, USA; ⁵University of California at Berkeley, USA

15.30 *FR-1:IL05* **Oxidation of P91 Steel in Molten Lead**

M.E. ANGIOLINI, P. AGOSTINI, F. FABBRI, M. FALCONIERI, Dept for Fusion and Tech. for Nuclear Safety and Security, ENEA, Rome, Italy; F. MURA, Centro di Ricerca per le Nanotecnologie Applicate all'Ingegneria, Università di Roma "La Sapienza", Rome, Italy

15.50 *Break*

Chair: Sergei DUDAREV, UK

16.20 *FR-2:IL01* **EUROFER97 as Structural Material for the ITER Test Blanket Module and the DEMO Starter Blanket**

G. AIELLO¹, E. GAGANIDZE², P. LAMAGNÈRE³, G. PINTSUK⁴, M. RIETH², D. TEREITYEV⁵, M. ZMITKO⁶, ¹EUROfusion-Programme Manag. Unit, Fusion Tech. Dept, Garching, Germany; ²Karlsruhe Inst. of Technology, Inst. for Applied Mats, Eggenstein-Leopoldshafen, Germany; ³CEA, DES, IRESNE, Nuclear Technology Dept, Cadarache, Saint Paul-Lez-Durance, France; ⁴Forschungszentrum Jülich GmbH, Inst. für Energie- und Klimaforschung - Plasmaphysik, Jülich, Germany; ⁵SCK CEN, Nuclear Materials Science Inst., Mol, Belgium; ⁶Fusion for Energy (F4E), Barcelona, Spain

16.50 *FR-2:IL02* **Radiological Response of Fusion Materials: Impact of Impurities Radwaste**

M.R. GILBERT, G.W. BAILEY, UKAEA, Culham Science Centre, Abingdon, UK

17.20 *FR-2:IL03* **Development of Fabrication Technology for Low Activation Vanadium Alloys as Fusion Blanket Structural Materials**

TAKUYA NAGASAKA^{1, 2}, T. TANAKA¹, J. SHEN^{1, 2}, S. JIANG³, K.-I. FUKUMOTO⁴, T. TOYAMA⁵, K. YABUUCHI⁶, ¹National Inst. for Fusion Science, Toki, Japan; ²SOKENDAI (The Graduate University for Advanced Studies), Toki, Japan; ³Qilu University of Technology (Shandong Academy of Sciences), Jinan, China; ⁴Research Inst. of Nuclear Eng., University of Fukui, Tsuruga, Japan; ⁵Inst. for Materials Research, Tohoku University, Sendai, Japan; ⁶Inst. of Advanced Energy, Kyoto University, Uji, Japan

SYMPOSIUM FA
**3D PRINTING AND BEYOND: STATE-
OF-THE-ART AND NEW PARADIGMS
FOR ADDITIVE MANUFACTURING
TECHNOLOGIES**

Room: **ASSISI B**

Chair: Lorenzo VALDEVIT, USA

- 9.00 *FA-1:IL05* **Quality Aspects with Regard to 3D Printing of Ceramics**
H. FRIEDRICH, F. RAETHER, J. VOGT, Fraunhofer Zentrum für Hochtemperatur-Leichtbau HTL, Bayreuth, Germany
- 9.30 *FA-1:IL06* **Additive Manufacturing of Ceramics and Ceramic Composites for Aerospace Applications**
J.J. BOWEN^{1,2}, L.M. RUESCHHOFF¹, K.L. MARTIN^{1,2}, D.P. STREET^{1,3}, M.J.S. PARVELESCU^{1,2}, **M.B. DICKERSON**¹, ¹Materials and Manufacturing Directorate, Air Force Research Laboratory, Wright-Patterson AFB, OH, USA; ²UES Inc., Dayton, OH, USA; ³NRC Research Associateship Programs, Washington, DC, USA
- 10.00 *FA-1:IL08* **Innovative Zirconia-based Material Shaped by SLA 3D Printing**
C. CHAPUT, C. SCHICK, 3DCERAM-SINTO, Bonnac La Cote, France
- 10.30 *Break*

Focused Session FA-5 / FQ-8
**3D Bioprinting of
Soft Tissues and Organs**

(Focused Joint Session with Conference FQ)

Chair: Albert TARANCON, Spain

- 11.00 *FA-5/FQ-8:IL06* **Biofabricating Murine and Human Myo-substitutes for Rapid Volumetric Muscle Loss Restoration**
M. COSTANTINI, Institute of Physical Chemistry - PAS, Warsaw, Poland; C. GARGIOLI, Università degli studi di Roma - Tor Vergata, Rome, Italy
- 11.30 *FA-5/FQ-8:L07* **Nano-encapsulation of Stem Cell-derived β -cell Aggregates using 3D Bioprinting System**
YEONGGWON JO, D.G. HWANG, M. KIM, S. CHO, J. JANG, Pohang University of Science and Technology (POSTECH), Pohang, Gyeongbuk, South Korea
- 11.50 *FA-5/FQ-8:L08* **Modular Assembly of 3D Bioprinted Engineered Heart Tissue to Reconstruct Contractile Direction to Mimic Myocardial Fiber Orientation**
DONG GYU HWANG, U. YONG, H. CHOI, J. JANG, POSTECH, Pohang, Gyeongbuk, South Korea

SYMPOSIUM FB
**FLEXIBLE AND STRETCHABLE
ELECTRONICS: MATERIALS, DEVICES
AND APPLICATIONS**

Room: **SALA RELATORI**

Chair: Mario PROSA, Italy (*Convener*)

8.55 *Welcome*

9.00 *FB-1:L05* **Laser Enhancement of Pristine PEDOT:PSS Conductivity and Applications in Organic Electronics**

J. TROUGHTON¹, J. RODRIGUEZ-PEREIRA², N. PEILLON¹, J. MACAK², T. DJENIZIAN^{1, 3}, M. RAMUZ¹, ¹Ecole des Mines de Sainte Etienne, Gardanne, France; ²Center of Materials and Nanotechnologies, University of Pardubice, Pardubice, Czechia, ³Center of Physical-Chemical Methods of Research and Analysis, Al-Farabi Kazakh National University, Almaty, Kazakhstan

9.25 *FB-1:IL07* **Electrodes by Selective Laser Sintering**

M. HAUKKA, University of Jyväskylä, Department of Chemistry, Jyväskylä, Finland

10.00 *FB-1:L08* **Benefits and Challenges Associated to Oxide Coating of Metallic Nanowire Networks**

C. SANCHEZ^{1, 2}, A. SEKKAT¹, M. AKBARI¹, C. CRIVELLO¹, D.T. PAPANASTSAIOU¹, L. BARDET¹, C. JIMÉNEZ¹, D. BELLET¹, D. MUÑOZ-ROJAS¹, ¹Univ. Grenoble Alpes, LMGP, CNRS, Grenoble INP, Grenoble, France; ²Univ. Grenoble Alpes, CNRS, Grenoble INP, CERAG, Grenoble, France

10.25 *FB-1:L09* **3D Printed Soft Organic Thermoelectric Generators**

H.E. BAYSAL, F. MOLINA-LOPEZ, KU Leuven, Leuven, Belgium

10.50 *Break*

Chair: Matti HAUKKA, Finland

11.20 *FB-1:L10* **Efficient and Stable Transparent Electrodes based on Silver Nanowire Networks**

L. BARDET^{1, 2}, M. AKBARI¹, C. CRIVELLO¹, L. RAPENNE¹, H. ROUSSEL¹, M. WEBER¹, C. JIMÉNEZ¹, D. MUÑOZ-ROJAS¹, A. DENNEULIN², D. BELLET¹, ¹Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; ²Univ. Grenoble Alpes, CNRS, Grenoble INP, LGP2, Grenoble, France

11.45 *FB-1:IL11* **Printed and Flexible Electronics and Photonics with Graphene and 2D Materials for Sensing, Wearable Electronics and Bioelectronics**

F. TORRISI, Imperial College London, London, UK

12.20 *FB-1:L13* **Plasmonic ITO Nanoparticles' Ink for IR Thermoelectric Applications on Flexible Substrates**

A. MAZZOTTA, M. CARLOTTI, A. OTTOMANIELLO, V. MATTOLI, Center for Materials Interfaces, Italian Institute of Technology, Pontedera, Italy; A. GABBANI, M. RUGGERI, E. FANTECHI, F. PINEIDER, A. PUCCI, Department of Chemistry, University of Pisa, Pisa, Italy

SYMPOSIUM FD
**RECENT ACHIEVEMENTS IN
MULTIFERROIC AND MAGNETOELECTRIC
MATERIALS**

Room: **CORCIANO**

Chair: Shireen ADENWALLA, USA

9.30 *FD-2:IL02* **Switchable Spin Springs at Oxide Interfaces**
K. DÖRR, M.M. KOCH, L. BERGMANN, A.D. RATA, A. HERKLOTZ,
Institute of Physics, MLU Halle-Wittenberg, Halle, Germany

10.05 *FD-2:L03* **Nanostructured Multiferroic Pb(Zr,Ti)O₃-NiFe₂O₄ Thin-film Composites**
A. MATAVŽ, P. KOŽELJ, **V. BOBNAR**, Condensed Matter Physics
Dept., Jožef Stefan Institute, Ljubljana, Slovenia; M. WINKLER, K.
GEIRHOS, P. LUNKENHEIMER, Experimental Physics V, Center for
Electronic Correlations and Magnetism, University of Augsburg,
Augsburg, Germany

10.30 *Break*

Chair: Kathrin DOERR, Germany

11.00 *FD-2:IL04* **Ferroelectric Two-dimensional Electron Gases**
J. BRÉHIN¹, F. TRIER¹, L. M. VINCENTE-ARCHE¹, P. HEMME²,
Y. CHEN³, P. NOËL⁷, M. COSSET-CHÉNEAU⁷, M. D'ANTUONO^{3,4},
J.P. ATTANÉ⁷, L. VILA⁷, D. STORNAIUOLO^{3,4}, C. PIAMONTEZE⁵, J.
VARIGNON⁶, B. DKHIL⁸, V. GARCIA¹, S. FUSIL¹, A. BARTHÉLÉMY¹,
M. CAZAYOUS², M. SALLUZZO³, M. BIBES¹, ¹Unité Mixte de
Physique, CNRS, Thales, Université Paris Saclay, Palaiseau, France;
²Laboratoire Matériaux et Phénomènes Quantiques, Université de
Paris, France; ³CNR-SPIN, Complesso Monte S. Angelo, Napoli,
Italy; ⁴University of Naples "Federico II", Complesso Monte S.
Angelo, Napoli, Italy; ⁵Swiss Light Source, Paul Scherrer Institut,
Villigen PSI, Switzerland; ⁶CRISMAT, CNRS UMR 6508, ENSICAEN,
Normandie Université, Caen Cedex, France; ⁷Univ. Grenoble Alpes,
CEA, CNRS, Grenoble INP, Spintec, France; ⁸Laboratoire Structures,
Propriétés et Modélisation des Solides, CentraleSupélec, Université
Paris Saclay, CNRS, France

11.35 *FD-2:IL05* **Ferroelectric Photovoltaics**
A. BHATNAGAR, Zentrum für Innovationskompetenz (ZIK) SiLi-
nano, Martin Luther Universität Halle-Wittenberg, Halle (Saale),
Germany

SYMPOSIUM FF
**ELECTROMAGNETIC METAMATERIALS
AND METASURFACES: RECENT
RESEARCH ACHIEVEMENTS AND NEW
PARADIGMS**

Room: **MAGIONE B**

Chair: Mikhail LAPINE, Australia

9.30 *FF-2:IL01* **Nanopillars Arrays as Anisotropic Metamaterials and Metasurfaces**

A.V. LAVRINENKO¹, E. SHKONDIN¹, O. TAKAYAMA¹, R. MALUREANU¹, M. E. ARYAEE PANAH¹, O.Y. YERMAKOV², A.A. BOGDANOV², S. CHATTERJEE³, G. STRANGI³, ¹Technical University of Denmark, Kgs. Lyngby, Denmark; ²ITMO University, Saint Petersburg, Russia; ³Case Western Reserve University, Cleveland, USA

10.05 *FF-2:IL03* **Topological Slow Light beyond the Time-bandwidth Limit**

K.L. TSAKMAKIDIS, K. BASKOURELOS, Department of Physics, National and Kapodistrian University of Athens, Panepistimioupolis, Athens, Greece

10.40 *FF-2:L05* **Ultrathin Suspended Membrane Metasurfaces for Efficient Terahertz Light Absorption and Modulation**

A. OTTOMANIELLO, V. MATTOLI, Center for Materials Interfaces, Istituto Italiano di Tecnologia, Pontedera, Italy; P. VEZIO, A. TREDICUCCI, Dipartimento di Fisica, University of Pisa, Pisa, Italy; S. ZANOTTO, A. PITANTI, Laboratorio NEST Scuola Normale Superiore, and Istituto Nanoscienze CNR, Pisa, Italy

11.05 *Break*

Chair: Kosmas TSAKMAKIDIS, Greece

11.35 *FF-2:IL06* **Superemission and Superabsorption Effects in Metamaterials**

S.I. MASLOVSKI, Instituto de Telecomunicações and Department of Electronics, Telecommunications and Informatics, University of Aveiro, Aveiro, Portugal

12.10 *FF-2:L07* **Hierarchically Structured Functional Ceramic Composites for Microwave Absorption using Graphene Augmented Inorganic Nanofibers**

A. SAFFAR SHAMSHIRGAR¹, R.E. ROJAS HERNÁNDEZ¹, G.C. TEWARI², J.F. FERNÁNDEZ³, R. IVANOV¹, M. KARPPINEN², I. HUSSAINOVA¹, ¹Department of Mechanical and Industrial Engineering, Tallinn University of Technology, Tallinn, Estonia; ²Department of Chemistry and Materials Science, Aalto University, Aalto, Finland; ³Institute of Ceramics and Glass (ICV-CSIC), Madrid, Spain

SYMPOSIUM FG
**ADVANCES IN INORGANIC
LUMINESCENT MATERIALS**

Room: **MONTEFALCO**

Chair: Markus SUTA, Germany

- 9.00 *FG-1:IL07* **TL and OSL as Research Tools in Luminescence: Possibilities and Limitations**
E.G. YUKIHARA, Department of Radiation Safety and Security, Paul Scherrer Institute, Villigen PSI, Switzerland
- 9.35 *FG-1:IL08* **Electron Transfer between Lanthanide Impurities: Insights from Multiconfigurational Calculations**
J.J. JOOS, LumiLab, Department of Solid State Sciences, Ghent University, Gent, Belgium; Z. BARANDIARÁN, L. SEIJO, Departamento de Química, Instituto Universitario de Ciencia de Materiales Nicolás Cabrera, and Condensed Matter Physics Center (IFIMAC), Universidad Autónoma de Madrid, Madrid, Spain
- 10.10 *FG-1:L09* **New Near-IR Optical Transitions in Sm³⁺ and Sm³⁺-Yb³⁺ doped Tellurite Glasses and Application in Tissue Transmission Spectroscopy**
E. KUMI-BARIMAH, G. SHARMA, Y. CHEN, R. TENWICK, M. EL-MURISH, A. JHA. School of Chemical and Process Engineering, University of Leeds, Woodhouse, Leeds, UK
- 10.35 *Break*
- Chair: Jonas JOOS, Belgium
- 11.05 *FG-1:IL11* **Theoretical Discussion of Mn⁴⁺ Luminescence**
M.G. BRIK^{1,2,3}, A.M. SRIVASTAVA⁴, M. PIASECKI³, ¹College of Sciences, Chongqing University of Posts and Telecommunications, Chongqing, China; ²Institute of Physics, University of Tartu, Tartu, Estonia; ³Institute of Physics, Jan Dlugosz University, Czestochowa, Poland; ⁴Srivastava consulting LLC, Niskayuna, NY, USA
- 11.40 *FG-1:L12* **Delineating the Effects of Metal Co-doping for Improved Upconversion in Inorganic Phosphors: A Case Study in Gadolinium Vanadate**
A. CHAUHAN¹, S. KATARIA¹, D. BUSKO¹, F.A. CARDONA¹, **A. TURSHATOV**¹, B.S. RICHARDS^{1,2}, ¹Institute of Microstructure Technology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; ²Light Technology Institute, Karlsruhe Institute of Technology, Karlsruhe, Germany
- 12.05 *FG-2:IL02* **Direct Laser Patterning as a Possible Strategy for Spatially Controlled QDs Formation**
F. ANTOLINI, F. LIMOSANI, R. CARCIONE, ENEA C.R. Frascati, Fusion and Technologies for Nuclear Safety and Security Department, Physical Technologies for Safety and Health Division, Micro and Nanostructure Laboratory, Italy; L. ORAZI, Department of Science and Methods for Engineering, University of Modena and Reggio Emilia, Reggio Emilia, Italy; R. GILLANDERS, I.D.W. SAMUEL, University of St. Andrews, St. Andrews, UK

FH - 4th International Conference

**EMERGING MATERIALS, TECHNOLOGIES
AND APPLICATIONS FOR NON-VOLATILE
MEMORY AND MEMRISTIVE DEVICES**

Room: **ASSISI A**

Chair: Sabina SPIGA, Italy & Manuel LE GALLO, Switzerland

- 9.00 *FH-1.1:IL05* **The Role of (dis)Order on the Structural-electronic Interplay in Amorphous GexSe1-x: A Microscopic Investigation**
F. TAVANTI, A. SLASSI, **A. CALZOLARI**, CNR-NANO Istituto Nanoscienze, Modena, Italy
- 9.25 *FH-1.1:L02* **New Insight into the Origin of the Resistive Switching Mechanism and the Low Power Consumption of GeTe/Sb2Te3 Superlattices in Phase-change Memory Devices**
D. TERE BENEC¹, N. CASTELLANI¹, N. BERNIER¹, V. SEVER¹, P. KOWALCZYK¹, M. BERNARD¹, M.-C. CYRILLE¹, N.-P. TRAN¹, J.-Y. RATY^{1,2}, F. D'ACAPITO³, F. HIPPERT⁴, P. NOÉ¹, ¹Université Grenoble Alpes, CEA, LETI, Grenoble, France; ²CESAM-Physics of Solids Interfaces and Nanostructures, B5, Université de Liège, Belgium; ³CNR-IOM-OGG c/o ESRF - The European Synchrotron, Grenoble, France; ⁴Université Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France
- 9.40 *FH-1.1:L03* **Analysis of Ge-incorporation and Crystallization Study in GexSbyTez Phase Change Alloys for Automotive Applications**
A. DIAZ FATTORINI, F. DE NICOLA, **M. BERTELLI**, S. DE SIMONE, V. MUSSI, R. CALARCO, M. LONGO, CNR-IMM Unit of Rome, Rome, Italy
- 9.55 *FH-1.1:L04* **Electronic Properties of Phase Change Material Heterostructures based on Ge-rich Ge-Sb-Te Alloys**
F. RIGHI RIVA¹, C. CHÈZE¹, E. PLACIDI², G. DI BELLA², S. PRILI¹, A. DIAZ FATTORINI³, S. CECCHI⁴, V. MUSSI³, S. DE SIMONE³, M. LONGO³, R. CALARCO³, M. BERNASCONI⁵, O. ABOU EL KHEIR⁵, F. ARCIPRETE¹, ¹Dept of Physics, University of Rome Tor Vergata, Roma, Italy; ²Dept of Physics, Sapienza University of Rome, Rome, Italy; ³CNR-IMM, Roma, Italy; ⁴Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany; ⁵Dept of Materials Science, University of Milano-Bicocca, Milan, Italy
- 10.10 *FH-1.1:L06* **Selective MOCVD Growth of Sb-Te and In-Ge-Te Nanostructures on Templated Substrates for Phase Change Memories**
R. CECCHINI^{1,2}, M. LONGO^{1,3}, C. MARTELLA¹, A. LAMPERTI¹, S. BRIVIO¹, F. ROSSI⁴, L. LAZZARINI⁴, E. VARESI⁵, ¹CNR-IMM, Unit of Agrate Brianza, Agrate Brianza (MB), Italy; ²CNR-IMM, Bologna, Italy; ³CNR-IMM, Rome, Italy; ⁴CNR-IMEM, Parma, Italy; ⁵Micron Technology Inc., Vimercate (MB), Italy
- 10.25 *FH-1.1:L07* **Shape Controlled Self-assembly of Core Shell Ge-Sb-Te/Sb2Te3 Nanowires by MOCVD**
A. KUMAR, **C. WIEMER**, CNR-IMM Unit of Agrate Brianza, Agrate Brianza, Italy; R. CECCHINI. CNR-IMM Unit of Bologna, Bologna, Italy; M. SCUDERI, G. NICOTRA, CNR-IMM Unit of Catania, Catania, Italy; V. MUSSI, S.D. SIMONE, R. CALARCO, M. LONGO, CNR-IMM Unit of Rome, Rome, Italy
- 10.40 *Break*

Continued on next page

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Chair: Sabina SPIGA & Arrigo CALZOLARI, Italy

- 11.10 *FH-1.1:IL09* **Deep Learning Inference and Training using Computational Phase-change Memory**
M. LE GALLO, A. SEBASTIAN, IBM Research Europe, Rueschlikon, Switzerland
- 11.35 *FH-1.1:L11* **C-based Phase-change Material Nanocomposites for Improved Phase-change Memory**
J. PATERSON¹, M. TOMELLERI^{1, 2}, D.TÉRÉBENEC¹, R.R. CHAHINE¹, M. BERNARD¹, N. BERNIER¹, N. CASTELLANI¹, M.-C. CYRILLE¹, N.-P. TRAN¹, R. CRAVERO³, O. BOURGEOIS³, V.M. GIORDANO⁴, J.-Y. RATY^{1, 5}, F. D'ACAPITO⁶, D. BENOIT², F. HIPPERT⁷, P. NOÉ¹, ¹Univ. Grenoble Alpes, CEA, LETI, Grenoble, France; ²STMicroelectronics, Crolles, France; ³Univ. Grenoble Alpes, CNRS, Grenoble INP, Institut Néel, Grenoble, France; ⁴ILM, UMR5306 Université Lyon 1-CNRS, Villeurbanne, France; ⁵Physics of Solids Interfaces and Nanostructures, B5, Université de Liège, Sart-Tilman, Belgium; ⁶CNR-IOM-OGG c/o ESRF - The European Synchrotron, Grenoble, France; ⁷Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France
- 11.50 *FH-1.1:L12* **Thermal Engineering Targeting Low Power Consumption for Next Generation Phase-change Memory**
C. DE CAMARET, Y. LE-FRIEC, STMicroelectronics, Crolles, France; G. BOURGEOIS, O. CUETO, V. MELI, V. BEUGIN, N. CASTELLANI, M.C. CYRILLE, F. ANDRIEU, J. ARCAMONE, G. NAVARRO, CEA-LETI, Grenoble, France
- 12.05 *FH-1.1:L13* **Overcoming the Thermal Stability Limit of Chalcogenide Phase-change Materials for High-temperature Applications**
M. TOMELLERI^{1, 2}, F. HIPPERT³, A. ALBANESE¹, F. D'ACAPITO⁴, T. FARJOT¹, C. SABBIONE¹, M. TESSAIRE¹, D. TEREBENEC¹, N. CASTELLANI¹, V.M. GIORDANO⁵, D. BENOIT², P. NOÉ¹, ¹Univ. Grenoble Alpes, CEA, LETI, Grenoble, France; ²STMicroelectronics, Crolles, France; ³Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; ⁴CNR-IOM-OGG c/o ESRF - The European Synchrotron, Grenoble, France; ⁵ILM, UMR 5306 Univ. Lyon 1-CNRS, Villeurbanne, France
- 12.20 *FH-1.1:L14* **A Novel Sb₂Te₃/Ge₂Sb₂Te₅/Ge Heterostructure with Enhanced Stability for PCM Application**
A. DIAZ FATTORINI, F. DE NICOLA, M. BERTELLI, S. DE SIMONE, V. MUSSI, M. LONGO, R. CALARCO, CNR-IMM Unit of Rome, Rome, Italy; G. D'ARRIGO, I. LOPEZ GARCIA, G. MAIDA, S.M.S. PRIVITERA, CNR-IMM Headquarters, Catania, Italy; M. BORGHI, A. REDAELLI, STMicroelectronics, Agrate B.za (MB), Italy; M.-C. CYRILLE, CEA, LETI, Univ. Grenoble Alpes, Grenoble, France

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

Room: **MAGIONE A**

Chair: Matthew R. ROSENBERGER, USA

- 9.00 *FI-1:IL05* **Advances in Organic 2D Crystals**
XINLIANG FENG, Center for Advancing Electronics Dresden & Faculty of Chemistry and Food Chemistry, Technische Universität Dresden, Germany
- 9.35 *FI-1:L07* **Mechanical Strain in Silicene Membranes**
C. MASSETTI², C. MARTELLA¹, D.S. DHUNGANA¹, C. GRAZIANETTI¹, A. MOLLE¹, E. BONERA², ¹CNR-IMM Agrate Brianza unit, Agrate Brianza (MB), Italy; ²Università Milano-Bicocca, Milano, Italy
- 10.00 *FI-1:L08* **Electronic Properties in MOCVD Mono- and Bilayer MoS₂ on CVD Single-layer Graphene on Alpha-Al₂O₃ (0001) at Atomic Resolution**
H. WÖRDENWEBER^{1, 2}, S. KARTHÄUSER¹, A. GRUNDMANN³, Z. WANG^{1, 2}, H. KALISCH³, A. VESCAN³, M. HEUKEN^{3, 4}, R. WASER^{1, 2}, S. HOFFMANN-EIFERT¹, ¹Peter Grünberg Institute 7&10, Forschungszentrum Jülich GmbH and JARA-FIT, Jülich, Germany; ²RWTH Aachen University, Aachen, Germany; ³Compound Semiconductor Technology, RWTH Aachen University, Aachen, Germany; ⁴AIXTRON SE, Herzogenrath, Germany
- 10.25 *FI-1:L09* **New Way of Conceiving the Structure of Graphene**
J. NIEWIADOMSKA-KAPLAR, Scientific Publishing House Tab, Rome, Italy
- 10.50 *Break*

Chair: Artem MISHCHENKO, UK

- 11.20 *FI-2:IL05* **Ferroelectric Domains and Networks of Piezoelectric Domains in Twistrionic Bilayers of Transition Metal Dichalcogenides (TMD)**
V. FALKO, National Graphene Institute, University of Manchester, Manchester, UK
- 11.55 *FI-2:L09* **2D Materials Beyond Graphene**
Y. GOGOTSI, C.E. SHUCK, A.J. Drexel Nanomaterials Institute, Drexel University, Philadelphia, PA, USA
- 12.20 *FI-2:IL02* **Mechanical Properties of Graphene and 2D Material Reinforcements in Composites**
I.A. KINLOCH, Dept. of Materials and National Graphene Institute, University of Manchester, Manchester, UK

SYMPOSIUM FJ
**ADVANCED PHOTOCATALYTIC
MATERIALS FOR ENERGY AND
CHEMISTRY IN TRANSITION AND FOR
THE ENVIRONMENT**

Room: **NORCIA**

Chair: Gabriele CENTI, Italy (*Convener*)

- 9.00 *FJ-1:IL03* **Nanostructure Design for Solar Water Splitting**
F. CADDEO, Z. DURMUS, B. MAHMOUDI, F. HIMMELSTEIN, D. EBERHART, T. LINDENBERG, H. ZHANG, R. NAUMANN, **A.W. MAIJENBURG**, Center for Innovation Competence SiLi-Nano, Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany
- 9.35 *FJ-2:IL02* **Semiconductor Induced Nitrate Radicals Formation and Applications for Selective Photocatalytic Syntheses**
F. PARRINO, S. DIRÈ, R. CECCATO, Department of Industrial Engineering, University of Trento, Trento, Italy; L. PALMISANO, Department of Engineering, University of Palermo, Palermo, Italy; S. LIVRAGHI, E. GIAMELLO, Dipartimento di Chimica and NIS, University of Torino, Torino, Italy
- 10.10 *FJ-2:IL04* **Charge Carriers Dynamics in WO₃/BiVO₄ Hetero-junction Photoanodes**
I. GRIGIONI, M.V. DOZZI, **E. SELLI**, Dipartimento di Chimica, Università degli Studi di Milano, Milano, Italy
- 10.45 *Break*

Chair: Francesco PARRINO, Italy

- 11.15 *FJ-2:IL05* **Antibacterial Properties of Ca₂Fe₂O₅ Brownmillerite for Water Disinfection**
A. ŠUTKA¹, M. VANAGS¹, L. MEZULE², ¹Institute of Materials and Surface Engineering, Faculty of Materials Science and Applied Chemistry, Riga Technical University, Riga, Latvia; ²Water Research and Environmental Biotechnology Laboratory, Faculty of Civil Engineering, Riga Technical University, Riga, Latvia
- 11.50 *FJ-2:IL06* **Quantifying Charge Transport and Recombination in Photoelectrodes**
P. CENDULA, A. SANCHETI, P. SIMON, G. CIBIRA, E. SERVICE, T. MOEHL, University of Zilina, Zilina, Slovakia

SYMPOSIUM FK
**THERMOELECTRICS: MATERIALS
RESEARCH AND APPLICATION
TECHNOLOGIES**

Room: **SPELLO**

Chair: In CHUNG, South Korea

9.30 *FK-1:IL13* **Thermomagnetic Transport in Layered Topological Semimetals**

M. ZEBARJADI, Md.S. AKHANDA, E. REZAEI, K. ESFARJANI, University of Virginia, Charlottesville, VA, USA; S. KRYLYUKE, A.V. DAVYDOV, N, Material Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD, USA

10.05 *FK-1:IL14* **High-performance Thermoelectric Oxides**

A.V. KOVALEVSKY, G. CONSTANTINESCU, D. LOPES, K.V. ZAKHARCHUK, S. RASEKH, A.A. YAREMCHENKO, CICECO-Aveiro Institute of Materials, Dept of Materials and Ceramic Engineering, University of Aveiro, Aveiro, Portugal; N.M. FERREIRA, i3N, Physics Dept, University of Aveiro, Aveiro, Portugal; W. XIE, A. WEIDENKAFF, Materials and Resources, Techn. Universität Darmstadt, Darmstadt, Germany; A. GALATANU, National Institute of Materials Physics, Magurele, Romania; M.H. AGUIRRE, Condensed Matter Physics Department, University of Zaragoza, Institute of Material Science of Aragón, ICMA-CSIC, Zaragoza, Spain; Advanced Microscopy Laboratory I+D Building-Campus Río Ebro, Zaragoza, Spain

10.40 *Break*

Chair: Alex MORATA, Spain

11.10 *FK-1:L09* **Innovative Oxidation Protective Glass Coating for Magnesium Silicide-based Thermoelectrics**

F. D'ISANTO¹, F. SMEACETTO¹, K. CHEN², M.J. REECE², M. SALVO¹. ¹Department of Applied Science and Technology (DISAT), Politecnico di Torino, Torino, Italy; ²Nanoforce Technology Limited and School of Engineering & Materials Science, Queen Mary University of London, London, UK

11.35 *FK-1:IL10* **Layered Chalcogenides as Thermoelectric Materials**

P. VAQUEIRO, Department of Chemistry, University of Reading, Reading, UK

12.10 *FK-1:IL11* **Unexpected Interstitials in Half-Heusler Compounds**

WENJIE XIE¹, R. YAN¹, A. WEIDENKAFF^{1,2}, ¹Department of Materials and Earth Sciences, Technical University of Darmstadt, Darmstadt, Germany; ²Fraunhofer Research Institution for Materials Recycling and Resource Strategies IWKSK, Germany

SYMPOSIUM FL
**STIMULI RESPONSIVE AND
MULTIFUNCTIONAL POLYMERS:
PROGRESS IN MATERIALS AND
APPLICATIONS**

Room: **SPOLETO B**

Chair: Hidenori OKUZAKI, Japan

- 9.30 *FL-3:IL01* **How Can “Smart” Organometallic Hydrogels Learn and Forget**
M.A. HEMPENIUS, K. ZHANG, X. FENG, S. SUI, **G.J. VANCOSO**,
University of Twente, Enschede, The Netherlands
- 10.05 *FL-3:L02* **Characterisation and Development of Polycationic Electro-Active Hydrogels**
M. KAIKOV, **A. SORT-MONTENEGRO**, E. DEASY, L. DOWLING,
C. DELANEY, L. FLOREA, School of Chemistry & AMBER, the
SFI Research Centre for Advanced Materials and BioEngineering
Research, Trinity College Dublin, Dublin, Ireland
- 10.30 *FL-3:L03* **Stimuli Responsive Hydrogel Actuators for Microscale Cargo Transport**
T. SPRATTE, C. ARNDT, C. SELHUBER-UNKEL, Institute for
Molecular Systems Engineering, Heidelberg University, Germany;
R. COLACO, A. STAUBITZ, Institute for Organic and Analytical
Chemistry, Bremen University, Germany; N. GEID, J. RÜHE, IMTEK-
Department of Microsystems Engineering, Freiburg University,
Germany
- 10.55 *Break*
- Chair: Marleen KAMPERMAN, The Netherlands
- 11.25 *FL-2:IL01* **Stimuli-responsive Polymer-based Sensors, Muscles, and Drug Delivery Platforms**
M.J. SERPE, Department of Chemistry, University of Alberta,
Edmonton, Canada
- 12.00 *FL-6:IL03* **Photo-crosslinkable, 3D-printable (Bio)Polymer Platform to Serve Tissue Engineering Needs**
J. VAN HOORICK^{1,2}, L. TYTGAT^{1,2}, L. VAN DAMME^{1,3}, A. ARSLAN¹,
P. GRUBER^{4,5}, M. MARKOVIC^{4,5}, A. OVSIANIKOV^{4,5}, H. DECLERCQ⁶,
P. DUBRUEL¹, **S. VAN VLIERBERGHE**^{1,2}, ¹Polymer Chemistry &
Biomaterials Group, Centre of Macromolecular Chemistry, Ghent
University, Ghent, Belgium; ²Brussels Photonics, Department of
Applied Physics and Photonics, Vrije Universiteit Brussel, Brussels,
Belgium; ³Plastic and Reconstructive Surgery, Department of
Surgery, University Hospital Ghent, Ghent, Belgium; ⁴Institute of
Materials Science and Technology, Vienna University of Technology
(TU Wien), Austria; ⁵Austrian Cluster for Tissue Regeneration (www.tissue-regeneration.at); ⁶Tissue Engineering and Biomaterials Group,
Department of Basic Medical Sciences, University Hospital Ghent,
Ghent, Belgium

SYMPOSIUM FP
**BIOLOGICAL, BIOHYBRID AND
BIOINSPIRED MATERIALS: FROM
ELECTRONICS AND PHOTONICS TO
MEDICINE**

Room: **ORVIETO**

Chair: Ioanna KARGUL, Poland

- 11.15 *FP-2:IL01* **Designing Biomimetic Electronic Interfaces**
F. SANTORO, A. MARIANO, Tissue Electronics, Istituto Italiano di
Tecnologia, Naples, Italy
- 11.50 *FP-2:IL03* **Bacterial Photosynthetic Reaction Centers in
Optoelectronic Devices**
F. MILANO, CNR-ISPA Institute of Sciences of Food Production,
Lecce, Italy; M. TROTTA, CNR IPCF Institute for Physical and
Chemical Processes, Bari, Italy; R. RAGNI, D. VONA, G. BUSCEMI,
G.M. FARINOLA, Chemistry Department, University of Bari Aldo
Moro, Bari, Italy
- 12.25 *FP-2:IL04* **Silk Protein for Opto-electronic Skin Devices**
SUNGHWAN KIM, Department of Physics & Department of Energy
Systems Research, Ajou University, Suwon, South Korea

FQ - 13th International Conference
**ADVANCED BIOMATERIALS AND
NANO-BIOTECHNOLOGY FOR MEDICINE**

Room: **ORVIETO**

Chair: Thomas WEBSTER, USA

- 9.00 *FQ-1:IL05* **Nanomaterials with Tunable Properties for Drug Delivery**
S. MAJD, University of Houston, Biomedical Engineering, Houston, TX, USA
- 9.35 *FQ-1:L06* **Physicochemical Study of a Calcium Carbonate-chitosan Composite Cement as a Potential Bone Substitute Material**
E. TOUFIK^{1, 2, 3}, H. NOUKRATI², C. REY⁴, H. BEN YUCEF¹, A. BARROUG^{2, 3}, C. COMBES⁴, ¹Mohammed VI Polytechnic University (UM6P), HTMR-Lab, Benguerir, Morocco; ²Mohammed VI Polytechnic University (UM6P), High Institute of Biological and Paramedical Sciences, ISSB-P, Benguerir, Morocco; ³Cadi Ayyad University, Faculty of Sciences Semlalia, Marrakech, Morocco; ⁴CIRIMAT, Université de Toulouse, CNRS, Toulouse INP-ENSIACET, Toulouse, France
- 10.00 *FQ-1:IL11* **Isothermal Shape Change by Enzymatic Trigger**
P.T. MATHER, Penn State University, University Park, PA, USA; J.H. HENDERSON, S.L. BUFFINGTON, Syracuse University, USA
- 10.35 *Break*

Focused Session FA-5 / FQ-8
**3D Bioprinting of
Soft Tissues and Organs**

(Focused Joint Session with Symposium FA)

Room: **ASSISI B**

Chair: Albert TARANCON, Spain

- 11.00 *FA-5/FQ-8:IL06* **Biofabricating Murine and Human Myo-substitutes for Rapid Volumetric Muscle Loss Restoration**
M. COSTANTINI, Institute of Physical Chemistry - PAS, Warsaw, Poland; C. GARGIOLI, Università degli studi di Roma - Tor Vergata, Rome, Italy
- 11.30 *FA-5/FQ-8:L07* **Nano-encapsulation of Stem Cell-derived β -cell Aggregates using 3D Bioprinting System**
YEONGGWON JO, D.G. HWANG, M. KIM, S. CHO, J. JANG, Pohang University of Science and Technology (POSTECH), Pohang, Gyeongbuk, South Korea
- 11.50 *FA-5/FQ-8:L08* **Modular Assembly of 3D Bioprinted Engineered Heart Tissue to Reconstruct Contractile Direction to Mimic Myocardial Fiber Orientation**
DONG GYU HWANG, U. YONG, H. CHOI, J. JANG, POSTECH, Pohang, Gyeongbuk, South Korea

FR - 4th International Conference
**MATERIALS CHALLENGES FOR
SUSTAINABLE NUCLEAR FISSION AND
FUSION TECHNOLOGIES**

Room: **SPOLETO A**

Chair: Vladimir BARABASH, France

- 9.00 *FR-3:IL01* **Development of Tungsten Fibre-reinforced Copper Alloy Composites for Application as Heat Sink Materials in DEMO High Heat Flux Components**
A. v. MÜLLER, B. BÖSWIRTH, H. GREUNER, K. HUNGER, P. JUNGHANN, R. NEU, J. RIESCH, J.H. YOU, Max-Planck-Institut für Plasmaphysik, Garching, Germany; V. CERRI, A. MORIANI, S. ROCCELLA, E. VISCA, ENEA, Frascati RM, Italy; U. SIEFKEN, Louis Renner GmbH, Bergkirchen, Germany
- 9.30 *FR-3:IL04* **Controlling Interfaces for Enhanced Thermal and Radiation Stability in Tungsten PFMs**
J.R. TRELEWICZ, Stony Brook University, Stony Brook, NY, USA
- 10.00 *FR-3:IL05* **Additive Manufacturing of Tailored Plasma-facing Fusion Wall Components**
D. DOROW-GERSPACH¹, A. KIRCHNER², M. GIPPERICH³, TH. LOEWENHOFF¹, T. WEISSGÄRBER², M. WIRTZ¹, G. PINTSUK¹, CH. LINSMEIER¹, ¹Forschungszentrum Jülich, Institut für Energie- und Klimaforschung, Jülich, Germany; ²Fraunhofer-Institut für Fertigungstechnik und Angewandte Materialforschung IFAM, Dresden, Germany; ³Fraunhofer-Institut für Produktionstechnologie IPT, Aachen, Germany
- 10.30 *FR-3:IL06* **Design and Challenges of Tritium Breeding Blanket Systems Tested in ITER**
H. TANIGAWA, W. GUAN, Y. MIYOSHI, T. KATAGIRI, T. HIROSE, Y. KAWAMURA, Rokkasho Fusion Institute, National Institutes for Quantum Science and Technology, Ibaraki, Japan
- 11.00 *Break*

Chair: Jason TRELEWICZ, USA

- 11.30 *FR-4:IL02* **Functional Materials - Polymer Type Materials for ITER Components**
V. BARABASH, G. KIM, M. LOUGHLIN, E. POLUNOVSKIY, ITER Organization, St. Paul Lez Durance Cedex, France
- 12.00 *FR-4:IL03* **Characterization of Advanced Dielectric and Optical Materials for Application in DEMO**
R. VILA, D. CRUZ, E. LEÓN, Laboratorio Nacional de Fusión, CIEMAT, Madrid, Spain
- 12.30 *FR-4:IL04* **Development of Next Generation Copper Alloys for High Heat Flux Application**
L.L. SNEAD¹, D.J. SPROUSTER¹, J.R. TRELEWICZ¹, S.J. ZINKLE², BIN CHENG², Y. YANG³, ¹Stony Brook University, Stony Brook, NY, USA; ²University of Tennessee, Knoxville. Knoxville TN, USA; ³Oak Ridge National Laboratory, Oak Ridge, TN, USA

Focused Session FA-5 / FQ-8
**3D Bioprinting of
Soft Tissues and Organs**

(Focused Joint Session Symposium FA & Conference FQ)

Room: **ASSISI B**

Chair: Brian DERBY, UK

- 14.30 *FA-5/FQ-8:IL09* **Strategies for Bioprinting of Volumetric Tissue Constructs**
M. GELINSKY, Centre for Translational Bone, Joint and Soft Tissue Research, TU Dresden, Dresden, Germany
- 15.00 *FA-5/FQ-8:IL10* **Organ-on-chip Technology for the Study of Neuro-degenerative Disorders**
A. POLINI, CNR Nanotec, Lecce, Italy
- 15.30 *FA-5/FQ-8:L12* **A Biohybrid 3D-printed Tissue-sensor Platform for Continuous Monitoring of Cardiac Muscle Contractions**
UIJUNG YONG¹, D. KIM¹, H. KIM², D. G. HWANG¹, S. CHO¹, H. NAM¹, S. KIM¹, T. Y. KIM¹, U. JEONG¹, K. KIM¹, W. K. CHUNG¹, W.H. YEO², J. JANG¹, ¹POSTECH, Pohang, Gyeongsangbuk-do, South Korea; ²Georgia Institute of Technology, Atlanta, GA, USA
- 15.50 *Break*

Chair: Jinah JANG, South Korea

- 16.20 *FA-5/FQ-8:L13* **3D Bioprinting of Human Islet-like Cellular Aggregates-Vascular Platform for Modeling Diabetes**
MYUNGJI KIM, S. CHO, D.G. HWANG, J. JANG, POSTECH, Pohang, Gyeongbuk, South Korea
- 16.40 *FA-5/FQ-8:IL15* **Implantable Bioprinted Devices for Vascularisation Studies**
B. DERBY, Department of Materials, University of Manchester, Manchester, UK
- 17.10 *FA-5/FQ-8:IL17* **Toward in vitro Tissue Modeling using Bioprinting Technology**
JINAH JANG, POSTECH, Pohang, Gyeongbuk, South Korea

SYMPOSIUM FD
RECENT ACHIEVEMENTS IN
MULTIFERROIC AND MAGNETOELECTRIC
MATERIALS

Room: **CORCIANO**

Chair: Jordi SORT, Spain

- 10.00 *FD-3:IL01* **Nanomagnetism of Magnetoelectric Granular Thin-film Antiferromagnets**
D. MAKAROV, Helmholtz-Zentrum Dresden-Rossendorf e.V., Institute of Ion Beam Physics and Materials Research, Dresden, Germany
- 10.35 *FD-3:IL02* **Nanoscale Magnetoelectric Effects Revealed by High-resolution Imaging**
M. GHIDINI, University of Parma, Parma, Italy; Diamond Light Source, UK; University of Cambridge, UK
- 11.10 *FD-3:IL05* **Local Writing of Exchange Biased Domains in a Heterostructure of Co/Pd pinned by Magnetoelectric Chromia**
U. SINGH, presently at XWave; M. STREET, presently at Seagate; W. ECHTENKAMP, C. BINEK, **S. ADENWALLA**, University of Nebraska-Lincoln, NE, USA

SYMPOSIUM FE
**FUNCTIONAL NANOMATERIALS FOR NEW
GENERATION SOLID STATE CHEMICAL
SENSORS**

Room: **MAGIONE B**

Chair: Giovanni NERI, Italy (*Convener*)

14.25 *Welcome*

14.30 *FE-1:IL01* **Gas Sensing of NiO-SCCNTs Core-shell Hetero-structures: Optimization by Radial Modulation of the Hole-accumulation Layer**

M.H. RAZA¹, K. MOVLAEE^{2,3}, S.G. LEONARDI³, N. BARSAN⁴, G. NERI³, N. PINNA¹, ¹Institut für Chemie and IRIS Adlershof, Humboldt-Universität zu Berlin, Berlin, Germany; ²Center of Excellence in Electrochemistry, School of Chemistry, College of Science, University of Tehran, Iran; ³Department of Engineering, University of Messina, Messina, Italy; ⁴Institute of Physical and Theoretical Chemistry, University of Tübingen, Tübingen, Germany

15.05 *FE-1:IL02* **High-performance Flexible Gas Sensors based on Carbon-based Nanostructures**

SEON-JIN CHOI, Division of Materials of Science and Engineering, Hanyang University, Seoul, South Korea

15.40 *FE-1:L04* **Dual-hydrogen Bond Donor Functionalized Single-walled Carbon Nanotubes for improved NO₂ Sensing**

JOON-SEOK LEE, S.H. CHOI, W.J. CHOI, J.W. SEO, S.J. CHOI, Division of Materials of Science and Engineering, Hanyang University, Seoul, South Korea

16.05 *FE-1:IL05* **Agro-industrial Biocarbon Nanomaterials for Advanced Gas Sensing Application**

C. ESPRO, University of Messina, Messina, Italy

FH - 4th International Conference

**EMERGING MATERIALS, TECHNOLOGIES
AND APPLICATIONS FOR NON-VOLATILE
MEMORY AND MEMRISTIVE DEVICES**

Room: **ASSISI A**

Chair: Ignasi FINA, Spain & Alberto RIMINUCCI, Italy

- 14.30 *FH-2:IL01* **Magneto-ionics: using Ionic Motion to Control Magnetism in Spintronics Devices**
L. HERRERA DIEZ, CNRS - Université Paris-Saclay, Palaiseau, France
- 14.55 *FH-2:IL02* **Improved Dynamical Switching Properties in Perpendicular Shape Anisotropy Magnetic Tunnel Junctions**
N. CAÇOILLO, B.M.S. TEIXEIRA, B. DIENY, R.C. SOUSA, L.D. BUDA-PREJBEANU, O. FRUCHART, I.L. PREJBEANU, Univ. Grenoble Alpes, CEA, CNRS, Grenoble INP, SPINTEC, Grenoble, France
- 15.20 *FH-2:IL05* **In-memory Computing with Ferroelectric Germanium Telluride**
C. RINALDI, L. NESSI, F. FAGIANI, M. CANTONI, R. BERTACCO, Politecnico di Milano, Milano, Italy; S. VAROTTO, M. BIBES, CNRS, Thales, Palaiseau, France; S. CECCHI, Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany; R. CALARCO, CNR-IMM, Roma, Italy; J. SŁAWINSKA, University of Groningen, Groningen, Netherlands; M. BUONGIORNO NARDELLI, University of North Texas, Denton, TX, USA; S. PICOZZI, CNR-SPIN, Chieti, Italy; P. NOËL, J.-P. ATTANÉ, L. VILA, Université Grenoble Alpes, CEA, CNRS, Grenoble, France
- 15.45 *FH-2:L04* **A High-coercivity Non-volatile Thin-film Magnet based on the Shell-FM Effect**
A. ÇAKIR, Department of Metallurgical and Materials Engineering, Mugla University, Mugla, Turkey; M. ACET, M. FARLE, Physics, Duisburg-Essen University, Duisburg, Germany
- 16.00 *FH-2:L10* **Spin-computing Devices for Edge Artificial Intelligence**
R. BERTACCO, Dipartimento di Fisica, Politecnico di Milano, Milano, Italy
- 16.15 *Break*

Continued on next page

Continued from preceding page

Chair: Christian RINALDI, Italy & Liza HERRERA DIEZ, France

- 16.45 *FH-2:IL06* **Resistive Switching in Ferroelectric Perovskites**
I. FINA, Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, Bellaterra, Catalonia, Barcelona, Spain
- 17.10 *FH-2:IL07* **Hafnia-based Ferroelectric Devices: A Singular Type of Switching**
P. NUKALA^{1,2}, D. CARBONE³, M. AHMADI¹, Y. WEI^{1,4}, S. MATZEN⁵, **B. NOHEDA**^{1,6}, ¹Zernike Institute for Advanced Materials, University of Groningen, Groningen, The Netherlands; ²Center for Nanoscience and Engineering, Indian Institute of Science, Bengaluru, India; ³MAX IV Laboratory, Lund University, Lund, Sweden; ⁴Nanoelectronic Devices Laboratory (NANOLAB), École Polytechnique Fédérale de Lausanne, EPFL, Lausanne, Switzerland; ⁵Center for Nanoscience and Nanotechnology, University Paris-Saclay, CNRS, Palaiseau, France; ⁶CogniGron Centre, University of Groningen, Groningen, The Netherlands
- 17.35 *FH-2:L11* **Ferroelectric Devices on CAAC-OSLSI**
S. NUMATA, Y. EGI, F. ISAKA, Y. JIMBO, T. HAMADA, H. BABA, K. OHSHIMA, T. MURAKAWA, S. TEZUKA, H. KUNITAKE, S. YAMAZAKI, Semiconductor Energy Laboratory, Co, Ltd., Atsugi-shi, Kanagawa, Japan
- 17.50 *FH-2:L12* **Evaluation of Ferroelectric Memory using CAAC-OSLSI Technology**
K. OHSHIMA, K. FURUTANI, T. MATSUZAKI, K. TSUDA, S. NUMATA, F. ISAKA, Y. JIMBO, H. KUNITAKE, T. ONUKI, S. YAMAZAKI, Semiconductor Energy Laboratory Co., Ltd., Atsugi-shi, Kanagawa, Japan

SYMPOSIUM FJ
ADVANCED PHOTOCATALYTIC
MATERIALS FOR ENERGY AND
CHEMISTRY IN TRANSITION AND FOR
THE ENVIRONMENT

Room: **NORCIA**

Chair: Andris SUTKA, Latvia

- 14.30 *FJ-2:IL07* **Molybdenum Doped CuWO₄-based Photoanodes for Solar Energy Conversion**
M.V. DOZZI, A. POLO, C. NOMEILLINI, I. GRIGIONI, E. SELLI,
Dipartimento di Chimica, Università degli Studi di Milano, Milano,
Italy
- 15.05 *FJ-2:IL09* **Multiredox Catalysis on Metal Oxides for Solar Water Splitting**
C.A. MESA, Institute of Advanced Materials (INAM), Universitat
Jaume I, Castellón, Spain

**SYMPOSIUM FK
THERMOELECTRICS: MATERIALS
RESEARCH AND APPLICATION
TECHNOLOGIES**

Room: **SPELLO**

Chair: Paz VAQUEIRO, UK

- 14.30 *FK-1:IL17* **Ultrahigh Thermoelectric Figure of Merit in Hole-doped Polycrystalline SnSe**
IN CHUNG, School of Chemical and Biological Engineering, Seoul National University, Seoul, South Korea
- 15.05 *FK-1:L19* **Boosting the Anisotropic Thermoelectric Performance of PEDOT:PSS by Brush Printing**
BOKAI ZHANG, F. MOLINA-LOPEZ, KU Leuven, Leuven, Belgium
- 15.30 *FK-1:IL21* **Optimization of Thermoelectric Properties in Some Transition Metal Sulfides: the Role of Magnetism**
S. HEBERT, Laboratoire CRISMAT Normandie Université, UMR6508 CNRS, ENSICAEN, UNICAEN, Caen, France
- 16.05 *FK-1:IL24* **Current Progress and Challenges in Organic Thermoelectrics**
M. CAMPOY-QUILES, O. ZAPATA, Institute of Materials Science of Barcelona (ICMAB-CSIC), Bellaterra, Spain
- 16.40 *Break*

Chair: Fabiana D'ISANTO, Italy

- 17.00 *FK-1:IL25* **Molybdenum-based Cluster Compounds as Candidates for High-temperature Thermoelectric Applications**
C. CANDOLFI¹, P. GOUGEON², P. GALL², R. GAUTIER², A. DAUSCHER¹, B. LENOIR¹, ¹Institut Jean Lamour, UMR 7198 CNRS - Université de Lorraine, Nancy Cedex, France; ²Univ Rennes, CNRS, ISCR UMR 6226, INSA Rennes, ENSC Rennes, Rennes, France
- 17.35 *FK-1:IL26* **Si-based Nanowires for Integrated Micro Thermoelectric Generators**
A. MORATA¹, J.M. SOJO GORDILLO¹, C. DUQUE SIERRA¹, A. TARANCÓN^{1,2}, ¹Catalonia Institute for Energy Research (IREC), Sant Adrià de Besòs, Barcelona, Spain; ²Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain
- 18.10 *FK-3:IL05* **Hybrid Thermionic-thermoelectric Generators for Concentrated Solar Radiation: Technological Advances and Future Challenges**
A. BELLUCCI, Istituto di Struttura della Materia-CNR (ISM-CNR), DiaTHEMA Lab, Monterotondo (RM), Italy

SYMPOSIUM FL
**STIMULI RESPONSIVE AND
MULTIFUNCTIONAL POLYMERS:
PROGRESS IN MATERIALS AND
APPLICATIONS**

Room: **SPOLETO B**

Chair: Michael J. SERPE, Canada

- 14.30 *FL-3:IL04* **Dually Cross-linked Stimuli-sensitive Gels**
D. KUCKLING¹, M. RODIN¹, J. LI^{1,2}, J. PARADIES¹, M. YIN²,
¹Department of Chemistry, Paderborn University, Paderborn,
Germany; ²State Key Laboratory of Chemical Resource Engineering,
Beijing Laboratory of Biomedical Materials, Beijing University of
Chemical Technology, Beijing, China
- 15.05 *FL-3:IL05* **Stimuli-sensitive Underwater Adhesive Gels inspired
by Sandcastle Worms**
M. KAMPERMAN, Zernike Institute for Advanced Materials,
University of Groningen, Groningen, The Netherlands
- 15.40 *Break*

Chair: Dirk KUCKLING, Germany

- 16.10 *FL-4:L01* **Corrosion Resistant Polymer-based Nanocomposite
Coatings with High Level of Microwaves Absorption**
T. PRIKHNA¹, O. PRYSIAZHNA¹, V. MOSHCHIL¹, M. MONASTYROV
^{1,2}, L. ANASTASIYA¹, ¹V. Bakul Institute for Superhard Materials
of the National Academy of Sciences of Ukraine, Kyiv, Ukraine;
²Open International University of Human Development «Ukraine»,
Kyiv, Ukraine
- 16.35 *FL-4:IL02* **Lignin as a Valuable Tool for Functional Coatings,
Composites and Beyond**
G. GRIFFINI, Department of Chemistry, Materials and Chemical
Engineering "Giulio Natta", Politecnico di Milano, Milano, Italy
- 17.10 *FL-4:IL03* **Flexible Sensors Driven by Piezoionic Effect**
HIDENORI OKUZAKI, University of Yamanashi, Kofu, Japan

SYMPOSIUM FN
**SMART AND INTERACTIVE
TEXTILES - FROM NANO-ENGINEERED
TEXTILE FIBRES TO INTEGRATED
WEARABLE SYSTEMS**

Room: **MONTEFALCO**

Chair: Niko MUNZENRIEDER, Italy

14.30 *FN-1:IL01* **Textile Actuation - Its Mechanisms, Potentials and Challenges**

N.-K. PERSSON^{1, 2}, C. BACKE¹, M. ASADI MIANKAFSHE¹, T. BASHIR^{1, 3}, E. JAGER⁴, L. GUO¹, ¹The Swedish School of Textiles, Polymeric E-textiles, University of Borås, Borås, Sweden; ²Smart Textiles Technology Lab, Smart Textiles, University of Borås, Borås, Sweden; ³Swedish Centre for Resource Recovery, University of Borås, Borås, Sweden; ⁴Linköping University, Department of Physics, Chemistry and Biology (IFM), Sensor and Actuator Systems, Linköping, Sweden

15.05 *FN-1:L05* **To Study the Effect of Abrasion Cycle and Twist Level on Cotton Knitted Fabric made by Eli-Twist and TFO Yarn**

M.L. REGAR, Department of Fashion Design, National Institute of Fashion Technology Jodhpur, Rajasthan, India

15.30 *FN-1:L06* **Threads of Tradition Satranji: Solapur Durries of Maharashtra India**

C.R. MEENA, Department of Textile Design, National Institute of Fashion Technology, Jodhpur, Rajasthan, India

15.55 *FN-1:L07* **The Sustainable and Creative Approach of Hand Block Prints Fabrics of Rajasthan, India**

J.S. HADA, Department of Textile Design, National Institute of Fashion Technology, Jodhpur, Rajasthan, India

16.20 *Break*

Chair: George STYLIOS, UK

16.50 *FN-3:IL01* **Finishing Treatments of Synthetic Fabrics to Reduce Microplastic Release During Washings**

M. COCCA, F. DE FALCO, G. GENTILE, R. AVOLIO, M.E. ERRICO, E. DI PACE, M. AVELLA, Institute for Polymers, Composites and Biomaterials, National Research Council of Italy, Pozzuoli, NA, Italy

17.25 *FN-3:L03* **Nanocomposite Motion Tape Sensors for Functional Movement Assessment**

Y.-A. LIN, X. ZHAO, S.-C. HUANG, **K.J. LOH**, Department of Structural Engineering, University of California San Diego, La Jolla, CA, USA

17.50 *FN-3:IL05* **Electrospun Nanofibers as designed 3D-structures for Nanomedicine**

I. BONADIES, Institute for Polymers, Composites and Biomaterials (IPCB)-CNR, Pozzuoli (NA), Italy

MONDAY JUNE 27 AFTERNOON

Special Session FO-5
Workshop on
**“AUTONOMIC, ADAPTIVE AND SELF-
SUSTAINING SYSTEMS: FUTURE
PERSPECTIVES”**

Room: **SALA STAMPA**

Chair: D.J. INMAN, USA

14.30 **Housekeeping**

14.35 **Biohybrid Systems for Morphing**

D. LENTINK, University of Groningen, Groningen, The Netherlands

15.20 **Towards a Fly-by-Feel Morphing Wing using Reinforcement Learning**

K.P.T. HAUGHN, D.J. INMAN, University of Michigan, Ann Arbor, MI, USA

15.45 **Powerful, Large Stroke Electrochemical Carbon Nanotube Yarn Artificial Muscles and their Use for Energy Harvesting**

R.H. BAUGHMAN, University of Texas at Dallas, Dallas, TX, USA

16.20 *Break*

16.35 **Multistable Morphing Skins Enabled by Additive Manufacturing**
J. BAUR, University of Illinois Urbana-Champaign, Urbana, IL, USA

17.10 **Multi-functional Structures Technologies for Aerospace Applications - Status and Future**

J. KUDVA, NextGen Aeronautics, Torrance, CA, USA

17.45 **Brain-Inspired Networks for Multifunctional Intelligent Systems in Aerial Vehicle**

Y. CHEN, University of California, Los Angeles, CA, USA

18.20 *FO-5* **Closing Remarks**

B.-L. LEE, Air Force Office of Scientific Research, Arlington, VA, USA

18.30 **Adjourn**

SYMPOSIUM FP
**BIOLOGICAL, BIOHYBRID AND
BIOINSPIRED MATERIALS: FROM
ELECTRONICS AND PHOTONICS TO
MEDICINE**

Room: **ORVIETO**

Chair: Christian B. NIELSEN, UK

- 14.30 *FP-1:LO5* **Surface-specific Polymerization and Deposition of Dopamine: a Novel Mussel-inspired Coating Technology**
M.L. ALFIERI, M. D'ISCHIA, Dept. of Chemical Sciences, University of Naples Federico II, Naples, Italy; M. MASSARO, S. RIELA, Department of Biological, Chemical and Pharmaceutical Sciences and Technologies (STEBICEF), University of Palermo, Palermo, Italy
- 14.55 *FP-1:IL06* **Biomimetic Surfaces as Facilitator for a Clean Environment**
H. HÖLSCHER, Karlsruhe Institute of Technology (KIT), Eggenstein-Leopoldshafen, Germany
- 15.30 *FP-2:IL05* **Interfacing Photosynthetic Enzymes with Newly Designed Transparent Electrode Materials**
J. KARGUL, Solar Fuels Laboratory, Centre of New Technologies, University of Warsaw, Warsaw, Poland
- 16.05 *Break*

Chair: Sunghwan KIM, South Korea

- 16.35 *FP-2:IL06* **Biological-organic Biohybrid Systems Interfaced with Electrodes**
D. VONA¹, G. BUSCEMI^{1,2}, R. LABARILE^{1,2}, R. RAGNI¹, F. MILANO², **M. TROTTA**², ¹Dipartimento di Chimica, Università di Bari, Bari, Italy; ²Istituto per i Processi Chimico Fisici, Consiglio Nazionale delle Ricerche, Bari, Italy
- 17.10 *FP-2:IL08* **Stretchable and Healable Bioelectronic Materials**
F. CICOIRA, Polytechnique Montreal, Montreal, Canada
- 17.45 *FP-2:IL09* **The Electrochemical Domain of Bacterial Photosynthesis**
G. BUSCEMI^{1,2}, D. VONA¹, P. STUFANO³, R. LABARILE^{1,2}, **M. GRATTIERI**^{1,2}, ¹Università degli Studi di Bari "Aldo Moro", Bari, Italy; ²Consiglio Nazionale delle Ricerche IPCF-CNR, Bari, Italy; ³Consiglio Nazionale delle Ricerche CNR-NANOTEC, Bari, Italy

Focused Session FR-10
**MATERIALS ISSUES IN RADIOACTIVE
NUCLEAR WASTE TREATMENT AND
DISPOSAL**

Room: **SPOLETO A**

Chair: Nadia CHERUBINI, Italy (*Convener*)

14.25 *Welcome*

14.30 *FR-10.1:IL01* **Geopolymer Foam as Inorganic Monolithic Sorbent for the Decontamination of Liquid Radioactive Waste**

S. PETLITCKAIA, CEA, DES, ISEC, DE2D, SEAD, LCBC, Univ. Montpellier, Marcoule, Bagnols sur Cèze, France; Y. BARRÉ, CEA, DES, ISEC, DMRC, STDC, LPSD, Univ. Montpellier, Marcoule, Bagnols sur Cèze, France; J. VICENTE, Aix Marseille Univ, IUSTI, CNRS, UMR 7343, Marseille, France; **A. POULESQUEN**, CEA, DES, ISEC, DE2D, SEAD, LCBC, Univ Montpellier, Marcoule, Bagnols sur Cèze, France

15.00 *FR-10.1:IL02* **Development of Zirconolite Ceramic Wasteforms for Pu Immobilisation**

L.R. BLACKBURN¹, L.J. GARDNER¹, A.R. MASON¹, SHI-KUAN SUN², E.R. MADDRELL³, M.C. STENNETT¹, C.L. CORKHILL¹, N.C. HYATT¹, ¹University of Sheffield, UK; ²Guangdong University of Technology, China; ³National Nuclear Laboratory, UK

15.30 *FR-10.1:IL03* **High-entropy A2B2O7-type Oxide Ceramics for the Immobilization of High-level Radioactive Waste**

GUO-JUN ZHANG, L. ZHOU, F. LI, J.-X. LIU, State Key Laboratory for Modification of Chemical Fibers and Polymer Materials, College of Materials Science and Engineering, College of Science, Institute of Functional Materials, Donghua University, Shanghai, China

16.00 *FR-10.1:IL04* **Thermodynamic Stability, Radiation Damage and Leaching Effects in Tunnel Structured Hollandite Materials**

K. BRINKMAN, Materials Science and Engineering, Clemson University, Clemson, SC, USA

16.30 *Break*

Continued on next page

Continued from preceding page

Chair: Kyle S. BRINKMAN, USA

- 17.00 *FR-10.1:IL05* **Recent Advances in the Immobilization of Low- or Intermediate-level Radioactive Waste in Cementitious Materials: Potential of Magnesium Potassium Phosphate Cements**
C. CAU DIT COUMES¹, G. PORAS¹, D. CHARTIER¹, D. LAMBERTIN¹, C. CANNES², S. DELPECH², S. PERRIN¹, ¹CEA, DES, ISEC, DE2D, SEAD, Univ Montpellier, Marcoule, France; ²Institut de Physique Nucléaire, CNRS, Univ. Paris-Sud, Orsay, France
- 17.30 *FR-10.1:L09* **Incorporation of Tetravalent Actinides in Monazite Structures**
A. ROCHE, S. SZENKNECT, A. MESBAH, N. CLAVIER, R. PODOR, N. DACHEUX, ICSM, Univ Montpellier, CEA, CNRS, ENSCM, Site de Marcoule, Bagnols-sur-Cèze, France
- 17.50 *FR-10.1:L10* **Chemical Durability of A2B2O7 Pyrochlore and Fluorite Structure Types and Machine-learning Prediction**
JIE LIAN, Department of Mechanical, Aerospace, Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY, USA
- 18.10 *FR-10.1:L11* **Understanding the Evolution of an Interface during the Dissolution of Nd-doped UO₂ by Macro-/Microscopic Dual Approach**
T. BARRAL, L. CLAPAREDE, R. PODOR, N. DACHEUX, ICSM, Univ Montpellier, CEA, CNRS, ENSCM, Site de Marcoule, Bagnols-sur-Cèze, France

SYMPOSIUM FA
**3D PRINTING AND BEYOND: STATE-
OF-THE-ART AND NEW PARADIGMS
FOR ADDITIVE MANUFACTURING
TECHNOLOGIES**

Room: **ASSISI B**

Chair: Timothy F. SCOTT, Australia

9.00 *FA-1:IL12* **A Segregation Model Study of Suspension-based Additive Manufacturing**
CHANG-JUN BAE¹, J.W. Halloran², ¹3D Printing Materials Center, Korea Institute of Materials Science (KIMS), Changwon, South Korea; ²Dept. of Materials Science and Engineering, University of Michigan, Ann Arbor, USA

9.30 *FA-1:L13* **A Guide for Selecting Dispersants for Ceramic Filled Resins for Stereolithography**
W. YARED, University of Stuttgart, GSaME, Graduate School of Excellence advanced Manufacturing Engineering, Stuttgart, Germany

9.50 *FA-1:L14* **Eutectic Ceramic Microstructures using Laser Powder Bed Fusion (L-PBF)**
J.E. MARTINEZ DOSAL, C. COLIN, M.H. BERGER, MINES Paris, PSL, Centre de Matériaux, UMR CNRS 7633, Evry, France

10.10 *Break*

Chair: Matteo SEITA, Singapore

10.40 *FA-2:IL02* **Multimaterial Components by Additive Manufacturing Technologies**
T. MORITZ, S. WEINGARTEN, J. ABEL, E. SCHWARZER, U. SCHEITHAUER, A. GÜNTHER, J. SCHILM, K. WÄTZIG, Fraunhofer Institute for Ceramic Technologies and Systems, Dresden, Germany

11.10 *FA-2:IL03* **The Role of Rheology in Laser Sintering of Polymer Particles**
R. CARDINAELS, P. ANDERSON, Polymer Technology Group, Eindhoven University of Technology, Eindhoven, Noord-Brabant, The Netherlands

11.40 *FA-2:IL04* **Nanoparticle Additivation of Polymer Powders for Powder Bed Fusion of Parts with Novel Optical and Magnetic Properties**
C. DONATE-BUENDIA, B. GÖKCE, Materials Science and Additive Manufacturing, University of Wuppertal, Wuppertal, Germany

SYMPOSIUM FC
RESEARCH ADVANCES ON MICRO/NANO
SYSTEMS AND THEIR APPLICATIONS

Room: **SALA RELATORI**

Chair: Giuseppe BARILLARO, Italy

9.00 *FC:KL2* **High Performance Flexible and Printed Electronics**
R. DAHIYA, Bendable Electronics and Sensing Technologies (BEST) Group, James Watt School of Engineering, University of Glasgow, Glasgow, UK

9.45 *FC-2:IL02* **Monolithic Silicon Carbide Intracortical Neural Interfaces for Long-term Human Implantation**
C. FREWIN¹, M. BEYGI², E. BERNARDIN², C. FENG^{2,3}, F. LA VIA⁴, W. DOMINGUEZ-VIQUEIRA⁵, **S.E. SADDOW**^{2,6}, ¹NeuroNexus, LLC, Ann Arbor, MI, USA; ²Dept. of Electrical Engineering, University of South Florida, Tampa, FL, USA; ³Dept. of Mechanical Engineering, University of South Florida, Tampa, FL, USA; ⁴IMM-CNR, Catania, Sicily, Italy; ⁵Moffitt Cancer Center, Tampa, FL, USA; ⁶Dept. of Medical Engineering, University of South Florida, Tampa, FL, USA

10.20 *FC-2:IL04* **Monitoring Integration Processes of Individual Single-walled Carbon Nanotubes into Sensors by Raman Spectroscopy**
M. HALUSKA, S. JUNG, C. ROMAN, C. HIEROLD, Micro and Nanosystems ETH Zürich, Zurich, Switzerland

10.55 *Break*

Chair: Leandro LORENZELLI, Italy

11.15 *FC-3:L02* **Systematization of Magnetic Structures in Magnetstrictive Microwires for Sensor Application**
A. CHIZHIK, J. GONZALEZ, Universidad del País Vasco, UPV/EHU, San Sebastián, Spain; A. ZHUKOV, Universidad del País Vasco, UPV/EHU, San Sebastián, Spain & IKERBASQUE, Basque Foundation for Science, Bilbao, Spain; A. STUPAKIEWICZ, Laboratory of Magnetism, University of Bialystok, Bialystok, Poland; P. GAWRONSKI, AGH Univ. of Science and Technology, Faculty of Physics and Applied Computer Science, Krakow, Poland

11.40 *FC-3:IL03* **On-site Energy using Piezoelectric Thin Films**
HIROKI KUWANO, Tohoku University, Sendai, Japan

12.15 *FC-3:L04* **Handling of Direct Laser Written Micro-structures via Ultrathin Films for Controlled Placement on Complex Surfaces**
A. OTTOMANIELLO, M. CARLOTTI, O. TRICINCI, **V. MATTOLI**, Center for Materials Interfaces, Istituto Italiano di Tecnologia, Pontedera, Italy; F. VAN DEN HOED, P. RAFFA, Department of Chemical Engineering - Product Technology, University of Groningen, Groningen, The Netherlands

12.40 *FC-4:IL01* **Metamaterials Based RF Microsystems for Telecommunication Applications**
R. MARCELLI, E. PROIETTI, G.M. SARDI, G. CAPOCCIA, CNR-IMM, Roma, Italy; G. BARTOLUCCI, University of Roma "Tor Vergata", Roma, Italy

SYMPOSIUM FD
RECENT ACHIEVEMENTS IN
MULTIFERROIC AND MAGNETOELECTRIC
MATERIALS

Room: **CORCIANO**

Chair: Sergey LISENKOV, USA

- 9.30 *FD-3:IL07* **Magnetoelectric Effect in Composite Ferrite-perovskite Ceramics at Macro- and Microscopic Scales**
V.V. SHVARTSMAN¹, M. NAVEED UL-HAQ², D. LEWIN¹, D.C. LUPASCU¹, ¹Institute for Materials Science, University of Duisburg-Essen, Essen, Germany; ²Department of Physics, COMSATS University Islamabad, Chak Shahzad, Islamabad, Pakistan
- 10.05 *FD-3:IL08* **Discovery of Magnetoelectric Quadrupole Order and Visualization of their Domain Structure via Nonreciprocal Linear Dichroism**
KENTA KIMURA, T. KATSUYOSHI, T. KIMURA, Department of Advanced Materials Science, The University of Tokyo, Kashiwa, Japan; P. BABKEVICH, H.M. RONNOW, Laboratory for Quantum Magnetism, Institute of Physics, École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland; M. TOYODA, Department of Physics, Tokyo Institute of Technology, Meguro-ku, Tokyo, Japan; K. YAMAUCHI, ISIR-SANKEN, Osaka University, Ibaraki, Japan; Y. SAWADA, Center for Advanced High Magnetic Field Science (AHMF), Osaka University, Osaka, Japan; S. KIMURA, Institute for Materials Research, Tohoku University, Sendai, Japan
- 10.40 *FD-3:L09* **Organic Multiferroics**
SHENQIANG REN, University at Buffalo, The State University of New York, Buffalo, NY, USA
- 11.05 *Break*

Chair: Youtarou TAKAHASHI, Japan

- 11.35 *FD-3:IL10* **Controlling the Electrical, Magnetoelectric and Thermal Properties in Epitaxial-strain-engineered Ferroic Films**
E. LANGENBERG, Department of Condensed Matter Physics, Universitat de Barcelona, Barcelona, Spain
- 12.10 *FD-3:IL11* **Multiferroics: Recent Developments and Trends**
A. LOIDL, Center for Electronic Correlations and Magnetism, University of Augsburg, Augsburg, Germany

SYMPOSIUM FE
**FUNCTIONAL NANOMATERIALS FOR NEW
GENERATION SOLID STATE CHEMICAL
SENSORS**

Room: **MAGIONE B**

Chair: Seon-Jin CHOI, South Korea

- 9.00 *FE-2:IL01* **The Role of Surface Oxygen Vacancies in the Sensing Mechanism of SnO₂**
C.S. BLACKMAN, Department of Chemistry, University College London, UK
- 9.35 *FE-2:IL03* **Improvement of Sensing Properties of Semiconductor Gas Sensors by Controlling Gas Diffusivity and Reactivity**
YASUHIRO SHIMIZU, T. HYODO, Graduate School of Engineering, Nagasaki University, Nagasaki, Japan
- 10.10 *FE-2:IL05* **Multi-scale Structuring of Nanoparticle Networks for Enhanced Chemical Sensing**
A. TRICOLI, Nanotechnology Research Laboratory, Australian National University, Canberra, Australia
- 10.45 *Break*

Chair: Eduard LLOBET, Spain

- 11.15 *FE-2:IL07* **Recent Advances in Thin Films of Metal Oxides as Gas Sensing Materials**
K. ZAKRZEWSKA, AGH-University of Science and Technology, Faculty of Computer Science, Electronics and Telecommunications, Institute of Electronics, Kraków, Poland
- 11.50 *FE-2:L09* **A CuO/SiO₂ Nanocomposite for Highly Selective H₂S Gas Sensing**
A. PAUL, C. WEINBERGER, T. WAGNER, **M. TIEMANN**, Paderborn University, Department of Chemistry, Paderborn, Germany
- 12.15 *FE-3:IL03* **Layered Amorphous Metal Oxide Gas Sensors by Controlled Oxidation of 2D-MDs**
V. PAOLUCCI¹, J. DE SANTIS¹, G. GIORGI^{2,3}, C. CANTALINI¹,
¹Department of Industrial and Information Engineering and Economics, University of L'Aquila, Italy; ²Department of Civil and Environmental Engineering (DICA), University of Perugia, Italy; ³CNR-SCITEC, Perugia, Italy

**SYMPOSIUM FG
ADVANCES IN INORGANIC
LUMINESCENT MATERIALS**

Room: **MONTEFALCO**

Chair: Fabio PICCINELLI, Italy

- 9.00 *FG-3:IL01* **Tailored Upconversion Nanocrystals Optimized for High Quantum Yield or Efficient Energy Transfer**
C. HOMANN, C. DREES, A.N. RAJ, R. KURRE, J. PIEHLER, **M. HAASE**, University of Osnabrück, Osnabrück, Germany; K. BUSCH, University of Münster, Germany; L. KRUKWITT, F. FRENZEL, B. GRAUEL, C. WÜRTH, U. RESCH-GENGER, BAM, Berlin, Germany; J. BOLZE, Panalytical, Almelo, The Netherlands
- 9.35 *FG-3:IL02* **Upconversion Nanoparticles in Nanobiomedicine**
J.A. CAPOBIANCO, Concordia University, Dept of Chemistry and Biochemistry and Centre for Nanoscience Research, Montreal, Quebec, Canada
- 10.10 *FG-3:IL03* **Multiphoton Fluorescence Upconversion with Hetero-structured 2D Colloidal Nanocrystals**
A.H. KHAN^{1,2}, G.H.V. BERTRAND², A. TEITELBOIM³, A. POLOVITSYN², J. PLANELLES⁴, J.I. CLIMENTE⁴, D. ORON³, **I. MOREELS**^{1,2}, ¹Dept of Chemistry, Ghent University, Ghent, Belgium; ²Istituto Italiano di Tecnologia, Genova, Italy; ³Dept of Physics of Complex Systems, Weizmann Institute of Science, Rehovot, Israel; ⁴Dept de Química Física i Analítica, Universitat Jaume I, Castelló de la Plana, Spain
- 10.45 *FG-3:IL04* **Band Gap Engineering in Luminescence Thermometry – Pros and Cons**
E. ZYCH, P. BOLEK, M. SÓJKA, D. KULESZA, J. ZELER, J. JEDON, J. TROJAN-PIEGZA, A. SHYICHUK, University of Wrocław, Faculty of Chemistry, Wrocław, Poland
- 11.20 *Break*
- Chair:* Markus HAASE, Germany
- 11.50 *FG-4:L01* **Intracellular Temperature Mapping of Cancer Cells using Ln³⁺-based Polymeric Micelles**
J. ZELER¹, C.D.S. BRITES², R. PIÑOL³, YUANYU GU^{3, 4}, P. TÉLLEZ⁵, A.N. CARNEIRO NETO², T.E. DA SILVA^{2, 6}, R. MORENO-LOSHUERTOS⁷, P. FERNANDEZ-SILVA⁷, A. GALLEGRO⁷, L. MARTINEZ-LOSTAO⁷, A. MARTÍNEZ⁸, L.D. CARLOS², A. MILLÁN³, ¹Faculty of Chemistry, University of Wrocław, Wrocław, Poland; ²Phantom-g, CICECO-Aveiro Institute of Materials, Dept of Physics, University of Aveiro, Aveiro, Portugal; ³ICMA, Institute of Materials Science of Aragon, CSIC-University of Zaragoza, Zaragoza, Spain; ⁴School of Materials Science and Eng., Nanjing Tech University, Nanjing PR China; ⁵Servicio de Apoyo a la Investigación. University of Zaragoza, Zaragoza, Spain; ⁶Dept of Fundamental Chemistry, Federal University of Pernambuco, Recife, PE, Brazil; ⁷Depto de Bioquímica, Biología Molecular y Celular, Universidad de Zaragoza, Zaragoza, Spain; ⁸Depto de Electrónica de Potencia, I3A, Universidad de Zaragoza Zaragoza, Spain
- 12.15 *FG-4:IL02* **Multi-wavelength Lanthanide-based Nanoparticles for Biomedical and Beyond Applications**
E. HEMMER, University of Ottawa, Dept of Chemistry and Biomolecular Sciences, Ottawa, Ontario, Canada

FH - 4th International Conference
**EMERGING MATERIALS, TECHNOLOGIES
AND APPLICATIONS FOR NON-VOLATILE
MEMORY AND MEMRISTIVE DEVICES**

Room: **ASSISI A**

Chair: Regina DITTMANN, Germany & Sabina SPIGA, Italy

- 9.00 *FH-3:IL12* **From Resistive Switching in Mott Insulators to Mott Memory and Artificial Neuron**
E. JANOD, B. CORRAZE, J. TRANCHANT, L. CARIO, **M.-P. BESLAND**, Nantes University, UMR CNRS, Institut des Matériaux Jean Rouxel (IMN), Nantes, France
- 9.25 *FH-3:IL13* **VO₂ Metal-insulator Devices for Energy Efficient Neuromorphic Computing**
S. KARG, E. CORTI, O. MAHER, IBM Research, Zurich, Switzerland
- 9.50 *FH-3:L14* **Innovative V₂O₃:Cr Mott Insulator-based Resistive Memory**
L. LABORIE, N. CASTELLANI, G. BOURGEOIS, C. CASTELLANA, T. MAGIS, E. NOWAK, G. MOLAS, E. JALAGUIER, CEA, LETI, Univ. Grenoble Alpes, Grenoble, France; G. LEFEVRE, S. DAVID, C. VALLÉE, Univ. Grenoble Alpes, CNRS, CEA-LETI Minatec, LTM, Grenoble, France; J. TRANCHANT, B. CORRAZE, M.-P. BESLAND, E. JANOD, L. CARIO, Université de Nantes, CNRS, Institut des Matériaux Jean Rouxel, IMN, Nantes, France
- 10.05 *FH-3:L15* **Silicon-integrated La₂NiO₄+ δ -Based Valence-change Memristive Devices with Neuromorphic Programming Capabilities**
KHANH KHUU, C. JIMENEZ, M. BURRIEL, Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; G. LEFÈVRE, A. BSIESY, Univ. Grenoble Alpes, CNRS, CEA/LETI Minatec, LTM, Grenoble, France; S. BLONKOWSKI, E. JALAGUIER, Univ. Grenoble Alpes, CEA, LETI, Grenoble, France
- 10.20 *FH-3:IL16* **Oscillator Computing based on Memristive Devices**
C. LENK, L. SEEGER, S. DURSTEWITZ, S. PARK, T. IVANOV, **M. ZIEGLER**, Micro- and Nanoelectronic Systems, Electrical Engineering and Information Technology, Ilmenau University of Technology, Ilmenau, Germany
- 10.45 *FH-3:L17* **Implementation of an Electrical Set-up to enable RRAM-based Neural Network Operations**
E. PEREZ-BOSCH QUESADA, E. PEREZ, M. KALISHETTYHALLI MAHADEVAIAH, C.A. CHAVARIN, C. WENGER, IHP-Leibniz-Institut für innovative Mikroelektronik, Frankfurt (Oder), Germany; F. ZAHARI, H. KOHLSTEDT, Nanoelectronic, Faculty of Engineering, Kiel University, Kiel, Germany; M. ZIEGLER, Department of Micro- and Nanoelectronic Systems, TU Ilmenau, Ilmenau, Germany; C. WENGER, BTU Cottbus-Senftenberg, Cottbus, Germany
- 11.00 *Break*

Continued on next page

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Chair: Lambert ALFF, Germany & Martin ZIEGLER, Germany

- 11.20 *FH-3:IL18* **Nanowire based Memristive Devices**
G. MILANO, C. RICCIARDI, Advanced Materials Metrology and Life Science Division, INRiM (Istituto Nazionale di Ricerca Metrologica), Torino, Italy; Department of Applied Science and Technology, Politecnico di Torino, Torino, Italy
- 11.45 *FH-3:L19* **A Graph Theory-based Approach for Memristive Nanowire Networks**
G. MILANO¹, K. MONTANO², E. MIRANDA³, C. RICCIARDI²,
¹Advanced Materials Metrology and Life Science Division, INRiM (Istituto Nazionale di Ricerca Metrologica), Torino, Italy; ²Department of Applied Science and Technology, Politecnico di Torino, Torino, Italy; ³Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona (UAB), Cerdanyola del Valles, Spain
- 12.00 *FH-3:L20* **Long-term Probing of Memristive Ag-based Nanostructures via an Unconventional cAFM Approach**
N. CARSTEN, R. GUPTA, T. STRUNSKUS, F. FAUPEL, A. VAHL, Institute for Materials Science, Chair for Multicomponent Materials, Kiel University, Kiel, Germany; A. HASSANIEN, Department of Condensed Matter Physics, J. Stefan Institut, Ljubljana, Slovenia
- 12.15 *FH-3:L21* **Resistive Switching in Nanoparticle-based Systems: From Diffusive Switching towards Collective Dynamics**
N. CARSTENS¹, B. ADEJUBE¹, M. NOLL², T. BIRKOBEN², M. MIRIGLIANO³, R. GUPTA¹, T. STRUNSKUS¹, F. FAUPEL¹, P. MILANI³, H. KOHLSTEDT², A. VAHL¹, ¹Institute for Materials Science - Chair for Multicomponent Materials, Faculty of Engineering, Kiel University, Kiel, Germany; ²Institute for Electrical Engineering and Information Engineering - Chair for Nanoelectronics, Faculty of Engineering, Kiel University, Kiel, Germany; ³Dipartimento di Fisica & Chimica, Università degli Studi di Milano, Milano, Italy
- 12.30 *FH-3:L22* **Correlation between the Threshold Kinetics and Relaxation Behavior of Ag/HfO₂-based Diffusive Memristors**
S.A. CHEKOL, S. MENZEL, R. WASER, S. HOFFMANN-EIFERT; W.R. AHMAD, R. WASER, JARA-FIT and Peter Gruenberg Institute (PGI 7 & 10), Forschungszentrum Juelich GmbH, Juelich, Germany; JARA-FIT and Institute of Materials in Electrical Engineering and Information Technology II, RWTH Aachen University, Aachen, Germany
- 12.45 *FH-3:L23* **Short Time Dynamics in SiO₂ and HfO₂-based Threshold Switching Devices**
M. DUTTA, S. BRIVIO, M. ALIA, S. SPIGA, CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy

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

Room: **MAGIONE A**

Chair: Henrik WÖRDENWEBER, Germany

- 9.00 *FI-3:IL01* **The Xene Generations: Details, Methods and Perspectives of Epitaxial Single-element Two-dimensional Materials**
A. MOLLE, CNR-IMM, unit of Agrate Brianza, Agrate Brianza, Italy
- 9.35 *FI-3:IL02* **Synthetic Route Towards Pure Phase of WS₂ & MoS₂ Inorganic Nanotubes and their Unusual Properties**
A. ZAK, S. GHOSH, C. PALLELLAPPA, HIT-Holon Institute of Technology, Holon, Israel; T. LIVNEH, Nuclear Research Center, Negev, Israel; I. KAPLAN-ASHIRI, Weizmann Institute of Science, Israel; Y. ZHANG, Max Planck Institute for Solid State Research, Stuttgart, Germany; Y. IWASA, The University of Tokyo, Japan; V. BRUSER, Leibnitz Institute of Plasma, Germany; A. DI BARTOLOMEO, University of Salerno, Italy
- 10.10 *FI-3:IL05* **2D Materials: Inorganic Nanotubes and Fullerene-like Nanoparticles, an Update**
R. TENNE, Weizmann Institute of Science, Rehovot, Israel
- 10.45 *Break*

Chair: Vladimir FALKO, UK

- 11.15 *FI-3:L06* **Two-dimensional MXenes with 5 Atomic Layers of Transition Metals: Mo₄VC₄T_x and Beyond**
C.E. SHUCK, G. DEYSHER, K. HANTANASIRISAKUL, K. MALESKI, A. SARYCHEVA, B. ANASORI, Y. GOGOTSI, A.J. Drexel Nanomaterials Institute, Drexel University, Philadelphia, PA, USA; N.C. FREY, A. FOUCHER, V.B. SHENOY, E.A. STACH, Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, USA
- 11.40 *FI-5:IL03* **A High Throughput and Unbiased Machine Learning Approach for Classification of Graphene Dispersions**
MD.J. ABEDIN, T. BARUA, M. SHAIBANI, **M. MAJUMDER**, Department of Mechanical & Aerospace Engineering, Monash University, Clayton, Australia

SYMPOSIUM FJ
**ADVANCED PHOTOCATALYTIC
MATERIALS FOR ENERGY AND
CHEMISTRY IN TRANSITION AND FOR
THE ENVIRONMENT**

Room: **NORCIA**

Chair: Camilo A. MESA, Spain

- 9.00 *FJ-2:IL10* **Tailoring the Electron and Energy Transfer Mechanisms in Heterogeneous Photocatalysis by TiO₂ Silanization: A Promising Opportunity for Emerging Technological Applications**
M. D'ARIENZO¹, F. PARRINO², R. SCOTTI¹, L. PALMISANO³, S. DIRÈ², M. BELLARDITA³, R. CECCATO², S. MOSTONI¹, B. DI CREDICO¹, ¹Dept of Materials Science (INSTM), University of Milano-Bicocca, Milano, Italy; ²Dept of Industrial Engineering (DII), University of Trento, Trento, Italy; ³Dept of Engineering, University of Palermo, Palermo, Italy
- 9.35 *FJ-2:IL11* **Post-excitation Transient IR Phenomena in α -Fe₂O₃ Films**
A. SULIGOJ, D. GRINBERG, **Y. PAZ**, Department of Chemical Engineering, Technion, Haifa, Israel
- 10.10 *FJ-2:IL12* **EPR Analysis as a Tool for the Characterization of Photofunctional Materials**
S. LIVRAGHI, Dipartimento di Chimica and NIS, Università di Torino, Torino, Italy
- 10.45 *Break*

Chair: Yaron PAZ, Israel

- 11.15 *FJ-3:L02* **Graphene as a 2D Support Shuttle for Separating Photo-generated Charges: an Example combining Copper and TiO₂ Nanotubes**
E. ZGHAB, M. HAMANDI, F. DAPPOZZE, C. GUILLARD, **G. BERHAULT**, IRCELYON, Villeurbanne, France; E. ZGHAB, M. SAÏD ZINA, Univ. Tunis El Manar, Laboratoire de Chimie des Matériaux et Catalyse, Tunis, Tunisia; H. KOCHKAR, Basic & Applied Scientific Research Center, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia
- 11.40 *FJ-3:IL03* **Artificial Photosynthesis of C₁-C₆ using Copper and Iron Mixed Oxide Films**
HYUNWOONG PARK, School of Energy Engineering, Kyungpook National University, Daegu, South Korea
- 12.15 *FJ-3:L05* **Al & Ga doped ZnO Nanowires for Water Remediation by Photocatalysis**
A. BAILLARD¹, E. APPERT¹, T. DEDOVA³, P. GAFFURI^{1, 2}, M. DANILSON⁴, M. WEBBER¹, O. CHAIX-PLUCHERY¹, I. OJA-ACIK³, V. CONSONNI¹, ¹Université Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; ²Université Grenoble Alpes, CNRS, Grenoble INP, Institut NEEL, Grenoble, France; ³Lab. of Thin Film Chemical Technologies, Dept of Materials and Environmental Technology, Tallinn Univ. of Technology, Tallinn, Estonia; ⁴Lab. of Optoelectronic Materials Physics, Dept of Materials and Environmental Technology, Tallinn Univ. of Technology, Tallinn, Estonia

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

Room: **SPOLETO B**

Chair: Jennifer LU, USA

- 9.00 *FL-4:IL04* **Molecular and Bulk Mechanics of Multifunctional Catecholamine Polymer Coatings**
P. DELPARASTAN¹, K. MALOLLARI², K. LEE³, M. PARK², C. GRIGOROPOULOS², **P.B. MESSERSMITH**^{1, 3, 4}, ¹Materials Science and Engineering Dept, ²Mechanical Engineering Dept, ³Bioengineering Dept, University of California, Berkeley, CA, USA; ⁴Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA, USA
- 9.35 *FL-4:IL05* **Carbon Nanotubes vs Graphene as Fillers for Functional Polymers**
P. POULIN, Centre de Recherche Paul Pascal CNRS, University of Bordeaux, Pessac, France
- 10.10 *FL-4:L06* **Optical Sensor Based on Redox-active Tetrazolium / Pluronic Nanoparticles Embedded in PDMS Films**
E. ARAYA-HERMOSILLA, F. VISENTIN, V. MATTOLI, Center for Materials Interfaces, Istituto Italiano di Tecnologia, Pontedera, Italy; R. ARAYA-HERMOSILLA, Programa Institucional de Fomento a la Investigación, Desarrollo e Innovación, Universidad Tecnológica Metropolitana, Santiago, Chile; F. PICCHIONI, Dept of Chemical Engineering - Product Technology, University of Groningen, Groningen, The Netherlands; A. PUCCI, Dept of Chemistry, University of Pisa, Pisa, Italy
- 10.35 *Break*
- Chair:* Yuichi OHYA, Japan
- 10.55 *FL-5:IL01* **Biomaterials for Regenerative Engineering: Enabling Regenerative Medicine**
G. AMEER, Northwestern University, Evanston, IL, USA
- 11.30 *FL-5:IL02* **Oxidation-sensitive Polymers as Anti-inflammatory Agents**
N. TIRELLI, Laboratory of Polymers and Biomaterials, Fondazione Istituto Italiano di Tecnologia (IIT), Genova, Italy
- 12.05 *FL-5:IL03* **Shape Memory Polymer Hydrogel Foams for Crohn's Fistula Healing**
M.B.B. MONROE¹, H.T. BEAMAN¹, B. HOWES², P. GANESH¹, ¹Biomedical and Chemical Engineering, BioInspired Syracuse, Syracuse University, Syracuse, NY, USA; ²Chemistry, Lemoyme University, USA
- 12.40 *FL-7:L03* **Direct Laser Writing of Responsive Polymer Microstructures - Towards Soft Robotics at the Micro-scale**
L. FLOREA, T. FARAONE, S. KOLAGATLA, A. ENNIS, L. LAVELLE, Colm Delaney School of Chemistry & AMBER, the SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, Ireland

**SYMPOSIUM FO
EMBODYING INTELLIGENCE IN
STRUCTURES AND INTEGRATED
SYSTEMS**

Room: **SALA STAMPA**

Chair: Fabio CASCIATI, Italy (*Convener*)

8.55 *Welcome*

9.00 *FO-2:IL05* **Simulation of Bending of a Plate Consisting of Shape Memory and Elastic-plastic Layers under Thermocycling after Preliminary Bending or Stretching**

A.E. VOLKOV, N.A. VOLKOVA, E.A. VUKOLOV, Saint-Petersburg State University, Saint-Petersburg, Russia

9.40 *FO-1:IL01* **Nonlinear Dynamics, Stabilization and Control of Nano- and Micro- Electromechanical Systems**

O. GOTTLIEB, Mechanical Engineering Nonlinear and Chaotic Dynamical Systems Group, Technion - Israel Institute of Technology, Haifa, Israel

10.20 *FO-1:IL02* **Modelling and Simulation of Electro-active Materials**

A. HUMER, A. PECHSTEIN, **M. KROMMER**, Institute of Technical Mechanics, JKU Linz, Linz, Austria

11.00 *Break*

Chair: Michael KROMMER, Austria

11.30 *FO-1:L03* **Large Deformation and Hysteresis in Non-linear Electro-mechanics**

A. HUMER, A. PECHSTEIN, M. KROMMER, Institute of Technical Mechanics, Johannes Kepler University, Linz, Austria

12.00 *FO-1:IL05* **Experimental Characterization of a Smart Material via DIC**

S. CASCIATI, D. BORTOLUZZI, SIART srl, Pavia, Italy

FQ - 13th International Conference
**ADVANCED BIOMATERIALS AND
NANO-BIOTECHNOLOGY FOR MEDICINE**

Room: **ORVIETO**

Chair: Vladimir P. TORCHILIN, USA

- 9.00 *FQ-1:IL12* **Growing Integration Layer [GIL] Strategy for Bio-active Ceramic Coating on Metallic Alloys**
MASAHIRO YOSHIMURA^{1, 2}, CHI-HUANG HUANG¹, ¹Hi-GEM & PCGMR, Materials Science and Engineering, National Cheng Kung University, Tainan, Taiwan; ²Tokyo Institute of Technology, Tokyo, Japan
- 9.35 *FQ-1:L14* **Spark Plasma Sintering, Crystallization, Mechanical Properties and Biological Behavior of an Innovative SrO- and MgO-containing Bioactive Glass**
D. ANGIONI, R. ORRÙ, G. CAO, Dipartimento di Ingegneria Meccanica, Chimica e dei Materiali, Università degli Studi di Cagliari, Cagliari, Italy; S. GARRONI, A. IACOMINI, Dipartimento di Chimica e Farmacia, Università degli Studi di Sassari, Sassari, Italy; D. BELLUCCI, V. CANNILLO, Dipartimento di Ingegneria "Enzo Ferrari", Università di Modena e Reggio Emilia, Modena, Italy
- 10.00 *FQ-1:L16* **Diatomite-based Nanocarriers for the Sustained Release of Galunisertib in Colorectal Cancer Cells**
C. TRAMONTANO^{1, 2}, G. CHIANESE¹, L. DE STEFANO¹, I. REA¹, E. LONARDO³, D. DELLE CAVE³, ¹Institute of Applied Science and Intelligent Systems (ISASI), National Research Council of Naples, Naples, Italy; ²Department of Pharmacy, University of Naples Federico II, Naples, Italy; ³Institute of Genetics and Biophysics (IGB), National Research Council of Naples, Naples, Italy

10.25 *Break*

Chair: Patrick T. MATHER, USA

- 10.55 *FQ-3:IL01* **Smart Stimuli-sensitive Combination Nanopreparations: Next Generation of Drug Delivery Systems**
V.P. TORCHILIN, Center for Pharmaceutical Biotechnology and Nanomedicine, Northeastern University, Boston, MA, USA
- 11.30 *FQ-3:IL04* **Intelligent Release of Functional Molecules Encapsulated in Complex Electrospun Polymer Fibers for Chem/Bio/Medical Applications**
A.J. STECKL, D. HAN, S. TORT, University of Cincinnati, Cincinnati, OH, USA
- 12.05 *FQ-4:IL01* **Multifunctional Bioceramics and Glasses for Advanced Therapy and Theranostics**
F. BAINO, Institute of Materials Physics and Engineering, Applied Science and Technology Department, Politecnico di Torino, Torino, Italy
- 12.40 *FQ-4:L02* **Theranostic Copper Oxide Nanoparticles Loaded Polymeric Nanocarriers as a Promising Drug Delivery System**
I.S. WEITZ, Department of Biotechnology Engineering, ORT Braude College, Karmiel, Israel

FR - 4th International Conference
**MATERIALS CHALLENGES FOR
SUSTAINABLE NUCLEAR FISSION AND
FUSION TECHNOLOGIES**

Room: **SPOLETO A**

Chair: Lance SNEAD, USA

- 9.00 *FR-5:IL01* **Characterization of Innovative Advance Reactor Metallic Fuel Concepts**
L. CAPRIOTTI¹, D.L. PORTER¹, J.H. HARP², D.M. WACHS¹, ¹Idaho National Laboratory, Idaho Falls, ID, USA; ²Oak Ridge National Laboratory, Oak Ridge, TN, USA
- 9.30 *FR-5:L02* **Mixed Actinides Oxides Synthesis by Solution Combustion Synthesis**
A. HAUTECOVERTURE, C. REY, P. ESTEVENON, X. DESCHANELS, ICSM UMR 5257, CEA Marcoule, Bagnols sur Cèze, France
- 9.50 *FR-5:L03* **Dislocation Nucleation in UO₂ Spent Fuels evaluated by Synchrotron-based Laue Diffraction Method**
S. BHATTACHARYA, G. KURI, J. BERTSCH, Nuclear Energy and Safety Department, Paul Scherrer Institut, PSI-Villigen, Switzerland
- 10.10 *FR-5:L04* **Microstructural Effect of p(O₂) Variation in Mixed Oxides (MOX) Sintering**
G.C.C. MIRANDA, CEA/DES/ISEC/DMRC, Marcoule, France and Université Grenoble Alpes, Saint-Martin d'Hères, France; G. BERNARD-GRANGER, L. RAMOND, F. LEBRETON, CEA/DES/ISEC/DMRC, Université de Montpellier, Marcoule, France; A. NDIAYE, T. GERVAIS, Orano Melox, Chusclan, France
- 10.30 *Break*

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Continued from preceding page

Chair: Luca CAPRIOTTI, USA

- 11.00 *FR-6:IL01* **Frontiers of Transmutation Materials Science Characterization**
D.J. SPROUSTER, J.R. TRELEWICZ, T. KOYANAGI, Y. KATOH, L.L. SNEAD, Stony Brook University, Stony Brook, NY, USA
- 11.30 *FR-6:L02* **Effects of Solutes on Radiation-induced Segregation at Grain Boundaries in Fe-Cr and Fe-Ni Alloys**
A. RAHMOUNI^{1,2}, O. TISSOT¹, E. MESLIN¹, A. FRACZKIEWICZ³,
¹CEA, DEN, Service de Recherches Métallurgiques Appliquées, Laboratoire d'Analyse Microstructurale des Matériaux, Gif-sur-Yvette, France; ²Université Paris 6 Pierre et Marie Curie, formation doctorale : ED 488 – Sciences, Ingénierie, Santé (EDSIS), France; ³Mines Saint-Etienne, ENSM-SE, Département RMT, Campus de Saint-Étienne, Saint-Étienne, France
- 11.50 *FR-6:L03* **Interstitial Loop Evolution in Alpha-Fe under Irradiation: Effects of C15 Cluster Stability and Loop One-dimensional Movement**
JIE GAO, E. GAGANIDZE, J. AKTAA, Karlsruhe Institute of Technology (KIT), Institute for Applied Materials, Eggenstein-Leopoldshafen, Germany
- 12.10 *FR-6:L06* **Numerical and Experimental Study of Stress Impact on Point Defect Absorption by Dislocations**
D. DA FONSECA, T. JOURDAN, Université Paris-Saclay, CEA, Service de Recherches de Métallurgie Physique, Gif-sur-Yvette, France; F. ONIMUS, Université Paris-Saclay, CEA, Service de Recherches Métallurgiques Appliquées, Gif-sur-Yvette, France; F. MOMPIOU, CEMES, CNRS et Université de Toulouse, Toulouse, France

SYMPOSIUM FA
**3D PRINTING AND BEYOND: STATE-
OF-THE-ART AND NEW PARADIGMS
FOR ADDITIVE MANUFACTURING
TECHNOLOGIES**

Room: **ASSISI B**

Chair: Chang-Jun BAE, South Korea

14.30 *FA-2:L05* **Two-photon Polymerisation of 3D PEDOT:PSS Composite Microstructures**

J.M. DELENTE, S. KOLAGATLA, L. FLOREA, School of Chemistry & AMBER, The SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, Dublin 2, Ireland; N. LÓPEZ-LARREA, M. CRIADO-GONZALEZ, D. MECERREYES, POLYMAT University of the Basque Country UPV/EHU, Donostia-San Sebastián, Spain

14.50 *FA-2:L06* **Residual Stress and Microstructure Gradients in Additively-manufactured Metallic Components Characterized by High-energy Synchrotron X-ray Diffraction**

J. KECKES, S.C. BODNER, J. TODT, Montanuniversität Leoben and Austrian Academy of Sciences, Leoben, Austria; N. SCHELL, Helmholtz Zentrum Geesthacht, Geesthacht, Germany

15.10 *FA-2:L07* **Inconel-steel Multilayers by Liquid Dispersed Metal Powder Bed Fusion: Microstructure, Residual Stress and Property Gradients**

J. KECKES, **S.C. BODNER**, J. ZALESK, J. TODT, J.F. KECKES, V. MAIER-KIENER, Montanuniversität Leoben and Austrian Academy of Sciences, Leoben, Austria; B. SARTORY, Materials Center Leoben, Leoben, Austria; N. SCHELL, Helmholtz Zentrum Geesthacht, Geesthacht, Germany; L.T.G. VAN DE VORST, The Netherlands Organisation for Applied Scientific Research, Eindhoven, The Netherlands; J.W. HOOIJMANS, J.J. SAURWALT, Admatec Europe BV, Moergestel, The Netherlands; S. MIRZAEI, Central European Institute of Technology CEITEC, Brno, Czech Republic

15.30 *Break*

Chair: Carlos DONATE BUENDIA, Germany

16.00 *FA-2:IL08* **Two-color Irradiation for Volumetric Photopolymerization Confinement**

T.F. SCOTT^{1,2}, H.L. VAN DER LAAN³, MARK A. BURNS^{4,5},
¹Department of Chemical Engineering, Monash University, Clayton, VIC, Australia; ²Department of Materials Science and Engineering, Monash University, Clayton, VIC, Australia; ³Macromolecular Science and Engineering Program, University of Michigan, Ann Arbor, MI, USA; ⁴Department of Chemical Engineering, University of Michigan, Ann Arbor, MI, USA; ⁵Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI, USA

16.30 *FA-2:IL10* **Microstructure Control of Metals via Additive Manufacturing Processes**

M. SEITA, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

SYMPOSIUM FB
FLEXIBLE AND STRETCHABLE
ELECTRONICS: MATERIALS, DEVICES
AND APPLICATIONS

Room: **SALA RELATORI**

Chair: Robert NAWROCKI, USA

14.30 *FB-1:L15* **Solution-processed CuI for p-type Transparent Electronics**
KYUNGHAN AHN¹, AO LIU², YONG-YOUNG NOH², **MYUNG-GIL KIM¹**, ¹School of Advanced Materials Science & Engineering, Sungkyunkwan University, Suwon, South Korea; ²Dept. of Chemical Engineering, Pohang University of Science and Technology (POSTECH), Pohang, South Korea

14.55 *FB-1:L16* **Easy Fabrication of Stretchable Waveguide for E-skin Applications**
L. FLIEGANS, M. RAMUZ, S. BLAYAC, École des Mines de Saint-Étienne, Campus Georges Charpak Provence, Gardanne, France

15.20 *FB-1:L17* **Fabrication of Inkjet Printed Tunable BST/P(VDF-TrFE) Dielectrics for Flexible Varactors**
T.P. MACH, J.R. BINDER, Institute for Applied Materials (IAM-ESS), Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany

15.45 *Break*

Chair: Matjaz HUMAR, Slovenia

16.15 *FB-2:L01* **Study in Operando of Organic Semiconductor Stretchability**
V. LAFARGE, C. SERBUTOVIEZ, M. BENWADIH, A. REVAUX, Univ. Grenoble Alpes, CEA, Liten, DTNM, Grenoble, France

16.40 *FB-2:IL02* **Soft Electronic and Robotic Systems from Resilient yet Biocompatible and Degradable Materials**
M. KALTENBRUNNER, Department of Soft Matter Physics, Johannes Kepler University Linz, Linz, Austria

17.15 *FB-2:L03* **Electro-mechanical Behaviour of Semiconducting Nanonets**
S. SHARMA¹, F. MORISOT¹, T. ARJMAND¹, M. BRACCINI¹, F. VOLPI², C. TERNON¹, ¹Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; ²Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP, Grenoble, France

SYMPOSIUM FD
RECENT ACHIEVEMENTS IN
MULTIFERROIC AND MAGNETOELECTRIC
MATERIALS

Room: **CORCIANO**

Chair: Eric LANGENBERG, Spain

- 14.30 *FD-4:IL03* **Optical Magnetoelectric Effect in Multiferroics**
YOUTAROU TAKAHASHI, Dept of Applied Physics and Quantum Phase Electronics Center (QPEC), University of Tokyo, Tokyo, Japan; RIKEN Center for Emergent Matter Science (CEMS), Saitama, Japan
- 15.05 *FD-4:L05* **High-frequency Molecular Dynamics Simulations of the Electrocaloric Effect in Ferroelectric PbTiO₃**
S. LISEKOV, University of South Florida, Tampa, FL, USA
- 15.30 *FD-4:L06* **Microstructure and Electro-optic Response of Thick Epitaxial BaTiO₃ Films Integrated on Silicon (001) for Applications in Silicon Photonics**
M. REYNAUD¹, W. LI¹, A.B. POSADAS¹, **A.A. DEMKOV**¹, Z. DONG², D. WASSERMAN², H. PARK^{3, 4}, J.H. WARNER^{3, 4}, W. CAO⁵, G.Z. MASHANOVICH⁵, ¹Dept of Physics, University of Texas at Austin; ²Dept of Electrical and Computer Engineering, University of Texas at Austin; ³Materials Science and Engineering Program and Texas Materials Institute, The University of Texas at Austin, Austin, TX, USA; ⁴Walker Dept of Mechanical Engineering, The University of Texas at Austin, Austin, TX, USA; ⁵Optoelectronics Research Centre, Faculty of Engineering and Physical Sciences, University of Southampton, Southampton, UK

15.55 *Break*

Chair: Alois LOIDL, Germany

- 16.25 *FD-4:L07* **Manoeuvring Phase Connectivity to Realise Enhanced Magnetoelectric Effect in distributed Disc structured Ni/PZT Composite**
A. KUMAR¹, A. AROCKIARAJAN^{1, 2}, ¹Dept of Applied Mechanics, Indian Institute of Technology Madras, Chennai, India; ²Ceramic Technologies Group-Centre of Excellence in Materials and Manufacturing for Futuristic Mobility, Indian Institute of Technology Madras, Chennai, India
- 16.50 *FD-4:IL10* **Taylored Magnetostrictive Multilayers for Magnetoelectric Sensors**
D. MEYERS, Inorganic Functional Materials, Institute of Materials Science, Faculty of Engineering, Kiel University, Kiel, Germany

SYMPOSIUM FF
ELECTROMAGNETIC METAMATERIALS
AND METASURFACES: RECENT
RESEARCH ACHIEVEMENTS AND NEW
PARADIGMS

Room: **MAGIONE B**

Chair: Ewold VERHAGEN, The Netherlands

14.30 *FF-4:IL02* **Temporally Modulated Metasurfaces for Extreme Control of Light and Electromagnetic Radiation**
XUCHEN WANG, A. DÍAZ RUBIO, V. ASADCHY, G. PTITCYN, M. MIRMOOSA, S. TRETYAKOV, Department of Electronics and Nanoengineering, Aalto University, Espoo, Finland

15.05 *FF-4:IL03* **Novel Devices based on Active and Tunable Dielectric Nanoantennas**
A.I. KUZNETSOV, Institute of Materials Research and Engineering, A*STAR (Agency for Science, Technology and Research), Singapore

15.40 *FF-4:IL05* **Conformable Holographic Metasurfaces**
A. DI FALCO, School of Physics and Astronomy, University of St Andrews, UK

16.15 *Break*

Chair: Nicolò MACCAFERRI, Luxembourg

16.45 *FF-5:IL01* **Topologically Protected Transport in Photonic Crystals**
M.I. SHALAEV, W. WALASIK, **N.M. LITCHINITSER**, Duke University, Durham, NC, USA

17.20 *FF-5:IL05* **Nonlinear Optical Switching and Tunability in AlGaAs Nanoantennas and Metasurfaces**
C. DE ANGELIS, D. ROCCO, Department of Information Engineering, University of Brescia, Brescia, Italy

**SYMPOSIUM FG
ADVANCES IN INORGANIC
LUMINESCENT MATERIALS**

Room: **MONTEFALCO**

Chair: Luis PINTO DA SILVA, Portugal

- 14.30 *FG-4:IL03* **Eu(III) and Tb(III) Complexes for Biosensing Applications**
F. PICCINELLI, C. NARDON, M. BETTINELLI, Luminescent Materials Laboratory, University of Verona, Verona, Italy
- 15.05 *FG-4:L04* **Pr-Activated Garnets for Wide-range Optical Thermometry**
D. KULESZA, J. ZELER, E. ZYCH, University of Wroclaw, Faculty of Chemistry, Wroclaw, Poland
- 15.30 *FG-4:L05* **Facile Fabrication of Carbon Dots based Fluorescent Strips for Florimetric ON-OFF Sensor**
C.M. SINGARAVELU, X. DESCHANELS, C. REY, **J. CAUSSE**, ICSM, University of Montpellier, CEA, CNRS, ENSCM, Marcoule, France

15.55 *Break*

Chair: Eva HEMMER, Canada

- 16.25 *FG-5:IL02* **Development of Novel Chemiluminescent Materials for Cancer Treatment**
C.M. MAGALHÃES, P.G. BERDULLAS, J.C.G. ESTEVES DA SILVA, **L. PINTO DA SILVA**, Chemistry Research Unit of University of Porto, Porto, Portugal
- 17.00 *FG-1:IL02* **Ag-Sensitized Tb³⁺/Yb³⁺ Codoped Silica-Zirconia Glasses and Glass-Ceramics**
F. ENRICH, Department of Computer Science, University of Verona, Verona, Italy

FH - 4th International Conference
**EMERGING MATERIALS, TECHNOLOGIES
AND APPLICATIONS FOR NON-VOLATILE
MEMORY AND MEMRISTIVE DEVICES**

Room: **ASSISI A**

Chair: Sabina SPIGA, Italy

- 14.30 *FH-3:IL07* **Neuromorphic Computing with Redox-based Memristive Elements - Capacitive and Resistive Concepts**
T. ZIEGLER, D.J. WOUTERS, R. WASER, JARA-FIT and IWE2, RWTH Aachen University, Aachen, Germany; S. MENZEL, R. WASER, JARA-FIT and PGI-7/-10, Forschungszentrum Jülich GmbH, Jülich, Germany
- 14.55 *FH-3:L24* **Voltage-time Dilemma of Current-driven Silver Single-atom Resistive Switches**
A. NYARY, B. SÁNTA, A. HALBRITTER, Budapest University of Technology and Economics, MTA-BME Condensed Matter Research Group, Budapest, Hungary

Chair: Stephan MENZEL, Germany

- 15.10 *FH-1.2:IL01* **Memristors for Artificial Neural Networks: From Device Compact Modelling to Circuit and System Level Simulations**
F.L. AGUIRRE, Universitat Autònoma de Barcelona, Spain
- 15.35 *FH-1.2:L03* **Resistive Switching in Sputtered MoS₂ Memristive Devices**
A. LINKENHEIL^{1,3}, T. SCHELER^{2,3}, S. PARK^{1,3}, P. SCHAAF^{2,3}, F. SCHWIERZ¹, M. ZIEGLER^{1,3}, ¹Micro- and NanoeLECTRONIC SYSTEMS, DEPARTMENT OF ELECTRICAL ENGINEERING AND INFORMATION TEChnology, TU Ilmenau, Ilmenau, Germany; ²Materials for Electrical Engineering and Electronics, Department of Electrical Engineering and Information Technology, TU Ilmenau, Ilmenau, Germany; ³Institute of Micro- and Nanotechnologies MacroNano®, TU Ilmenau, Ilmenau, Germany
- 15.50 *FH-1.2:L04* **Resistive Switching Behavior of Lateral TMDC Devices**
Z. GENG¹, C. ZHANG¹, S. PARK¹, C. ZIEBOLD¹, S. SHARMA¹, F. SCHWIERZ¹, K. ROSSNAGEL², M. ZIEGLER¹, ¹Micro- and Nanoelectronic Systems, Department of Electrical Engineering and Information Technology, Technische Universität Ilmenau, Germany; ²Institute of Experimental and Applied Physics, Kiel University, Germany, and Ruprecht Haensel Laboratory, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany
- 16.05 *FH-1.2:L05* **Multiple Physical Time Scales in Few-nanometers Sized Graphene-SiOx-graphene Memristors**
L. PÓSA, Department of Physics, Budapest University of Technology and Economics and MTA-BME Condensed Matter Research Group, Budapest, Hungary, Institute for Technical Physics and Materials Science, Centre for Energy Research, Budapest, Hungary; T. TÖRÖK, G. FEHÉRVÁRI, Z. BALOGH, A. HALBRITTER, Department of Physics, Budapest University of Technology and Economics and MTA-BME Condensed Matter Research Group, Budapest, Hungary
- 16.20 *Break*

Continued on next page

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Chair: Anthony KENYON, UK & Stefano BRIVIO, Italy

- 16.50 *FH-1.2:IL06* **The Role of Materials Design for the Transition from Digital to Analog Memories**
L. ALFF, Institute of Materials Science, Technische Universität Darmstadt, Darmstadt, Germany
- 17.15 *FH-1.2:L07* **Oxygen Engineering in Yttrium Oxide-based RRAM Devices: Suppressed Noise, Digital-to-Analog Switching Transition and Conductance Quantization for NVM, Multibit and Neuromorphic Applications**
E. PIROS¹, S. PETZOLD¹, R. EILHARDT², A. ZINTLER², M. LONSKY³, N. KAISER¹, T. VOGEL¹, E. JALAGUIER⁴, E. NOLOT⁴, C. CHARPIN⁴, C. WENGER⁵, J. MÜLLER³, E. MIRANDA⁶, L. MOLINA-LUNA², L. ALFF¹, ¹Advanced Thin Film Technology, Institute of Materials Science, Technische Universität Darmstadt, Darmstadt, Germany; ²Institute of Physics, Goethe-University Frankfurt, Frankfurt am Main, Germany; ³Advanced Electron Microscopy Division, Institute of Materials Science, Technische Universität Darmstadt, Darmstadt, Germany; ⁴CEA, LETI, Grenoble, France; ⁵IHP, Leibniz-Institut fuer innovative Mikroelektronik, Frankfurt (Oder), Germany; ⁶Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona, Cerdanyola del Valles, Barcelona, Spain
- 17.30 *FH-1.2:L08* **Substoichiometric Hafnium Oxide Polymorphs with Semiconducting Properties**
N. KAISER¹, T. VOGEL¹, A. ZINTLER², S. PETZOLD¹, A. ARZUMANOV¹, E. PIROS¹, R. EILHARDT², L. MOLINA-LUNA², L. ALFF¹, ¹Advanced Thin Film Technology Division, Institute of Materials Science, TU Darmstadt, Darmstadt, Germany; ²Advanced Electron Microscopy Division, Institute of Materials Science, TU Darmstadt, Darmstadt, Germany
- 17.45 *FH-1.2:L09* **Statistical Evaluation of Tailored Memristive Characteristics in TiO_x-HfO_x Bilayer System**
S. PARK, **C. ZIEBOLD**, S. KLETT, T. IVANOV, M. ZIEGLER, Department of Electrical Engineering and Information Technology, & Institute of Micro and Nanotechnologies MacroNano, TU Ilmenau, Germany
- 18.00 *FH-1.2:L11* **Selective Activation of Memristive Interfaces in TaO_x-based Devices by Controlling Oxygen Vacancies Dynamics at the Nanoscale**
M.J. SÁNCHEZ¹, C. FERREYRA², M. AGUIRRE^{3, 4, 5}, C. ACHA⁶, S. BENGIO², J. LECOURT⁷, U. LUDERS⁷, D. RUBI², ¹INN-Centro Atómico Bariloche and Instituto Balseiro, San Carlos de Bariloche, Argentina; ²GlyA and INN-CONICET, CNEA, San Martín, Buenos Aires, Argentina; ³Depto de Física de Materia Condensada, Universidad de Zaragoza, Zaragoza, Spain; ⁴Lab. de Microscopías Avanzada (LMA), Instituto de Nanociencia de Aragón (INA)-Universidad de Zaragoza, Zaragoza, Spain; ⁵Instituto de Ciencias de Materiales de Aragón (ICMA), Universidad de Zaragoza, Zaragoza, Spain; ⁶Depto. de Física, FCEyN, Universidad de Buenos Aires and IFIBA, UBA-CONICET, Pab I, Ciudad Universitaria, Buenos Aires, Argentina; ⁷CRISMAT, CNRS UMR 6508, ENSICAEN, Caen, France
- 18.15 *FH-1.2:L12* **Investigation of the Ultrafast Resistive Switching**
B. SANTA, D. MOLNÁR, A. HALBRITTER, Budapest University of Technology and Economics and MTA-BME Condensed Matter Research Group, Budapest, Hungary; M. CSONTOS, Empa, Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland

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

Room: **MAGIONE A**

Chair: Reshef TENNE, Israel

- 14.30 *FI-3:IL07* **Thickness and Lateral Engineering of 2D Materials**
L. CAMILLI, Department of Physics, University of Rome "Tor Vergata", Rome, Italy
- 15.05 *FI-3:L08* **Sustainable and Scalable Liquid-phase Exfoliation of Graphene-like Materials with Nontoxic Polarclean Solvent**
J. DE SANTIS¹, V. PAOLUCCI¹, G. DI IORIO¹, A. POLITANO², C. CANTALINI¹, ¹Department of Industrial and Information Engineering and Economics, University of L'Aquila, Italy; ²Department of Physical and Chemical Sciences, University of L'Aquila, Italy
- 15.30 *FI-4:IL02* **Graphene for Waveguide-integrated Optoelectronics**
C. COLETTI, Center for Nanotechnology Innovation @ NEST, Istituto Italiano di Tecnologia, Pisa, Italy; Graphene Labs, Istituto Italiano di Tecnologia, Genova, Italy

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

Room: **SPOLETO B**

Chair: Philippe POULIN, France

14.30 *FL-5:IL04* **A New Class of Submolecular Switches based on the DBCOD Conformational Change**

W. FU¹, T. ALAM², R. ADAMS³, J.C. LI⁴, W. YANG⁴, **JENNIFER LU**¹, ¹Materials Science and Engineering, University of California at Merced, Merced, CA, USA; ²Sandia National Laboratory, USA; ³Chemistry Department, University of Manchester, UK; ⁴Chemistry Department, Duke University, USA

15.05 *FL-5:IL05* **Biodegradable Injectable Polymer Systems Exhibiting Temperature-responsive Irreversible Gelation**

YUICHI OHYA, Faculty of Chemistry, Materials and Bioengineering, Kansai University, Suita, Japan

15.40 *Break*

Chair: Nicola TIRELLI, Italy

16.10 *FL-6:IL02* **Building Multifunctional, Morphing 3D Structures**

T.H. WARE, Department of Biomedical Engineering, Department of Materials Science and Engineering, Texas A&M University, College Station, TX, USA

16.45 *FL-6:IL04* **Advancing 4D Fabrication and Computational Analysis of Shape-Memory Polymers**

J.H. HENDERSON, BioInspired Syracuse: Institute for Material and Living Systems, Syracuse Biomaterials Innovation Facility, Syracuse University, Syracuse, NY, USA

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

Room: **NORCIA**

Chair: Tino GOTTSCHALL, Germany

14.30 *FM-1:IL09* **Optimizing Novel Manufacturing Processes for Ni-Mn-Ga Magnetic Shape Memory Materials**
E. PAGOUNIS, ETO MAGNETIC GmbH, Stockach, Germany

15.05 *FM-1:IL10* **NiMn Based Heusler Alloys for Magnetocaloric Applications: Direct and Inverse Magnetocaloric Effects, Large Scale Synthesis**
S. FABBRICI, C. BENNATI, F. ALBERTINI, IMEM-CNR, Parma, Italy; F. PUGLIELLI, V. MUSSI, MUSP Laboratory, Piacenza, Italy; F. CUGINI, N. SARZI AMADÈ, M. SOLZI, Department of Mathematical, Physical and Computer Sciences, University of Parma, Parma, Italy

15.40 *FM-1:IL12* **Coupled Transformation and Plasticity in NiTi Shape Memory Alloy**
P. SEDLÁK, B. BENEŠOVÁ, M. FROST, H. SEINER, Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic; L. HELLER, P. ŠITTNER, Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic

16.15 *Break*

Chair: Petr SEDLAK, Czech Republic

16.45 *FM-1:IL14* **Symmetry Analysis of Martensitic Transition in Magneto-caloric Heusler Alloys**
F. ORLANDI¹, A. ÇAKIR², R. WAITE^{1,3}, P. MANUEL¹, D.D. KHALYAVIN¹, M. ACET⁴, L. RIGHI^{5,6}, ¹ISIS Facility, Rutherford Appleton Laboratory - STFC, Chilton, Didcot, UK; ²Mugla Stiki Kocman University, Department of Metallurgical and Materials Engineering, Mugla, Turkey; ³H.H. Wills Physics Laboratory, University of Bristol, Bristol, UK; ⁴Faculty of Physics and Center for Nanointegration (CENIDE), Universität Duisburg-Essen, Duisburg, Germany; ⁵Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Parma, Italy; ⁶IMEM-CNR, Parma, Italy

17.20 *FM-1:L16* **Ultrasonic-based Evaluation of NiTi Elasticity during Stress-induced Martensitic Transformation**
T. GRABEC, K. ZOUBKOVA, P. STOKLASOVA, P. SEDLAK, H. SEINER, Institute of Thermomechanics of the CAS, Prague, Czech Republic

17.45 *FM-1:L18* **Shape Recovery Behaviour of NiTi-PMMA Composite**
S. SAMAL, O. KOSJAKOVA, D. VOKOUN, P. ŠITTNER, FZU-Institute of Physics of Czech Academy of Science, Prague, Czech Republic

**SYMPOSIUM FO
EMBODYING INTELLIGENCE IN
STRUCTURES AND INTEGRATED
SYSTEMS**

Room: **SALA STAMPA**

Chair: Oded GOTTLIEB, Israel

14.30 *FO-2:IL01* **On the Use of Gyroscope and Accelerometer Sensors for Direct Displacement Measurements**

YIZHENG LIAO, **A.S. KIREMIDJIAN**, K. BALAFAS, R. RAJAGOPAL, Stanford University, Stanford, CA, USA; H.-C. LOH, University of California San Diego, USA

15.10 *FO-3:L01* **Efficient Method for Optimal Sensor Placement in Large-scale Structures**

M. OSTROWSKI, B. BLACHOWSKI, A. SWIERCZ, P. TAUZOWSKI, Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland; P. OLASZEK, Road and Bridge Research Institute, Warsaw, Poland; L. JANKOWSKI, Institute of Fundamental Technological Research, Polish Academy of Sciences, Poland

15.40 *FO-3:L02* **Semi-active Decentralized Vibration Damping Strategy in Two-dimensional Frame Structures**

B. POPLAWSKI, G. MIKUŁOWSKI, Ł. JANKOWSKI, Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland

16.10 *Break*

Chair: Anne S. KIREMIDJIAN, USA

16.40 *FO-3:L03* **Structural Glass Panels: an Integrated System**

G. BIDINI, L. BARELLI, C. BURATTI, G. CASTORI, E. BELLONI, **E. SPERANZINI**, University of Perugia, Department of Engineering, Perugia, Italy

17.10 *FO-3:IL04* **Adaptive Stiffness Structural Systems: State of the Art and Practice**

S. NAGARAJIAH, Rice University, Houston, TX, USA

SYMPOSIUM FP
BIOLOGICAL, BIOHYBRID AND
BIOINSPIRED MATERIALS: FROM
ELECTRONICS AND PHOTONICS TO
MEDICINE

Room: **SPELLO**

Chair: Mathias KOLLE, USA

14.30 *FP-2:IL10* **A New in Vivo Model for Bioelectronics**

C. TORTIGLIONE, Istituto di Scienze Applicate e Sistemi Intelligenti, Consiglio Nazionale delle Ricerche, Pozzuoli, Italy

15.05 *FP-2:IL11* **The Mammalian Eumelanin Pigment as Novel (Bio) Material for Applications in Energy Conversion**

A. PEZZELLA, Department of Physics "Ettore Pancini", University of Naples "Federico II," Naples, Italy; Institute for Polymers, Composites and Biomaterials (IPCB), CNR, Pozzuoli, Italy; National Interuniversity Consortium of Materials Science and Technology (INSTM), Florence, Italy

15.40 *Break*

Chair: Miryana HEMADI, France

16.00 *FP-3:IL01* **Measuring Cellular Dynamics with Microlaser-based Sensors**

M. SCHUBERT¹, L. WOOLFSON¹, I.R.M. BARNARD¹, A.M. DORWARD², B. CASEMENT¹, A. MORTON¹, G.B. ROBERTSON², G.B. MILES³, C.S. TUCKER⁴, S.J. PITT², **M.C. GATHER**^{1,5}, ¹SUPA, School of Physics and Astronomy, University of St Andrews, UK; ²School of Medicine, University of St Andrews, UK; ³School of Psychology & Neuroscience, University of St Andrews, UK; ⁴The Queen's Medical Research Institute, University of Edinburgh, UK; ⁵Centre for NanoBioPhotonics, Dept. für Chemie, University of Cologne, Köln, Germany

16.35 *FP-3:IL02* **Photosynthesis Enhancement in Diatom Microalgae by Photoactive Molecules**

C. D'ANDREA^{1,2}, G. LEONE³, G. DE LA CRUZ VALBUENA^{1,2}, S.R. CICCIO³, D. VONA³, E. ALTAMURA³, R. RAGNI³, E. MOLOTOKAITE², M. CECCHIN⁴, S. CAZZANIGA⁴, M. BALLOTTARI⁴, G. LANZANI^{1,2}, G.M. FARINOLA³, ¹Department of Physics, Politecnico di Milano, Milano, Italy; ²Center for NanoScience and Technology @PoliMi, Istituto Italiano di Tecnologia, Italy; ³Department of Chemistry University of Bari, Italy; ⁴Department of biotechnology, University of Verona, Italy

Continued on next page

Continued from preceding page

- 17.10 *FP-3:L04* **Bioinspired Hydrogel Structures for Responsive Photonics**
C. DELANEY¹, J. QIAN², L. BRADLEY², L. FLOREA¹, ¹School of Chemistry & AMBER, the SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, Ireland; ²School of Physics and AMBER, Trinity College Dublin, College Green, Dublin, Ireland
- 17.35 *FP-3:IL08* **Hybrid Plasmonic/Photonic Crystals for Optical Detection of Bacterial Contaminants**
G.M. PATERNO¹, L. MOSCARDI^{1, 2}, S. DONINI¹, D. ARIODANTI³, I. KRIEGEL⁴, E. PARISINI¹, G. LANZANI^{1, 2}, F. SCOTOGNELLA^{1, 2}, ¹Center for Nano Science and Technology@PoliMi, Istituto Italiano di Tecnologia, Milano, Italy; ²Dipartimento di Fisica, Politecnico di Milano, Milano, Italy; ³Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta", Milano, Italy; ⁴Department of Nanochemistry, Istituto Italiano di Tecnologia (IIT), Genova, Italy
- 18.10 *FP-3:IL09* **Multifunctional Optical Materials in Nature: Responsive Photonic Structures and the Role of Scale Geometry and Disorder**
B. WILTS, University of Salzburg, Salzburg, Austria

Focused Session FQ-6
NEXT GENERATION IMPLANTABLE
NEURAL INTERFACES

Room: **ORVIETO**

Chair: Stefano VASSANELLI, Italy (*Convener*)

14.25 *Welcome*

14.30 *FQ-6:IL01* **Electronic Materials and Devices for Neural Interfaces**

M.R. ABIDIAN, Biomedical Engineering, University of Houston, Houston, TX, USA

15.00 *FQ-6:IL02* **Glial Interfaces: Materials, Devices and Approaches to Probe and Sense the “Other Brain”.**

E. SARACINO¹, D. POLESE², D. SPENNATO¹, R. FABBRI¹, A.I. BORRACHERO-CONEJO^{3,4}, V. GUARINO⁵, G.P. NICCHIA⁶, M. MUCCINI³, G. FORTUNATO², L. AMBROSIO⁵, R. ZAMBONI¹, A. CONVERTINO², L. MAIOLO², **V. BENFENATI**¹, ¹CNR-ISOF, Istituto per la sintesi organica e la fotoreattività, Bologna, Italy; ²CNR-IMM, Istituto per la Microelettronica e Microsistemi; ³CNR-ISMN, Istituto per lo Studio dei Materiali Nanostrutturati, Bologna, Italy; ⁴Vanderbilt University Dept. Biomedical Engineering, Nashville, TN, USA; ⁵CNR-IPCB, Istituto per i Polimeri Compositi e Biomateriali, Napoli, Italy; ⁶Università di Bari, Dept of Biotechnology Biosciences and Biopharmaceutics, Bari, Italy

15.30 *FQ-6:IL04* **Magnetoelectric Nanomaterials for Wireless Neuronal Modulation**

K. KOZIELSKI, Technical University of Munich, Munich, Germany

16.00 *Break*

16.30 *FQ-6:IL05* **The Role of Ultra-flexible Electronics in Developing Advanced Brain Computer Interfaces**

L. MAIOLO, A. CONVERTINO, F. MAITA, D. POLESE, G. FORTUNATO, Istituto per la Microelettronica e Microsistemi - Consiglio Nazionale delle Ricerche (IMM-CNR), Roma, Italy

17.00 *FQ-6:IL06* **Axon-like Neural Interface**

D.M. DURAND, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH, USA

17.30 *FQ-6:IL07* **Organic Nanotechnology for Optical Modulation of Living Systems, from Genesis to Specific Functions**

M.R. ANTOGNAZZA, Center for Nano Science and Technology, Italian Institute of Technology, Milano, Italy

Focused Session FR-10
**MATERIALS ISSUES IN RADIOACTIVE
NUCLEAR WASTE TREATMENT AND
DISPOSAL**

Room: **SPOLETO A**

Chair: Thierry MENNECART, Belgium

14.30 *FR-10.2:IL01* **Challenges in the Management of Spent Nuclear Fuel**

G. LEINDERS, Belgian Nuclear Research Centre (SCK CEN), Fuel Materials, Institute for Nuclear Materials Science, Mol, Belgium; **C. SCHREINEMACHERS**, Forschungszentrum Jülich, Jülich, Germany

15.00 *FR-10.2:LO5* **Solid Fixation on Grafted Mesoporous Silica for Actinide Uptake**

C. REY, X. DESCHANELS, J. CAUSSE, ICSM, CEA, CNRS, Université de Montpellier, ENSCM, Bagnols-sur-Cèze, France; G. ZANTE, S. LE CAËR, Université Paris-Saclay, CEA, CNRS, NIMBE, UMR 3685, Gif-sur-Yvette, France; V. BOUNIOL, S. SENE, Y. GUARI, ICGM, Université de Montpellier, CNRS, ENSCM, Montpellier, France

15.20 *FR-10.2:LO6* **Fabrication and Characterization of Americium Transmutation Target Microspheres**

G. COLAK^{1,2}, G. LEINDERS¹, A.R. DELVILLE¹, F. JUTIER¹, M. VERWERFT¹, J. VLEUGELS², ¹Belgian Nuclear Research Centre (SCK CEN), Institute for Nuclear Materials Science, Mol, Belgium; ²KU Leuven, Department of Materials Engineering, Leuven, Belgium

15.40 *Break*

Chair: Lewis BLACKBURN, UK

16.10 *FR-10.3:IL01* **Characterization of Radiation Effects in Ceramics with Spallation Neutron Probes**

M. LANG, Department of Nuclear Engineering, University of Tennessee, Knoxville, TN, USA

16.40 *FR-10.3:IL02* **Recent Experimental Evidence for the Suppression of the Dissolution of Spent Nuclear Fuel by H₂ Gas**

Th. MENNECART¹, L. IGLESIAS PÉREZ², M. HERM², C. CACHOIR¹, K. LEMMENS¹, V. METZ², K. MEERT³, ¹SCK CEN – Belgian Nuclear Research Centre, Mol, Belgium; ²KIT-INE - Karlsruhe Institute of Technology, Institute for Nuclear Waste Disposal, Eggenstein-Leopoldshafen, Germany; ³ONDRAF/NIRAS - Belgian Agency for Radioactive Waste and Enriched Fissile Material, Bruxelles, Belgium

17.10 *FR-10.3:IL03* **In-operando Raman Spectroscopy applied to the Understanding of MOX Fuel Alteration Mechanisms**

S. MIRO, C. JÉGOU, L. SARRASIN, M. TRIBET, V. BROUDIC, C. MARQUÈS, S. PEUGET, CEA, DES, ISEC, DE2D, Université de Montpellier, Marcoule, France

17.40 *FR-10.3:IL05* **Radiation Damage and Corrosion of Single and Multi-phase Amorphous and Crystalline Solids**

ANAMUL HAQ MIR, MIAMI Irradiation Facility, School of Computing and Engineering, University of Huddersfield, UK

18.10 *FR-10.3:IL06* **Long-term Matrix Corrosion of Spent Nuclear Fuels: Process Understanding derived from Single Effect Studies on Simplified Model Systems**

D. BOSBACH, Forschungszentrum Jülich, Jülich, Germany

SYMPOSIUM FA
**3D PRINTING AND BEYOND: STATE-
OF-THE-ART AND NEW PARADIGMS
FOR ADDITIVE MANUFACTURING
TECHNOLOGIES**

Room: **ASSISI B**

Chair: Giulia SCALET, Italy

- 9.00 *FA-2:IL12* **Multi- Material / Modality / Scale / Axis: Realizing Multi-Functional Products with Next-Generation AM Processes**
C.B. WILLIAMS, Virginia Tech, Blacksburg, VA, USA
- 9.30 *FA-2:IL14* **Additive Manufacturing of Architected Composites with Exceptional Energy Absorption**
L. VALDEVIT, J. BAUER, M. SALA CASANOVAS, University of California, Irvine, Irvine, CA, USA
- 10.00 *FA-2:L16* **Numerical Analysis and Characterization of a 3D Printed Metallic Load Frame**
M. HAMID, KH. MCMILLAN, A.R. TIANO, K. OLSON, J. UTTER, J. TOROK, IBM, Rochester, MN, USA
- 10.20 *FA-2:L17* **Mechanical Properties of a Case-hardened Low-alloyed Steel produced by PBF-LB**
K. KUTLEŠA, S.C. BODNER, J. KECKES, Montanuniversität Leoben, Leoben, Austria
- 10.40 *Break*

Chair: David BOURELL, USA

- 11.10 *FA-3:IL01* **Moving 4D Printed Active Polymer Structures**
G. SCALET, Department of Civil Engineering and Architecture, University of Pavia - Italian Interuniversity Consortium on Materials Science and Technology (INSTM), Pavia, Italy
- 11.40 *FA-3:L02* **4D Sugar Responsive Microstructures Fabricated via Two Photon Polymerisation**
A. ENNIS, D. NICADO, C. DELANEY, L. FLOREA, School of Chemistry & AMBER, the SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, the University of Dublin, College Green, Dublin, Ireland
- 12.00 *FA-3:L03* **Cyclic Ketene Acetals as Additives for the Formulation of Subtractive Manufacturing Resists: Properties and Applications**
M. CARLOTTI, O. TRICINCI, V. MATTOLI, Center for Materials Interfaces, Italian Institute of Technology, Pontedera, Italy

SYMPOSIUM FB
**FLEXIBLE AND STRETCHABLE
ELECTRONICS: MATERIALS, DEVICES
AND APPLICATIONS**

Room: **SALA RELATORI**

Chair: Kenjiro FUKUDA, Japan

9.00 *FB-3:IL02* **Soft Neuromorphic Computing**

M.J. MIRSHOJAEIAN HOSSEINI¹, YI YANG¹, E. DONATI², T. YOKOTA³, S. LEE³; G. INDIVERI², T. SOMEYA³, **R.A. NAWROCKI**¹,
¹School of Engineering Technology, Purdue University, West Lafayette, IN, USA; ²Institute of Neuroinformatics, University of Zurich and ETH Zurich, Zurich, Switzerland; ³Department of Electrical and Electronics Engineering, The University of Tokyo, Tokyo, Japan

9.35 *FB-3:L03* **Silver Nanowire Networks for Stretchable Energy Harvesters: Properties and Challenges**

D.T. PAPANASTASIOU¹, S.E. HAIM², **A. SYLVESTRE**², S. BASROUR³, D. BELLET¹, ¹Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; ²Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; ³Univ. Grenoble Alpes, CNRS, Grenoble INP, TIMA, Grenoble, France

10.00 *FB-3:IL04* **Organic Neuromorphic Electronics and Biohybrid Systems**

Y. VAN DE BURGT, Eindhoven University of Technology, Eindhoven, Netherlands

10.35 *Break*

Chair: Sven INGEBRANDT, Germany

11.05 *FB-3:IL09* **Flexible and Printed Sensors and Biosensors: From Materials and Processes to Systems and Applications**

L. PETTI, P. LUGLI, Free University of Bozen, Bolzano, Italy

11.40 *FB-3:IL10* **Biomaterial Lasers for Sensing and Imaging**

M. HUMAR, J. Stefan Institute, Ljubljana, Slovenia; Faculty of Mathematics and Physics, University of Ljubljana, Ljubljana, Slovenia; CENN Nanocenter, Ljubljana, Slovenia

SYMPOSIUM FE
**FUNCTIONAL NANOMATERIALS FOR NEW
GENERATION SOLID STATE CHEMICAL
SENSORS**

Room: **MAGIONE B**

Chair: Yasuhiro SHIMIZU, Japan

- 9.00 *FE-4:IL03* **Optical Detection of Chemicals and Biological Entities on Gold Nanostructured Solid Supports**
R.E. IONESCU, Laboratoire Lumière, Nanomatériaux et Nanotechnologies- L2n, CNRS ERL 7004, Université de Technologie de Troyes, Troyes, France
- 9.35 *FE-5:L02* **Flexible Plasmonic PEGDA Hydrogels for Biosensing Applications**
B. MIRANDA^{1, 2}, S. DE MARTINO³, R. MORETTA¹, P. DARDANO¹, I. REA¹, C. FORESTIERE², L. DE STEFANO¹, ¹Institute of Applied Sciences and Intelligent Systems, Napoli, Italy; ²DIETI, Università degli Studi di Napoli "Federico II", Napoli, Italy; ³Materias s.r.l., Napoli, Italy
- 10.00 *FE-5:L04* **Single Walled Carbon Nanotube-polymer Composite for Real-time Wireless Heavy Metal Ion Sensing**
SEUNG-HO CHOI, J.S. LEE, W.J. CHOI, J.W. SEO, S.J. CHOI, Hanyang University, Seoul, South Korea
- 10.25 *Break*

Chair: Katarzyna ZAKRZEWSKA, Poland

- 10.55 *FE-5:IL05* **Gas Sensors based on Metal Oxide Nano-heterojunctions**
E. LLOBET, E. NAVARRETE, Universitat Rovira i Virgili, MINOS, Tarragona, Spain
- 11.30 *FE-5:IL06* **Tin Dioxide Based Nanocomposite for Electrochemical and Gas Sensing Applications**
N. LAVANYA, Dept. of Electronic Engineering, University of Messina, Messina, Italy; Dept. of Bioelectronics & Biosensors, Alagappa University, Karaikudi, TN, India
- 12.05 *FE-5:IL07* **Nanoparticle Networks for Label-free Biosensing**
D. TSOUKALAS, E. SKOTADIS, M. KAINOURGAKI, Dept. of Applied Physics, National Technical University of Athens, Greece; G. TSEKENIS, Biomedical Research Foundation of the Academy of Athens, Athens, Greece

SYMPOSIUM FG
**ADVANCES IN INORGANIC
LUMINESCENT MATERIALS**

Room: **MONTEFALCO**

Chair: Andrea S.S. DE CAMARGO, Brazil

- 9.30 *FG-6:IL01* **Simulating Out-coupling and Radiation Patterns from Luminescent Materials in Lighting Applications**
Y. MEURET, B. KARADZA, A. CORREIA, KU Leuven, ESAT, Light and Lighting Laboratory, Ghent, Belgium
- 10.05 *FG-6:L02* **Optimal Quantum Dot Luminescent Solar Concentrator Double and Triple Tandem Structures Based on Ray Tracing Simulations**
T. DE BRUIN, **W. VAN SARK**, Copernicus Institute of Sustainable Development, Utrecht University, Utrecht, The Netherlands
- 10.30 *FG-6:L03* **Thermometric and Pressure Independent Nanoprobe via Upconversion Photoluminescence: Application to Temperature Measurement in Tribological Contacts**
YUJIAO ZHOU, L. BOIS, C. JOURNET-GAUTIER, Lab. des Multimatériaux et Interfaces, UMR CNRS 5615, Université Lyon1-CNRS, Villeurbanne, France; S. DESCARTES, D. PHILIPPON. Univ Lyon, INSA Lyon, CNRS, LaMCoS - UMR5259, Villeurbanne, France; G. LEDOUX, Institut Lumière Matière, UMR CNRS 5306, Université Lyon1-CNRS, Villeurbanne, France
- 10.55 *Break*
- 11.25 *FG-6:IL04* **Nanomaterials and Molecular Photoanodes for Light-driven Water Splitting**
J. LI, H. CHEN, C.A. TRIANA, YONGGUI ZHAO, **G.R. PATZKE**, University of Zurich, Department of Chemistry, Zurich, Switzerland
- 12.00 *FG-6:L05* **Unclonable Anti-counterfeiting Based on Randomly Distributed Microphosphor Particles under Microlens Arrays**
V. KUMAR, S. DOTTERMUSCH, A. CHAUHAN, N. KATUMO, B.S. RICHARDS, I.A. HOWARD, Institute of Microstructure Technology, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany Light Technology Institute, Karlsruhe Institute of Technology, Karlsruhe, Germany

FH - 4th International Conference

**EMERGING MATERIALS, TECHNOLOGIES
AND APPLICATIONS FOR NON-VOLATILE
MEMORY AND MEMRISTIVE DEVICES**

Room: **ASSISI A**

Chair: Sabina SPIGA, Italy & Marie-Paule BESLAND, France

- 9.00 *FH-1.2:IL13* **Oxide ReRAM Technology NVM Solution**
A. REGEV, Weebit-nano, Hod Hasharon, Israel
- 9.25 *FH-1.2:IL14* **Structural Changes and Conductive Filament Formation in Silicon Oxide during Resistance Switching**
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 Eng., UCL, London, UK; ²Inst. of Materials Research and Eng., Singapore; ³Dept of Physics and Astronomy and London Centre for Nanotech., University College London, London, UK; ⁴Dept of Mats, Imperial College London, South Kensington Campus, London, UK
- 9.50 *FH-1.2:IL15* **Prospects and Challenges of Area-dependent Memristive Devices for Neuromorphic Computing**
R. DITTMANN, Peter-Grünberg-Institute (PGI-7), Research Center Jülich, Jülich, Germany
- 10.15 *FH-1.2:L16* **Memristor-based Artificial Neural Network (ANN) Hardware based on Flexible Semiconducting Technology**
A. KIAZADEH, J. DEUERMEIER, M. PEREIRA, R. MARTINS, E. FORTUNATO, i3N/CENIMAT, Dept of Materials Science, NOVA School of Science and Technology, Universidade NOVA de Lisboa and CEMOP/UNINOVA, Campus de Caparica, Portugal
- 10.30 *FH-1.2:L17* **Advanced Analysis of Current Noise in SiO_x-based Phase-change Memories**
Z. BALOGH, A. HALBRITTER, Dept. of Physics, Budapest Univ. of Technology and Economics, and MTA-BME Condensed Matter Research Group, Budapest, Hungary; P. BALÁZS, D. KRISZTIÁN, G. FEHÉRVÁRI, Dept. of Physics, Budapest Univ. of Technology and Economics, Budapest, Hungary; L. PÓSA, Dept. of Physics, Budapest Univ. of Technology and Economics, Budapest, Hungary and Inst. for Technical Physics and Materials Science, Centre for Energy Research, Hungarian Academy of Sciences, Budapest, Hungary
- 10.45 *FH-1.2:L22* **Swift Heavy Ion Irradiation Induced Effects on Emerging Memories - Correlation of Structural and Electrical Properties**
T. VOGEL¹, T. KÄMPFE², A.L. SERRA³, N. KAISER¹, M. LEDERER², G. LEFÈVRE³, N. GUILLAUME³, R. OLIVO², T. ALI², D. LEHNINGER², E. PIROS¹, G. NAVARRO³, C. CHARPIN-NICOLLE³, S. PETZOLD¹, C. TRAUTMANN⁴, L. ALFF¹, ¹Advanced Thin Film Technology Division, Institute of Materials Science, TU Darmstadt, Darmstadt, Germany; ²Fraunhofer IPMS, Dresden, Germany; ³CEA LETI, Grenoble, France; ⁴GSI Helmholtzzentrum, Darmstadt, Germany & Institute of Materials Science, TU Darmstadt, Darmstadt, Germany
- 11.00 *FH-1.2:L23* **Quantum Transport Phenomena in Transition Metal Oxide Memristors**
T.N. TÖRÖK, P. MAKK, A. HALBRITTER, Department of Physics, Budapest University of Technology and Economics, Budapest, Hungary; M. CSONTOS, Empa, Swiss Federal Labs for Materials Science and Technology, Transport at Nanoscale Interfaces Laboratory, Switzerland
- 11.15 *Break*

Continued on next page

Continued from preceding page

Chair: Stefan SLESAZECK, Germany & Amir REGEV, Israel

- 11.40 *FH-3:IL25* **Physic Based Simulation of ReRAM for Neural Network Applications**
S. MENZEL, Forschungszentrum Jülich, Peter Grünberg Institut (PGI-7), Jülich, Germany
- 12.05 *FH-3:L27* **Impact of Memristive Switching Dynamics on Spiking Neural Network Operation**
S. BRIVIO, S. SPIGA, CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy; D.R.B. LY, E. VIANELLO, Université Grenoble Alpes, Leti, Grenoble, France
- 12.20 *FH-3:L28* **Modelling the Switching of RRAM Devices for Bio-inspired Computing**
F. VACCARO, S. BRIVIO, S. SPIGA, CNR-IMM, Unit of Agrate Brianza, Agrate Brianza, Italy; S. PEROTTO, Dipartimento di Matematica, Politecnico di Milano, Milano, Italy; A.G. MAURI
- 12.35 *FH-3:L30* **1/f Noise Spectroscopy and Noise Tailoring of Resistive Switching Devices**
A. HALBRITTER, Z. BALOGH, B. SÁNTA, L. PÓSA, T.N. TÖRÖK, D. MOLNÁR, Department of Physics and MTA-BME Condensed Matter Research Group, Budapest University of Technology and Economics, Budapest, Hungary; M. CSONTOS, Transport at Nanoscale Interfaces Laboratory, Empa, Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland
- 12.50 *FH-3:L31* **A Metal-Oxide-Based Memristor for Artificial Synapse**
N. RAEIS-HOSSEINI, C. PAPAVALASSILIOU, Imperial College London, London, UK

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

Room: **MAGIONE A**

Chair: Julio ALONSO, Spain

- 9.30 *FI-6:IL01* **Synergizing High Capacitance with Fast Charging: Pseudocapacitance in 2D Materials**
M.R. LUKATSKAYA, Department of the Mechanical and Process Engineering, ETH Zürich, Zürich, Switzerland
- 10.05 *FI-6:L02* **Graphite Superlubricity Unabled by Triboinduced Nanocontacts**
R. BUZIO, A. GERBI, C. BERNINI, CNR-SPIN, Genova, Italy; L. REPETTO, Department of Physics, Università di Genova, Genova, Italy; A. VANOSSI, International School for Advanced Studies (SISSA) and CNR-IOM, Trieste, Italy
- 10.30 *FI-6:L03* **Intercalation of Alkaline-ions in 3D-aeromaterial Consisting of MoS₂**
P. HOLTZ, S. HANSEN, R. ADELUNG, Functional Nanomaterials, Department of Materials Science and Engineering, CAU Kiel, Kiel, Germany
- 10.55 *Break*

Chair: Maria LUKATSKAYA, Switzerland

- 11.25 *FI-6:L04* **Nanotribology of AFM Probes Functionalized by Graphene**
A. GERBI, R. BUZIO, C. BERNINI, CNR-SPIN, Genova, Italy; L. REPETTO, Department of Physics, Università di Genova, Genova, Italy; A. VANOSSI, International School for Advanced Studies (SISSA) and CNR-IOM, Trieste, Italy
- 11.50 *FI-6:IL06* **Computational and Experimental Approaches for Printed 2D-based Devices**
G. FIORI, **D. MARIAN**, University of Pisa, Dipartimento Ingegneria Informazione, Pisa, Italy

SYMPOSIUM FK
**THERMOELECTRICS: MATERIALS
RESEARCH AND APPLICATION
TECHNOLOGIES**

Room: **SPELLO**

Chair: Sylvie HEBERT, France

- 9.30 *FK-2:IL02* **Thermoelectric Silicide Devices: Mechanical Reliability Large-scale Synthesis, and Module Integration**
YU-CHIH TSENG, Canmet Materials, Natural Resources Canada, Hamilton, Canada
- 10.05 *FK-2:IL04* **Innovative Design of Thermoelectric Micro-generators based on Bismuth-telluride**
S. EL OUALID¹, F. KOSIOR¹, A. DAUSCHER¹, C. CANDOLFI¹, G. SPAN², E. MEHMEDOVIC², J. PARIS², **B. LENOIR**¹, ¹Institut Jean Lamour, UMR 7198 CNRS, Université de Lorraine, Nancy Cedex, France; ²Mahle Thermoelektronik GmbH, Duisburg, Germany
- 10.40 *Break*

Chair: Andrei V. KOVALEVSKY, Portugal

- 11.10 *FK-2:IL06* **Phonon Engineering in Thermoelectric Materials and Flexible Thermoelectric Devices for Body Heat Harvesting and Personal Thermoregulation**
WOCHUL KIM, School of Mechanical Engineering, Yonsei University, Seoul, South Korea
- 11.45 *FK-3:L02* **Additive and Minimalistic Process of Flexible Inorganic Thermoelectric Devices Enabled by Laser-printing on Plastic Foil**
YUAN TIAN, F. MOLINA-LOPEZ, KU Leuven, Leuven, Belgium
- 12.10 *FK-3:L03* **Two-in-one Management and Recovering of Thermal Energy from LTCC Flip-chip Packages**
N. JAZIRI, M.-K. IQBAL, A. SCHULZ, H. BARTSCH, J. MÜLLER, Electronics Technology Group, Institute of Micro and Nanotechnologies MacroNano, Technische Universität Ilmenau, Ilmenau, Germany; F. TOUNSI, Systems Integration & Emerging Energies (SI2E), École Nationale d'Ingénieurs de Sfax (ENIS), Université de Sfax, Sfax, Tunisia

**SYMPOSIUM FL
STIMULI RESPONSIVE AND
MULTIFUNCTIONAL POLYMERS:
PROGRESS IN MATERIALS AND
APPLICATIONS**

Room: **SPOLETO B**

Chair: Andreas LENDLEIN, Germany

- 10.00 *FL-7:IL04* **HASEL Artificial Muscles**
C. KEPLINGER, Max Planck Institute for Intelligent Systems,
Stuttgart, Germany
- 10.35 *FL-7:IL06* **Plants as Concept Generators for the Development
of New Materials Systems for Soft-robotics**
T. SPECK^{1, 2, 3}, M. THIELEN^{1, 2}, F. ESSER^{1, 2, 3}, B. MAZZOLAI⁴,
¹Botany: Functional Morphology & Biomimetics, Botanic Garden of
the University of Freiburg, Freiburg, Germany; ²Freiburg Materials
Research Centre (FMF) and Freiburg Institute for Interactive Materials
& Bioinspired Technologies (FIT), Germany; ³Cluster of Excellence
Living, Adaptive and Energy-autonomous Materials Systems (livMatS
@ FIT); ⁴Italian Institute of Technology (IIT), Italy

SYMPOSIUM FM
**STATE-OF-THE-ART RESEARCH AND
APPLICATIONS OF SHAPE MEMORY
ALLOYS**

Room: **NORCIA**

Chair: Peter MULLNER, USA

- 9.00 *FM-1:IL21* **Multicaloric effects in Shape Memory Alloys**
L. MANOSA, Universitat de Barcelona, Barcelona, Catalonia, Spain
- 9.35 *FM-1:IL22* **The Use of Magnetic Shape Memory Alloys in Multicaloric Refrigeration Cycles**
T. GOTTSCHALL, E. BYKOV, Y. SKOURSKI, J. WOSNITZA, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany; A. GRÀCIA-CONDAL, LL. MAÑOSA, A. PLANES, Universitat de Barcelona, Barcelona, Catalonia, Spain; B. BECKMANN, A. TAUBEL, L. PFEUFFER, O. GUTFLEISCH, Technical University of Darmstadt, Darmstadt, Germany
- 10.10 *FM-1:L23* **Magnetocaloric and Elastocaloric Properties of Polycrystalline Samples of NiMnGaCu Ferromagnetic Shape Memory Alloy: Effect of Improvement of Thermoelastic Martensitic Transformation**
E. VILLA¹, C. TOMASI², F. VILLA¹, A. NESPOLI¹, F. PASSARETTI¹, E. BESTETTI¹, R. FRIGERIO¹, F. ALBERTINI³, G. LAMURA⁴, F. CANEPA⁵, ¹Consiglio Nazionale delle Ricerche – Istituto della Materia Condensata e di Tecnologie per l'Energia (CNR-ICMATE Sede di Lecco), Lecco, Italy; ²Consiglio Nazionale delle Ricerche – Istituto della Materia Condensata e di Tecnologie per l'Energia (CNR-ICMATE Sede di Genova), Genova, Italy; ³Consiglio Nazionale delle Ricerche – Istituto dei Materiali per l'Elettronica e il Magnetismo, Parma, Italy; ⁴CNR-SPIN, Genova, Italy; ⁵Dipartimento di Chimica e Chimica Industriale, Università di Genova, Genova, Italy
- 10.35 *Break*

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Chair: Lluís MANOSA, Spain

- 11.05 *FM-3:IL01* **3D Reconstitution and Numerical Analysis of Thermo-mechanical Behavior of Porous and Cellular Shape Memory Alloys**
T. BEN ZINEB¹, R. XU^{1,2}, S. ZHU³, C. CISSÉ⁴, R. NISHANT³, C. BOUBY¹, A. CHEROUAT³, H. ZAHROUNI¹, H. HU², W. ZAKI⁴,
¹Université de Lorraine, CNRS, Arts et Métiers Paris Tech, LEM3, Nancy, France; ²School of Civil Engineering, Wuhan University, Wuchang, Wuhan, China; ³University of Technology of Troyes, ICD/GAMMA3, Troyes, France; ⁴Khalifa University of Science and Technology, Abu Dhabi, UAE
- 11.40 *FM-3:L04* **Thermomagnetic Thin Film Energy Harvester**
J. JOSEPH, M. KOHL, Karlsruhe Institute of Technology (KIT), Institute of Microstructure Technology (IMT), Karlsruhe, Germany; M. OHTSUKA, Institute of Multidisciplinary Research for Advanced Matls, Tohoku University, Sendai, Japan; H. MIKI, Institute of Fluid Science, Tohoku University, Sendai, Japan
- 12.05 *FM-3:L05* **Investigation of the Damping Properties of Innovative NiTi Elements: Development of Proof of Concept and Demonstrators**
F. VILLA¹, E. BASSANI¹, G. DE CEGLIA², T. CLAUDE PARKEL³, F. PASSARETTI¹, S. VISCUSO⁴, E. VILLA¹, ¹National Research Council - Institute of Condensed Matter Chemistry and Technologies for Energy (CNR ICMATE), Lecco, Italy; ²Technosprings Italia Srl, Besnate (VA), Italy; ³CSEM - Centre Suisse d'Electronique et de Microtechnique, Landquart (GR), Switzerland; ⁴TSS InnovationProjekte GmbH, Roveredo (GR), Switzerland
- 12.30 *FM-3:IL09* **Development of Tube-based Structures to be Applied in Durable and Efficient Elastocaloric Cooling Device**
S. DALL'OLIO, A. ŽEROVNIK, L. PORENTA, Ž. AHČIN, J. CERAR, P. KABIRIFAR, **J. TUŠEK**, Faculty of Mechanical Engineering, University of Ljubljana, Ljubljana, Slovenia

**SYMPOSIUM FO
EMBODYING INTELLIGENCE IN
STRUCTURES AND INTEGRATED
SYSTEMS**

Room: **SALA STAMPA**

Chair: Satish NAGARAJIAH, USA

9.00 *FO-4:IL01* **Provisions for Passive Control Devices in the New Eurocode 8**

C.Z. CHRYSOSTOMOU, Cyprus University of Technology, Limassol, Cyprus

9.40 *FO-4:IL02* **Some Aspects in Managing Smart Cities**

R. DE LOTTO, University of Pavia, Department of Civil Engineering and Architecture, Pavia, Italy

10.20 *Break*

Chair: Christis CHRYSOSTOMOU, Cyprus

10.50 *FO-4:L03* **Monitoring the Building Response during Borehole Excavation**

D. BORTOLUZZI, M. FRANCOLIN, SIART srl, Pavia, Italy

11.20 *FO-4:IL04* **Towards a Fly-by-Feel Morphing Wing using Reinforcement Learning**

K.P.T. HAUGHN, D.J. INMAN, University of Michigan, Ann Arbor, MI, USA

12.00 *FO-4:IL05* **Rail Bolt Joint Looseness Monitoring Using PZT Sensing Network**

LU ZHOU^{1,2}, **YI-QING NI**^{1,2}, ¹Hong Kong Branch of National Transit Electrification and Automation Engineering Technology Research Center, The Hong Kong Polytechnic University, Hong Kong, China; ²Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Hong Kong, China

Focused Session FQ-7

**WIRELESS BODY SENSOR NETWORKS FOR
HEALTHCARE APPLICATIONS**

Room: **ORVIETO**

Chair: Simone GENOVESI, Italy

9.30 *FQ-7:IL02* **A Wearable Sensing Platform for the Unobtrusive Analysis of Sweat**

F. DI FRANCESCO¹, F.M. VIVALDI¹, A. DALLINGER², D. SANTALUCIA¹, A. BONINI¹, N. POMA¹, D. BIAGINI¹, F. GRECO^{2,3},
¹Department of Chemistry and Industrial Chemistry, University of Pisa, Pisa, Italy; ²Institute of Solid State Physics, Graz University of Technology, Graz, Austria; ³Institute of Biorobotics, Sant'Anna School of Advanced Studies, Pisa, Italy

10.00 *FQ-7:IL04* **Textile-based Deformation and Flexion Sensors for Motion Analysis and Human Machine Interaction**

A. TOGNETTI, Dipartimento di Ingegneria dell'Informazione, University of Pisa, Pisa, Italy

10.30 *FQ-7:IL05* **Embedded Sensing by 3D Multi-material Printing**

G. KRIJNEN, A. DIJKSHOORN, M. SCHOUTEN, D. KOSMAS, G. WOLTERINK, Robotics and Mechatronics Dept., University of Twente, Enschede, The Netherlands

11.00 *Break*

Chair: Alessandro TOGNETTI, Italy

11.30 *FQ-7:IL07* **Non-invasive Daily Diagnostics through Printed Sensor Technology**

M.P.M. JANK, Fraunhofer Institute for Integrated Systems and Device Technology, Thin-Film Systems Group, Erlangen, Germany

12.00 *FQ-7:IL08* **InnoRetVision - A new Research Training Group on Innovative Retinal Interfaces for Optimized Artificial Vision funded by the German Research Foundation**

W. MOKWA¹, P. WALTER², S. INGEBRANDT¹, RWTH Aachen University ¹Institute of Materials in Electrical Engineering I, Aachen, Germany; ²Department of Ophthalmology, University Hospital, Aachen, Germany

12.30 *FQ-7:IL09* **Printed Wearable Metasurfaces for Wireless On-body Sensors**

S. GENOVESI, F. COSTA, A. TOGNETTI, Dipartimento di Ingegneria dell'Informazione, University of Pisa, Pisa, Italy

FR - 4th International Conference
**MATERIALS CHALLENGES FOR
SUSTAINABLE NUCLEAR FISSION AND
FUSION TECHNOLOGIES**

Room: **SPOLETO A**

Chair: Steven ZINKLE, USA

9.00 *FR-6:IL07* **Helium Induced Degradation Scenarios for Fusion Structural Steels**

A. BHATTACHARYA, Materials Science and Technology Division, Oak Ridge National Lab, Oak Ridge, TN, USA

9.30 *FR-6:IL08* **Development of Small Specimen Test Technique for Master Curve Fracture Toughness Measurements of Eurofer97 and F82H**

XIANG CHEN, M.A. SOKOLOV, Y. KATOH, Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA; S. GONZALEZ DE VICENTE, International Atomic Energy Agency, Vienna, Austria

10.00 *FR-6:L10* **Phase Separation under Irradiation in Fe-Ni and Low-alloyed Steels**

Q. TENCE¹, E. MESLIN¹, M. NASTAR¹, I. MOUTON², B. DÉCAMPS³, I. JOLIOT-CURIE⁴, ¹Université Paris-Saclay, CEA, Service de Recherches de Métallurgie Physique, Gif-sur-Yvette, France; ²Université Paris-Saclay, CEA, Service de Recherches de Métallurgie Appliquée, Gif-sur-Yvette, France; ³Laboratoire de Physique des 2 infinis; ⁴(IJCLab), Université Paris-Saclay, Orsay, France

10.20 *Break*

Chair: Massimo E. ANGIOLINI, Italy

10.50 *FR-6:IL13* **Critical Evaluation of High Temperature Helium Embrittlement Phenomena in Structural Materials**

S.J. ZINKLE^{1,2}, ZEHUI QI¹, ¹University of Tennessee, Knoxville, TN, USA; ²Oak Ridge National Laboratory, Oak Ridge, TN, USA

11.20 *FR-8:IL01* **Challenges for Nuclear Fusion Science and Technology**

M. ABDOU, Mechanical and Aerospace Engineering Dept, University of California-Los Angeles, Los Angeles, CA, USA

11.50 *FR-8:IL02* **Challenges for Fusion Materials and Potential Solutions**

J.W. COENEN^{1,2}, Y. MAO¹, A. LITNOVSKY^{1,3}, A. HOUBEN¹, V. GANESH¹, A. TERRA¹, D. DOROW-GERSPACH¹, J. RIESCH⁴, R. NEU^{4,5}, Ch. LINSMEIER¹, ¹Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung - Plasmaphysik, Partner of the Trilateral Euregio Cluster (TEC), Jülich, Germany; ²Department of Engineering Physics, University of Wisconsin-Madison, Madison, WI, USA; ³National Research Nuclear University MEPhI, Moscow, Russian Federation; ⁴Max-Planck-Institut für Plasmaphysik, Garching, Germany; ⁵Technische Universität München, Garching, Germany

SYMPOSIUM FA
**3D PRINTING AND BEYOND: STATE-
OF-THE-ART AND NEW PARADIGMS
FOR ADDITIVE MANUFACTURING
TECHNOLOGIES**

Room: **ASSISI B**

Chair: Tassilo MORITZ, Germany

- 14.30 *FA-4:IL01* **Additive Manufacturing - Recent Developments and Future Challenges**
D.L. BOURELL, The University of Texas at Austin, Austin, TX, USA
- 15.00 *FA-4:L02* **Integration of 3D Laser Lithography and Micro-contact Printing for Bioinspired Surfaces with Advanced Wettability**
O. TRICINCI, F. PIGNATELLI, V. MATTOLI, Center for Materials Interfaces, Istituto Italiano di Tecnologia, Pontedera (PI), Italy

SYMPOSIUM FB
**FLEXIBLE AND STRETCHABLE
ELECTRONICS: MATERIALS, DEVICES
AND APPLICATIONS**

Room: **SALA RELATORI**

Chair: Mario PROSA, Italy

- 14.30 *FB-3:IL11* **Flexible and Reliable Organic Solar Cell**
KENJIRO FUKUDA¹, T. SOMEYA^{1,2}, ¹RIKEN, Saitama, Japan; ²The University of Tokyo, Japan
- 15.05 *FB-3:IL12* **Computational and Physical Optical Models of the Eye for Medical Applications**
M. RAMUZ, S. REGAL, Flexible Electronics Department, Mines St Etienne, Gardanne, France
- 15.40 *FB-3:IL13* **Wireless Epidermal Electronic System to Simultaneously Measure Electrocardiograms and Seismocardiograms from Human Body**
M.E. HESAR, N. SEYEDSADRKHANI, D. KHAN, **S. INGEBRANDT**, Institute of Materials in Electrical Engineering 1, RWTH Aachen University, Aachen, Germany
- 16.15 *FB-3:IL14* **Thermoelectric-based Adjustable Wearable Camouflage Devices**
SUNMI SHIN, Department of Mechanical Engineering, National University of Singapore, Singapore

SYMPOSIUM FF
**ELECTROMAGNETIC METAMATERIALS
AND METASURFACES: RECENT
RESEARCH ACHIEVEMENTS AND NEW
PARADIGMS**

Room: **MAGIONE B**

Chair: Costantino DE ANGELIS, Italy

- 14.30 *FF-5:IL06* **Topological Photons and Phonons in Nanophotonic Architectures**
E. VERHAGEN, Center for Nanophotonics, AMOLF, Amsterdam, The Netherlands
- 15.05 *FF-6:IL02* **Controlling the Parity and Time-reversal Symmetry of Metasurfaces in Current-driven Graphene Dirac Plasmons**
TAIICHI OTSUJI, Research Institute of Electrical Communication, Tohoku University, Sendai, Japan
- 15.40 *FF-6:IL03* **Broadband Active Control of Light-matter Interactions with Metal-dielectric Nanocavities**
N. MACCAFERRI, Department of Physics and Materials Science, University of Luxembourg, Luxembourg, & Department of Physics, Umeå University, Umeå, Sweden

**SYMPOSIUM FG
ADVANCES IN INORGANIC
LUMINESCENT MATERIALS**

Room: **MONTEFALCO**

Chair: Giancarlo RIGHINI, Italy

- 14.30 *FG-7:IL01* **It's Getting Hot in Here: Intracellular Luminescent Thermometers**
L.D. CARLOS, Phantom-g, CICECO-Aveiro Institute of Materials, Physics Department, University of Aveiro, Campus Universitário de Santiago, Aveiro, Portugal
- 15.05 *FG-7:IL02* **Lanthanide-doped Nanoparticles for Applications in Theranostics**
F. VETRONE, Institut National de la Recherche Scientifique, Centre Énergie, Matériaux et Télécommunications, Université du Québec, Varennes, Canada
- 15.40 *FG-7:IL04* **Photoactive Nanoclay Carriers and Functionalized Upconverting Nanoparticles for Biophotonic Applications**
A. DE CAMARGO, São Carlos Institute of Physics, University of São Paulo, São Carlos, SP, Brazil

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

Room: **MAGIONE A**

Chair: Yury GOGOTSI, USA

- 14.30 *FI-5:IL01* **Modelling of WS₂ Nanostructures: Optical Properties and Interaction with Hydrogen**
J.A. ALONSO, Dept. of Theoretical, Atomic and Optical Physics, University of Valladolid, Valladolid, Spain; A. ZAK, A. LAIKHTMAN, Physics Department, Faculty of Sciences, Holon Institute of Technology, Holon, Israel; J.I. MARTINEZ, ESISNA Group, Institute of Materials Science of Madrid (CSIC), Madrid, Spain
- 15.05 *FI-5:IL04* **From the Atomic Structure to the Optoelectronic Properties Studies of 2D Materials via TEM**
R. ARENAL, Laboratorio Microscopias Avanzadas, U. Zaragoza, Zaragoza, Spain; Fundacion ARAID, Zaragoza, Spain; Instituto de Nanociencia y Materiales de Aragon (INMA), CSIC-U. Zaragoza, Zaragoza, Spain

SYMPOSIUM FM
**STATE-OF-THE-ART RESEARCH AND
APPLICATIONS OF SHAPE MEMORY
ALLOYS**

Room: **NORCIA**

Chair: Franca ALBERTINI, Italy

- 14.30 *FM-2:IL01* **Shell Ferromagnetism**
M. ACET¹, A. CAKIR², M. FARLE¹, ¹Physics Faculty, Duisburg-Essen University, Duisburg, Germany; ²Department of Metallurgical and Materials Engineering, Muğla Sıtkı Koçman University, Muğla, Turkey
- 15.05 *FM-2:IL02* **Microstructure Engineering of Magnetic Shape Memory Thin Films and Nanostructures**
F. CASOLI, M. TAKHSHA GHAHFAROKHI, L. NASI, S. FABBRICI, R. CABASSI, G. TREVISI, F. ALBERTINI, IMEM - CNR, Parma, Italy; J.A. ARREGI, M. STANO, M. HORKY, J. HAJDUCEK, V. UHLIR, CEITEC BUT, Brno, Czech Republic; A. CHIRKOVA, F. MACCARI, Functional Materials, TU Darmstadt, Darmstadt, Germany
- 15.40 *FM-2:IL03* **Epitaxial NiTi Thin Films: Growth, Microstructure and Martensitic Phase Transition**
K. LÜNSER^{1,2,3}, S. SCHWABE¹, K. NIELSCH^{1,2}, S. FÄHLER³, ¹Leibniz IFW Dresden, Institute for Metallic Materials, Dresden, Germany; ²Institute of Materials Science, TU Dresden, Dresden, Germany; ³Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Dresden, Germany
- 16.15 *FM-2:L04* **Shape-memory Heusler Films Towards Nanoscale by Lithography Patterning**
M. TAKHSHA, G. TREVISI, L. NASI, F. CASOLI, F. ALBERTINI, IMEM-CNR, Parma, Emilia-Romagna, Italy; J.A. ARREGI, M. HORKÝ, V. UHLÍR, CEITEC BUT, Brno University of Technology, Brno, South Moravian, Czech Republic
- 16.40 *FM-2:L06* **The Impact of the Interaction between Twin Microstructures and Magnetic Domain Patterns on the Magneto-mechanics of Magnetic Shape Memory Alloys**
P. MÜLLNER, M. VELIGATLA, Boise State University, Boise, ID, USA; A. HOBZA, SpaceX C.J. GARCÍA-CERVERA, University of California Santa Barbara & Basque Center for Applied Mathematics

**SYMPOSIUM FO
EMBODYING INTELLIGENCE IN
STRUCTURES AND INTEGRATED
SYSTEMS**

Room: **SALA STAMPA**

Chair: Fabio CASCIATI, Italy

14.30 *FO-2:IL02* **The Smart Potential of Vision-based Technology**
L. FARAVELLI, Zhejiang University, Hangzhou, China; D.
BORTOLUZZI, SIART srl, Pavia, Italy

SYMPOSIUM FP
**BIOLOGICAL, BIOHYBRID AND
BIOINSPIRED MATERIALS: FROM
ELECTRONICS AND PHOTONICS TO
MEDICINE**

Room: **SPELLO**

Chair: Gianluca M. FARINOLA, Italy

- 14.30 *FP-4:IL02* **Functional Nanomaterials and their Applications in the Therapy of Cancer and Infectious Diseases**
M. HÉMADI, France Laboratoire ITODYS, Université de Paris, CNRS-UMR 7086, Paris Cedex, France
- 15.05 *FP-4:L03* **Antibacterial Structures Inspired by Cicada Wings**
A.M. BÜRGER, R.W. VAN NIEUWENHOVEN, L.L.E. MEARS, K. WHITMORE, **I.C. GEBESHUBER**, Vienna University of Technology, Vienna, Austria; C. SIMON, D.C. MARSHALL, University of Connecticut, USA; P. KIENZL, A. ELBE-BÜRGER, Medical University of Vienna, Austria
- 15.30 *FP-4:IL04* **Mechano-responsive Color-changing Photonic Materials: Scalable Manufacture for Wearables and Medical Textiles**
M. KOLLE, Massachusetts Institute of Technology, Cambridge, MA, USA
- 16.05 *FP-4:IL05* **Nature Inspired Design of Bioactive Antimicrobial Materials**
G. LUCIANI, University of Naples Federico II, Dept. DICMaPI - Dept. Chemical, Materials and Industrial Production Engineering, Naples, Italy
- 16.40 *FP-4:IL06* **Bioelectronics to Study and Regenerate Bone**
Y. FU, F. SANTORO, S. CARTMELL, D. WIDERA, R.M. OWENS, D. IANDOLO, Department of Chemical Engineering and Biotechnology, University of Cambridge, UK; F. SANTORO, IIT, Naples, Italy; S. CARTMELL, University of Manchester, UK; D. WIDERA, School of Pharmacy, University of Reading, UK; **D. IANDOLO**, INSERM, U1059 Sainbiose, Université Jean Monnet, Mines Saint-Étienne, Université de Lyon, Campus Santé Innovation, Saint-Étienne, France

Focused Session FR-10
**MATERIALS ISSUES IN RADIOACTIVE
NUCLEAR WASTE TREATMENT AND
DISPOSAL**

Room: **SPOLETO A**

Chair: Nadia CHERUBINI, Italy

- 14.30 *FR-10.4:IL02* **Production of Mixed Actinide Oxide Microparticle Reference Materials – Materials Science Aspects and Challenges**
S. NEUMEIER, P. KEGLER, S.K. POTTS, M. KLINKENBERG, D. BOSBACH, I. NIEMEYER, Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research - Nuclear Waste Management and Reactor Safety (IEK-6), Juelich, Germany; S. HAMMERICH, Heidelberg University, Institute of Earth Sciences, Heidelberg, Germany
- 15.00 *FR-10.4:LO3* **Synthesis of Silicotitanates for Sr Sorption – Influence of the Ti/Si Ratio**
T. TRATNJEK¹, J. CAUSSE¹, A. HERTZ², X. DESCHANELS¹, ¹Univ Montpellier, ICSM, CEA, CNRS, ENSCM, Marcoule, France; ²CEA Marcoule, DES/ISEC/DE2D/SEAD/LPSD, Marcoule, France
- 15.20 *FR-10.4:IL04* **Advanced Nuclear Waste Form Research at UCI**
S.C. FINKELDEI, University of California, Irvine, Department of Chemistry, Irvine, CA, USA
- 15.50 *FR-10.4:IL05* **Nanoporosity and Irradiation - New Perspectives for the Treatment of Radioactive Effluents?**
J. LIN¹, G. TOQUER¹, C. GRYGIEL², S. DOURDAIN¹, Y. GUARI³, C. REY¹, J. CAUSSE¹, **X. DESCHANELS**¹, ¹ICSM, CEA, CNRS, ENSCM, Univ Montpellier, Marcoule, France; ²CIMAP, CEA-CNRS-ENSICAEN-UNICAEN, Caen, France; ³ICGM, Univ Montpellier, CNRS, ENSCM, Montpellier, France

POSTER DISCUSSION

WEDNESDAY JUNE 29: 14.30 - 17.30

Posters desmouting:

(Soon after the poster discussion)

F:P01 Production of Magnetically Soft Components from FeSi_{6.5} Alloy with Selective Laser Melting Technology - Optimisation, Prototyping and Post-processing

B. JÓZWIK, A. KOLANO-BURIAN, P. ZACKIEWICZ, A. PILSNIAK, M. POLAK, A. BRUDNY, A. RADON, Łukasiewicz Research Network, Institute of Non-Ferrous Metals, Gliwice, Poland; A. WÓJCIK, Institute of Metallurgy and Materials Science, Polish Academy of Sciences, Krakow, Poland

F:P02 Soft Magnetic Amorphous and Nanocrystalline Ribbons for Energy Conversion and Storage

T. WARSKI^{1, 2}, L. HAWELEK¹, A. RADON¹, A. PILSNIAK¹, A. KOLANO-BURIAN¹, M. POLAK¹, A. WOJCIK³, ¹Łukasiewicz Research Network - Institute of Non-Ferrous Metals, Gliwice, Slaskie, Poland; ²Silesian University of Technology, Gliwice, Slaskie, Poland; ³Institute of Metallurgy and Materials Science of Polish Academy of Sciences, Krakow, Malopolskie, Poland

F:P03 Morpho-structural Characterization of Polymer Embedded BaTiO₂ and γ-Fe₂O₃ Nano-structures

L. MIHAI¹, **A. MARCU**¹, A. ROTARU², G. CARUNTU^{2, 3}, D. CARUNTU^{2, 3}, F. DUMITRACHE¹, A. CRIVEANU¹, L. GAVRILA-FLORESCU¹, M. ZAMFIRESCU¹, ¹National Institute for Laser Plasma and Radiation Physics, Magurele, Ilfov, Romania; ²Department of Electrical Engineering and Computer Science & MANSiD Research Center, "Stefan Cel Mare" University, Suceava, Romania; ³Department of Chemistry and Biochemistry, Central Michigan University, Mount Pleasant, MI, USA

F:P04 Modelling a Combined Electrostatic – Triboelectric Flexible Generator

S.E. HAIM, Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; C. JEAN-MISTRAL, Univ. Lyon, INSA-Lyon, CNRS UMR 5259, LaMCoS, Villeurbanne, France; A. SYLVESTRE, Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France

F:P05 Microstructure Analysis of Metal Thin Film on Polyimide Substrate under Tensile Stress for Flexible Display

HONGWON CHOI, CHANGWAN SEO, INSUN YOON, KEUMHWAN PARK, **CHAN-JAE LEE**, Korea Electronics Technology Institute, Seongnam, South Korea

F:P06 Zr-based Super Elastic Alloy and its Piezoresistive Response for Strain Sensor

YOUNGEUN KIM¹, JAESANG CHO², DONGHWAN WANG², CHAN-JAE LEE¹, **KEUMHWAN PARK**¹, ¹Korea Electronics Technology Institute, ²School of Integrative Engineering, Chung-Ang University, South Korea

F:P07 Ti:sapphire Crystalline Core and Clad Fiber for Broadband NIR Emission

T.I YANG, **S.L. HUANG**, National Taiwan University, Taipei, Taiwan; P.S. YEH, National Taiwan University of Science and Technology, Taipei, Taiwan

F:P08 The Broadband Emission from Cr³⁺ Ion in Near-Infrared Phosphors for Light-emitting Diodes

N. MAJEWSKA¹, T. LESNIEWSKI¹, S. MAHLIK¹, V. RAJENDRAN², MU-HUAI FANG², WEN-TSE HUANG², G. LENIEC³, S.M. KACZMAREK³, RU-SHI LIU²,

¹Institute of Experimental Physics, Faculty of Mathematic, Physics, and Informatics, Gdansk University, Gdansk, Poland; ²Department of Chemistry, National Taiwan University, Taipei, Taiwan; ³Institute of Physics, Department of Mechanical Engineering and Mechatronics, West Pomeranian University of Technology Szczecin, Szczecin, Poland

F:P09 **High Pressure Study of AlN Doped with Eu²⁺ and Ce³⁺**

M. KAMINSKI, S. MAHLIK, A. LAZAROWSKA, T. LESNIEWSKI, Institute of Experimental Physics, Faculty of Mathematic, Physics, and Informatics, University of Gdansk, Gdansk, Poland; RU-SHI LIU, Department of Chemistry, National Taiwan University, Taipei, Taiwan

F:P10 **Resistive Switching in V-doped Cr₂O₃ Thin Films Mott Insulator for Memory Applications**

M. RODRIGUEZ FANO, J. TRANCHANT, E. JANOD, B. CORRAZE, P.-Y. JOUAN, L. CARIO, M.-P. BESLAND, Université de Nantes, CNRS, Institut des Matériaux Jean Rouxel, Nantes, France

F:P11 **Integration of Memristive Switching with Sensing in Ag Alloy Nanoparticle based Memensors**

R. GUPTA¹, N. CARSTENS¹, M. TERASA², T. STRUNSKUS¹, F. FAUPEL¹, R. ADELUNG², A. VAHL¹, ¹Institute for Materials Science - Chair for Multicomponent Materials, Faculty of Engineering, Kiel University, Kiel, Germany; ²Institute for Materials Science - Functional Nanomaterials, Faculty of Engineering, Kiel University, Kiel, Germany

F:P12 **Towards Photocatalytically Generated Long-range Connections for Artificial Neural Networks**

B. ADEJUBE¹, M. PAULSEN², J. SCHARDT², T. STRUNSKUS¹, F. FAUPEL¹, M. GERKEN², A. VAHL¹, ¹Institute for Materials Science - Chair for Multicomponent Materials, Faculty of Engineering, Kiel University, Kiel, Germany; ²Institute of Electrical Engineering and Information Engineering - Chair for Integrated Systems and Photonics, Faculty of Engineering, Kiel University, Kiel, Germany

F:P13 **Structural Transformation and Phase Change Properties of Se Substituted GeTe**

R. SHEKHAWAT, H. PAMULURI, V. ERKKARA MADHAVAN, K. RAMESH, Indian Institute of Science-Bangalore, Bangalore, India

F:P14 **Multiple Magnetization Switching and Magnetic Glass Signature in Gd doped Distorted Antiferromagnetic Perovskite SmCrO₃**

S. DAS, R.K. DOKALA, S. THOTA, Department of Physics, Indian Institute of Technology Guwahati, Assam, India

F:P15 **Degenerate Spin-states Widening the Metamagnetic Phase in Twinned Antiferromagnetic Charge-Ordered Pr_{0.35}Yb_{0.10}Sr_{0.55}MnO₃**

R.K. DOKALA, S. DAS, S. THOTA, Department of Physics, Indian Institute of Technology Guwahati, Assam, India

F:P16 **Signature of Dirac Fermions in Type-II Dirac Semimetal NiTe₂**

M.T. JAMES, S. MANDAL, N.K SEBASTIAN, R. GANESAN, P.S. ANIL KUMAR, Indian Institute of Science, Bangalore, India

F:P17 **Low temperature electrical transport of nanoflakes of strong topological insulator BiSbTe_{1.25}Te_{1.75}**

N.K. SEBASTIAN, P.S. ANIL KUMAR, Indian Institute of Science, Bangalore, India

F:P18 **Ultrahigh Specific Surface Area 2D-Nanostructured Carbon Electrodes and Coatings by Electrospinning**

QI LI, FENG YAN, **J. TEXTER**, Department of Polymer Science and Engineering, College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Suzhou, China; Coating Research Institute, School of Engineering, Eastern Michigan University, Ypsilanti, MI, USA; Strider Research Corporation, Rochester, NY, USA

F:P19 **Influence of Oxygen in Ti₃AlC₂ MAX Precursor on the Physical Characteristics of Ti₃C₂T_x MXene Nanosheet**

SUBIN CHOI, KEUM HWAN PARK, CHAN-JAE LEE, **JONG-WOONG KIM**, Jeonbuk National University, Jeonju, South Korea

F:P20 Effect of Synthesis Route on the Structural, Compositional, and Electrochemical Properties of g-C₃N₄/Ce-MOF Nanocomposites

Z. DURMUS, A.W. MAIJENBURG, Centre for Innovation Competence (ZIK) SiLi-nano, Martin Luther University Halle-Wittenberg, Halle (Salle), Germany; R. KÖFERSTEIN, Institut für Chemie Festkörperchemie, Martin Luther University Halle-Wittenberg, Halle (Salle), Germany

F:P21 Improving the Longevity of Triboelectric Charge

L. GERMANE¹, L. LAPČINSKIS^{1, 2}, M. KNITE¹, A. ŠUTKA², ¹Institute of Technical Physics, Faculty of Materials Science and Applied Chemistry, Riga Technical University, Riga, Latvia; ²Institute of Materials and Surface Engineering, Faculty of Materials Science and Applied Chemistry, Riga Technical University, Riga, Latvia

F:P22 Multi-responsive Hydrogel Microspheres for the Controlled Release of Ozoile

G. CIARLEGLIO^{1, 2}, S. VELLA², E. TOTO¹, M.G. SANTONICOLA¹, ¹Department of Chemical Engineering Materials Environment (DICMA) Sapienza University of Rome, Rome, Italy; ²Erbagil s.r.l., Telesse Terme (BN), Italy

F:P23 Landau-energy Landscape Reconstruction for a Ni-Fe-Ga(Co) Shape Memory Alloy

K. ZOUBKOVA, P. SEDLÁK, H. SEINER, Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic; E. VILLA, CNR ICMATE Sede di Lecco, Lecco, Italy; M. TAHARA, H. HOSODA, Institute of Innovative Research (IIR), Tokyo Institute of Technology, Yokohama, Japan; V. CHERNENKO, BCMaterials & University of Basque Country (UPV/EHU), Bilbao, Spain

F:P24 Static and Dynamic Characterization of Flexinol Wires in a Biomimetic Perspective

B. TONDU, Université Fédérale de Toulouse, and LAAS-CNRS, Toulouse, France

F:P25 Investigation of Thermally Induced Intermartensitic Transformations in Ni-Mn-Ga-Fe Alloy

M. VINOGRADOVA¹, O. SOZINOV¹, L. STRAKA², P. VERTÁT², E. LÄHDERANTA¹, K. ULLAKKO¹, ¹Department of Physics, LUT-University, Lappeenranta, Finland; ²FZU - Institute of Physics of the Czech Academy of Sciences, Czech Republic

F:P26 Full Variation of Site Substitution in Ni-Mn-Ga by Ferromagnetic Transition Metals

V. KOPECKY, M. RAMES, M. VEIS, O. HECZKO, FZU - Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic

F:P27 Fabrication and Characterisation of Double Layered Bone Scaffold

L. YILDIZBAKAN¹, D. ABDULAZIZ¹, N. IQBAL¹, E. JONES², N. T. DO³, P. V. GIANNOUDIS⁴, A. JHA¹, ¹School of Chemical and Process Engineering, University of Leeds, Leeds, UK; ²Clinical Sciences Building, St James University Hospital, School of Medicine, University of Leeds, Leeds, UK; ³Division of Oral Biology, St James University Hospital, School of Medicine, University of Leeds, Leeds, UK; ⁴Academic Department of Trauma and Orthopaedic, School of Medicine, University of Leeds, Leeds General Infirmary, Leeds, UK

F:P28 Preparation and Spectroscopic Investigations of Oxide Glasses with High Iron Concentrations

T. TASHEVA¹, R. HARIZANOVA¹, I. MIHAILOVA¹, I. AVRAMOVA², Z. CHERKEZOVA-ZHELEVA³, D. PANEVA³, C. RÜSSEL⁴, ¹University of Chemical Technology and Metallurgy, Sofia, Bulgaria; ²Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria; ³Institute of Catalysis, Bulgarian Academy of Sciences, Sofia, Bulgaria; ⁴Otto Schott Institute for Materials Research, Jena University, Jena, Germany

F:P29 Preliminary Characterization of Advanced Alloys as Structural Material for LFR

A. MELI, ESSENTIAL Group, DENERG, Politecnico di Torino, Torino, Italy; M. TARANTINO, S. BASSINI, A. FIORE, C. CIANTELLI, M. ANGIOLINI, D. MARTELLI, ENEA - Department for Fusion and Technology for Nuclear Safety and Security C. R. Brasimone, Camugnano (Bologna), Italy

F:P30 W/Steel Composites as a Potential Interlayer for the Joining of W and Steel for the First Wall of a Fusion Reactor

V. GANESH^{1, 2}, D. DOROW-GERSPACH¹, S. HEUER¹, L. LEICH², J. MATEJICEK³, M. VILEMOVA³, M. BRAM^{2, 4}, J. WILLEM COENEN^{1, 5}, M. WIRTZ¹, G. PINTSUK¹, W. THEISEN², C. LINSMEIER¹, ¹Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung - Plasmaphysik, Jülich, Germany; ²Institut für Werkstoffe, Lehrstuhl Werkstofftechnik, Ruhr Universität Bochum, Bochum, Germany; ³Institute of Plasma Physics of the Czech Academy of Sciences, Prague, Czech Republic; ⁴Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung - Werkstoffsynthese und Herstellungsverfahren, Jülich, Germany; ⁵Department of Engineering Physics, University of Wisconsin Madison, Madison, USA

F:P31 Nanostructured Mo Mirrors Behavior under He Irradiation

L. CIUPINSKI¹, A.T. KRAWCZYNSKA¹, M. GLOC¹, D. SETMAN², M. SPYCHALSKI¹, P. PETERSSON³, ¹Warsaw University of Technology, Faculty of Materials Science and Engineering, Warsaw, Poland; ²University of Vienna, Faculty of Physics, Vienna, Austria; ³KTH Physics Royal Institute of Technology, Stockholm, Sweden

F:P32 Selection of Inboard Materials for Optimal Radial Build of a Tokamak Fusion Reactor

BONG GUEN HONG, Chonbuk National University, Jeonju-si, South Korea

F:P33 Potentiodynamic Electrochemical Impedance Spectroscopy of CuGaSe₂ Photocathode for Photoelectrochemical Water Splitting

B. MAHMOUDI, R. SINGH, F. CADDEO, T. LINDENBERG, T. SCHNEIDER, T. HÖLSCHER, R. SCHEER, A.W. MAIJENBURG, Center for Innovation Competence (ZIK) "SiLi-nano", Martin Luther University Halle Wittenberg, Halle, Germany

Publication Policy

Authors at CIMTEC 2022 may submit their papers for publication in a special issue of Elsevier-TechnaGroup journal “Ceramics International”

<https://www.journals.elsevier.com/ceramics-international>

A window for papers submission will be opened at journal website as from July 1 to August 31. We regret that late submissions cannot be considered.

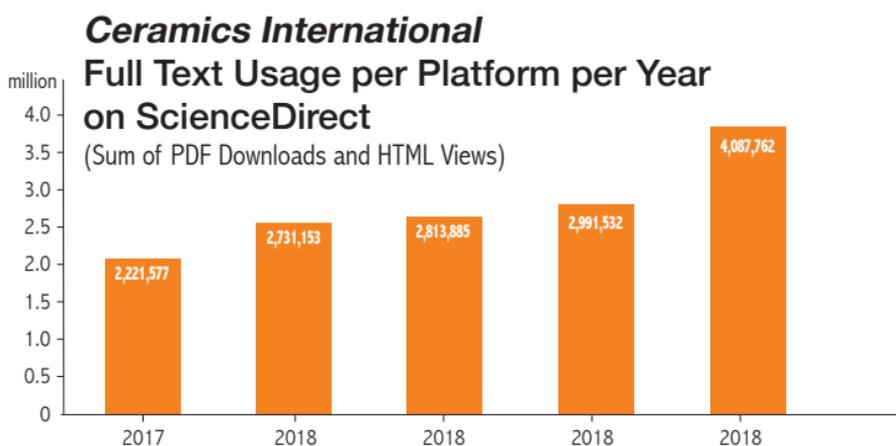
SUBMISSION INFORMATION

1. Only papers presented at CIMTEC 2022 by Authors regularly registered to the conference (Congress and/or Forum) may be submitted choosing the Article Type Name “SI: CIMTEC 2022”.
2. The Corresponding Author for the submitted paper shall be the one registered at the Conference as Presenting Author for the paper.
3. The Code Number assigned to the paper shall be mandatorily reported at the end of the title of the submitted paper.

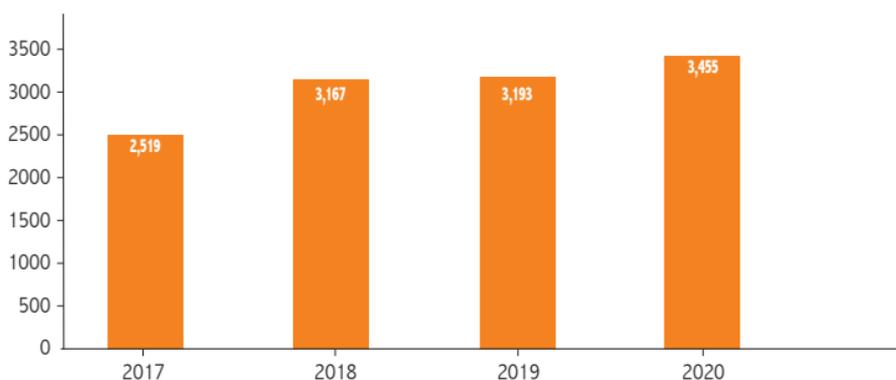
Example: Iron Boride Coatings for Wear and Corrosion Resistance Applications (CH-5:IL02).

If the Code Number is not indicated, the paper will not be recognized as a CIMTEC 2022 contribution with the risk to be rejected without peer review.

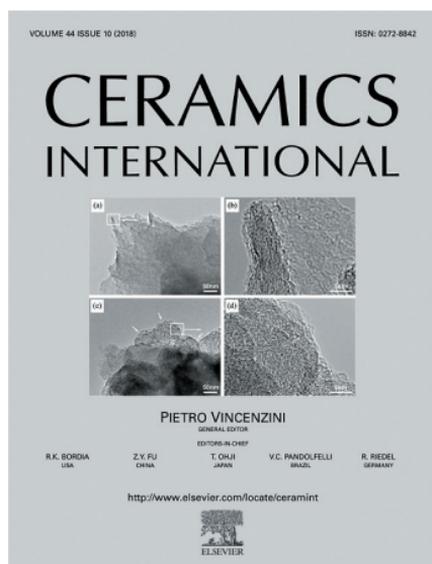
4. All papers will be subjected to the standard peer review process.
5. Deadline for submission of the final approved paper is December 31, 2022.



Impact Factor Citable Items



Ceramics International



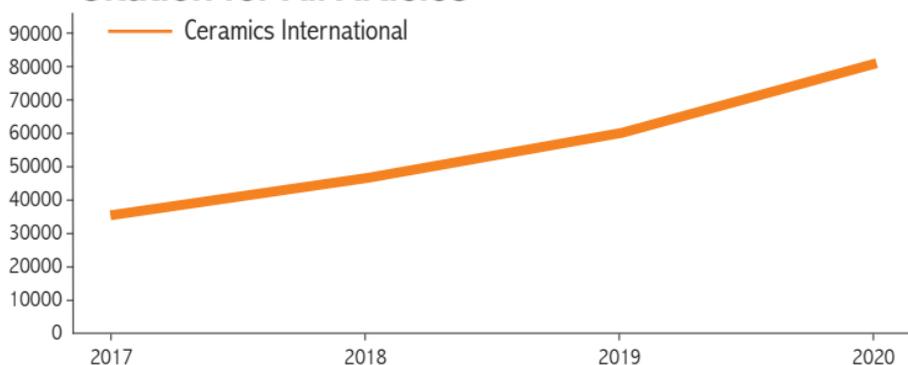
Ceramics International is particularly keen to attract papers which deal with fundamental scientific aspects that are relevant to the development of the whole range of advanced ceramics including e.g. phase equilibria and transformations, reactivity, transport processes, thermodynamic and electronic properties, as well as quantum effects in low dimensional materials. The journal encourages contributions that demonstrate

how an understanding of the basic chemical and physical phenomena may direct materials design and stimulate ideas for new or improved processing techniques, in order to obtain materials with desired structural features and properties.

Ceramics International covers oxide and non-oxide ceramics, functional glasses, glass ceramics, amorphous inorganic non-metallic materials (and their combinations with metal and organic materials), in the form of particulates, dense or porous bodies, thin/thick films and laminated, graded and composite structures. Technologically relevant low-dimensional systems are a particular focus of Ceramics International. These include 0, 1 and 2-D nanomaterials (also covering CNTs, graphene and related materials, and diamond-like carbons), their nanocomposites, as well as nano-hybrids and hierarchical multifunctional nanostructures that might integrate molecular, biological and electronic components.

Process related topics such as ceramic-ceramic joints or joining ceramics with dissimilar materials, as well as surface finishing and conditioning are also covered. Besides traditional processing techniques, manufacturing routes of interest include innovative procedures benefiting from externally applied stresses, electromagnetic fields and energetic beams, as well as top-down and self-assembly nanotechnology approaches. In addition, the journal welcomes submissions on bio-inspired and bio-enabled materials designs, experimentally validated multi scale modeling and simulation for materials design, and the use of the most advanced chemical and physical characterization techniques of structure, properties and behaviour.

Citation for All Articles



Social Programme

Welcome Party Chiostro di Santa Giuliana

*Sunday June 26
20.30 - 22.00*

The Welcome Party will take place at the St' Giuliana Cloister (Chiostro di Santa Giuliana). The Cloister 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.



Entrance ticket for companions: 35.00 EUR

Conference Dinner Tenuta San Lorenzo Vecchio

*Wednesday June 29
20.30 - 23.00*

The Conference Dinner will take place at “Tenuta San Lorenzo Vecchio”, a 17th century village surrounded by vineyards and olive groves, located on a hill between Foligno and Spello, on the slopes of Mount Subasio, at 400/600 m.



Entrance ticket for companions: 65.00 EUR

Optional Tours

PASSIGNANO & TRASIMENO LAKE

Sunday June 26, afternoon

15.00 - 19.00

Passignano sul Trasimeno (Passignano on Trasimeno Lake) is placed on the lakeshores. The town was built in between the 16th and the 17th Century whereas its suggestive historical centre surrounding the fortress dates back to medieval and also to most ancient times. After a view of the historical centre, participants will take a ferry to visit Isola Maggiore, the biggest island of Lake Trasimeno.

The lake is south of the river Po and north of the nearby river Tiber. Only two minor streams flow directly into the Lake and none flows out. The



water level of the lake fluctuates significantly according to rainfall levels and the seasonal demands from the towns, villages and farms near the shore. The first civilization to inhabit this area was the Etruscans; three of the main Etruscan cities - Perugia, Chiusi, and Cortona - are within 20 kilometres (12 miles) of the lake. Little physical evidence remains from the period of Etruscan or later Roman settlement. Castiglione del Lago, has some Roman ruins and its main streets are structured like a chessboard in the Roman style. The lake includes three islands: Isola Maggiore, Isola Polvese and Isola Minore.



Meeting point: Centro Congressi Quattrotorri at 14.30. Return to Perugia at about 19.00.

The participation fee (40.00 EUR) includes bus transfer, English speaking hostess and local guides, served lunch and ferry ticket.

SPOLETO & MONTEFALCO

Monday June 27, full day
9.30 - 19.00

Spoletto, (Latin Spoletium) is an ancient city in the Perugia district located at the head of a large, broad valley, surrounded by mountains. The town has long occupied a strategic geographical position. It appears to have been an important town to the original Umbri tribes, who built walls around their settlement in the 5th century BC, some of which are visible today. An ancient Roman colony, after Ostrogoth



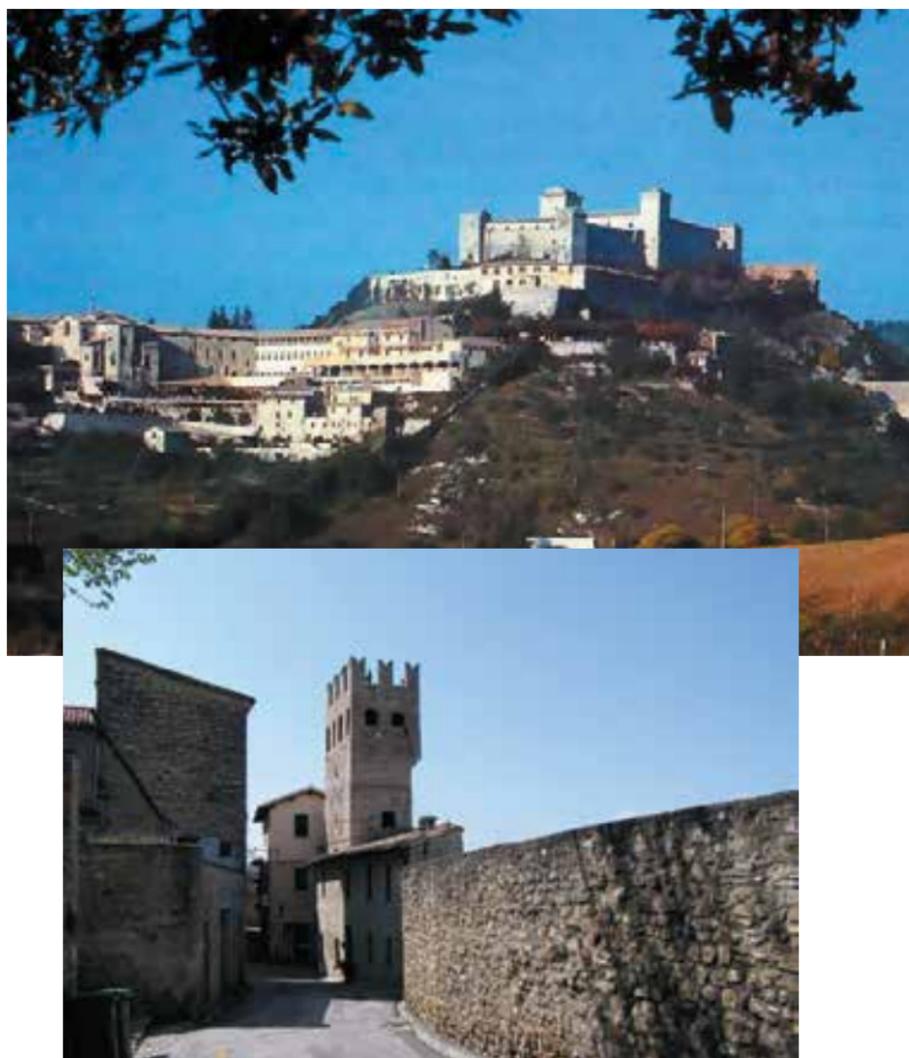
and Lombard, medieval town contended between the Pope and the Emperor, between Guelfs and Ghibellines, cultural centre during the Renaissance and Bishop seat, the history of the City has left an exceptional architectonic and art cultural heritage within a splendid naturalistic context. The Acquedotto delle Torri (Towers Aqueduct) with its majesty and beauty welcomes us when joining Spoleto.

The tour includes:

- Town walls, "Torre dell'Olio" (Oil Tower) and Porta Fuga (Fuga Door)
- Roman Theatre
- Domus of Flavia Vespasia Pollia Domus, mother of Roman Emperor Vespasiano
- Arco di Druso (Arch of Drusus)
- Roman church of Sant'Eufemia
- Cathedral square
- Ponte delle torri (Tower Bridge) connecting the historical centre. The bridge, built in between the 12th and 13th Century, is 280 meters long and 82 meters high.

Lunch: Restaurant in Spoleto

Montefalco, a charming tow built on a hill overlooking the valley linking Perugia with Spoleto, has been settled since the times of the Umbri. It has been under the successive domination of the Romans, Lombards, being called Coccorone in the Middle Ages. In 1249 it



was sacked by Frederick II, but was soon rebuilt with the modern name. From the 13th century it had been a free comune under the domination of local nobles and merchants, but later, as with many other Umbrian locales, the comune gave way to government by a signoria (1383-1439). In 1446 it fell under the rule of the Papal States where it remained until the unification of Italy in 1861. Montefalco has several churches, some in the Romanesque, some in the Gothic and some in the Renaissance style. The 13th century Palazzo Comunale ("Town Hall") has a mullioned window from the original edifice and a 15th-century portal. Also notable are the gates in the walls, including Porta Sant'Agostino, Porta Camiano and Porta Federico II.

The tour includes:

- Saint Francis Church
- Architectural lodges
- Main Square
- Consuls Palace and Palace of the Podestà
- Cathedral
- Ducal Palace
- Medieval street and panoramic views

Meeting point: Centro Congressi Quattrotorri at 9.00. Return to Perugia at about 19.00.

The participation fee (75.00 EUR) includes bus transfer, English speaking hostess and local guides, and served lunch.

ASSISI & SPELLO

Tuesday June 28, 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 (Medioeval Tawn Hall)
- Palazzo Cruciali (Cruciali Palace)
- Belvedere (panoramic viewpoint)
- Porta Venere con Torri di Propezio (Venere Gate and Propezio Towers)



Meeting point: Centro Congressi Quattrotorri at 9.00. Return to Perugia at about 19.00.

The participation fee (80.00 EUR) includes transportation, city entrance taxes, English speaking hostess and local guides, headphone & earphones for basilica, and lunch.

GUBBIO

Wednesday June 29, 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: Centro Congressi Quattrotorri at 9.00. Return to Perugia at about 13.00.

The participation fee (35.00 EUR) includes transportation, city taxes, English speaking hostess and local guide.

Conference Hotels

1. Best Western Hotel Quattrotorri
CONGRESS CENTER
2. Chocohotel
3. Sangallo
4. Brufani
5. Fortuna
6. Giò Wine & Jazz
9. Chiostro S. Giuliana
(Welcome Reception)
10. Central Railway Station
11. Ellera Railway Station
12. Piazza Partigiani
Bus Transfer to/from Congress Center





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