

ESOMAT 2024

13th European Symposium on
Martensitic Transformations

26 - 30 August 2024

Lecco - Italy



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WELCOME

We are pleased to invite you to join ESOMAT 2024!

The European Symposium on Martensitic Transformations, since 1989 first edition, is one of the most important events for scientists who are interested in martensitic transformation-based phenomena, shape memory alloys, magnetic shape memory alloys, martensite in steel and ceramics.

ESOMAT 2024 covers all aspects behind of martensitic transformation, from theory, modelling, experimental characterization, fabrication and processing, structure/property evaluation and applications. Again, martensitic transformation features and properties of 3D additive manufacturing materials will be focused.

Participants of ESOMAT 2024 will have an opportunity of interactions among worldwide scientists with various professional backgrounds and will be a great chance for young students to present their new results.

The ESOMAT 2024 will be held in Lecco, a northern Italian small city within the exclusive Como Lake Area, from 26th to 30th August 2024, the ideal place where you can spend a delighting scientific week.

ESOMAT 2024 Chairs



Ausonio Tuissi and Carmine Maletta

ESOMAT 2024

4

Monday 26 August – room AULA MAGNA

13:00 Registration

OPENING CEREMONY

13:45 Welcome address

PLENARY LECTURES

14:00 [ESOMAT_014] **A unifying perspective of common motifs that occur across disparate classes of materials harboring displasive phase transitions**
G. Schierning - University of Duisburg-Essen, Germany

15:00 [ESOMAT_200] **Thermodynamic rationale for transformation-induced slip in shape memory alloys**
H. Sehitoglu, AS. Khan Mohammed - University of Illinois at Urbana-Champaign, USA

16:00 Coffee break

MATERIAL DESIGN, MODELING AND SIMULATION: MODELING

CHAIRPERSON: Sebastian FÄHLER

16:30 **INVITED [ESOMAT_201] Martensitic microstructure in NiTi – what we can learn from epitaxial films**
K. Lünser - Universitat de Barcelona, Spain and Helmholtz-Zentrum Dresden-Rossendorf, Germany
A. Undisz - TU Chemnitz, Germany and Friedrich-Schiller-Universität Jena, Germany
M. F.-X. Wagner - TU Chemnitz, Germany
K. Nielsch - Leibniz IFW Dresden, Germany
S. Fähler - Universitat de Barcelona, Spain

17:00 [ESOMAT_060] **Study of martensitic transformation in Nickel–Titanium shape memory alloy using molecular dynamics simulations**
J. Chen, H. Kumar Yeddu - LUT University, Finland

Monday 26 August – room AULA MAGNA

MATERIAL DESIGN, MODELING AND SIMULATION: MODELING

CHAIRPERSON: Sebastian FÄHLER

- 17:15** [ESOMAT_090] **Modeling of coupled transformation and plastic deformation processes in polycrystalline shape memory alloys**
M. Frost, P. Sedlák, H. Seiner, A. Moskovka, J. Valdman, M. Kružík, P. Šittner - Czech Academy of Sciences, Czech Republic
- 17:30** [ESOMAT_104] **Multiscale structural analysis for shape memory alloy lattice structures by combining finite element square and data-driven methods**
W. Yan, T. Ben Zineb, H. Zahrouni - Université de Lorraine, CNRS, France
H. Hu - Ningxia University, China
- 17:45** [ESOMAT_105] **Modelling atomic structure and mobility of twins in NiTi Shape-memory alloy**
L. La Rosa, F. Maresca - University of Groningen, The Netherlands
- 18:00** [ESOMAT_159] **Predicting dynamic responses of fast actuated SMA wires: multiphysics modelling and experimental validation**
S. Rodino, E. Sgambitterra, C. Maletta - Università della Calabria, Italy
- 18:15** [ESOMAT_204] **Computational modelling of the mechanical performance of Nitinol guidewires in an idealised tortuous path for medical device applications**
W. Ronan, P. E. McHugh - University of Galway, Ireland
M. Moloney, E. Nagel, R. Dickenson - Integer Holdings Corporation
- 19:00** **Welcome reception**

ESOMAT 2024

6

Monday 26 August – room B1.1

ALLOYS DEVELOPMENT AND PROCESSING: SMA SYSTEMS – 1/2

CHAIRPERSON: Annalisa FORTINI

- 16:30** **INVITED [ESOMAT_024] Effect of hydrogen on the transformation behaviors in Ti-Ni alloys**
M. Nishida - Kyushu University, Japan
- 17:00** **[ESOMAT_036] The effect of vanadium on the superelastic properties of FeMnNiAl shape memory alloy**
W. Abuzaid, T. Nawaz, M. Egilmez - AUS, United Arab Emirates
- 17:15** **[ESOMAT_061] The effect of low-temperature ECAP in a core-shell mode on structure and properties of TiNi SMA**
R. Karelin, V. Komarov - National University of Science and Technology MISIS, Russia and Baikov Institute of Metallurgy and Materials Science, Russia
I. Khmelevskaya, V. Cherkasov, S. Prokoshkin - National University of Science and Technology MISIS, Russia
V. Andreev, V. Yusupov - Baikov Institute of Metallurgy and Materials Science, Russia
- 17:30** **[ESOMAT_102] Martensite variant microstructures, textures, plastic strains and lattice defects generated by stress induced B2-B19' martensitic transformations in nanocrystalline NiTi shape memory**
P. Šittner, O. Tyc, X. Bian, E. Iaparova, O. Molnarová, L. Heller - Czech Academy of Sciences, Czech Republic
- 17:45** **[ESOMAT_123] Low-temperature aging of Superelastic NiTi alloy**
O. Tyc, Y. Chen, P. Šittner - Czech Academy of Sciences, Czech Republic
- 18:00** **[ESOMAT_137] Microstructure and functional performance of thin Ti rich-NiTi wires subjected to fast laser shape setting**
C. A. Biffi, A. Tuissi - CNR-ICMATE, Italy
G. Ischia, S. Gialanella - Università degli Studi di Trento, Italy
- 18:15** **[ESOMAT_139] Generating large elastic strains in thin films using NiTi**
H. Yang, S. Sarkar, F. Motazedian, Y. Liu - The University of Western Australia, Australia
- 19:00** **Welcome reception**

ESOMAT 2024

7

Tuesday 27 August – room AULA MAGNA

8:45 **Plenary Lecture [ESOMAT_165] What we have learned in the last ten years of additive manufacturing of NiTi**

M. Elahinia, S. Vanaei, M. Pourshams, H. Dabbaghi, M. Sojoodi, N. Taheri, S. Mohajerani, P. Rocco, M. Abdollahzadeh, T. Cullaz - The University of Toledo, USA

MATERIAL DESIGN, MODELING AND SIMULATION: FUNDAMENTALS OF MARTENSITIC TRANSFORMATION

CHAIRPERSON: Petr SITTNER

9:45 **INVITED (ONLINE) [ESOMAT_028] Triplet condition: Another supercompatibility condition for suppressing transformation-induced dislocation in shape memory alloy**
T. Inamura - Tokyo Institute of Technology, Japan

10:15 **[ESOMAT_050] Grain boundary compatibility for martensitic phase transformations**
J. Ball - Heriot-Watt University, United Kingdom
M. Galanopoulou - University of Sussex, United Kingdom

10:30 **[ESOMAT_098] Change in variant pairs with progression of transformation in lath martensite**
N. Takahashi, T. Inamura - Tokyo Institute of Technology, Japan
Y. Shinohara - The University of Electro-Communications, Japan
H. Kawata - Nippon Steel Corporation, Japan

10:45 **[ESOMAT_126] Prestrain-related crossover from stabilization to burst-like reverse martensitic transformation**
S. Kustov - Universitat de les Illes Balears, Spain
V. Nikolaev - Shaped Crystals Physics Laboratory, Russia
J. Van Humbeeck - University of Leuven, Belgium

11:00 **[ESOMAT_185] Dynamic theory of surface martensite formation, allowing also a general scenario of lateral growth**
N.M. Kashchenko - Ural Federal University named after the First President of Russia B. N. Yeltsin, Russia
M.P. Kashchenko - Ural Federal University named after the First President of Russia B. N. Yeltsin, Russia and Ural State Forest Engineering University, Russia

11:15 **Coffee break**

ESOMAT 2024

8

Tuesday 27 August – room B1.1

FERROIC AND MAGNETIC ALLOYS: FUNDAMENTAL ASPECTS - 1/2

CHAIRPERSON: Anna WOJCIK

- 9:45** **INVITED [ESOMAT_192] Martensitic transformations in finite size and at finite time**
S. Fähler - Helmholtz-Zentrum Dresden-Rossendorf, Germany
- 10:15** **[ESOMAT_117] The effect of independent twinning systems on the strain accommodation in NiMnGa-based Heusler shape memory alloys**
W. Maziarz, A. Wójcik, Ł. Rogal, M. Szlezynger, A. Szewczyk - Polish Academy of Sciences, Poland
A. Waszczuk, R. Chulist - AGH University of Science and Technology, Poland
- 10:30** **[ESOMAT_062] Spin reorientation in premartensite Ni-Mn-Ga magnetic shape memory alloys**
A. Perevertov, O. Heczko - Czech Academy of Sciences, Czech Republic
R.H. Colman - Charles University Prague, Czech Republic
- 10:45** **[ESOMAT_078] Duality of wave modulation and nanotwinning in Ni-Mn-Ga five-layered martensite**
L. Straka, P. Veřtát, O. Heczko - Czech Academy of Sciences, Czech Republic
M. Zelený – Brno University of Technology, Czech Republic
- 11:00** **[ESOMAT_086] Anharmonic incommensurate structure modulation in Ni-Mn-Ga martensites exhibiting highly mobile twin boundaries**
P. Veřtát, O. Heczko, L. Straka - Czech Academy of Sciences, Czech Republic
M. Klicpera - Charles University, Czech Republic
O. Fabelo - Institut Laue-Langevin, France
- 11:15** **Coffee break**

Tuesday 27 August – room AULA MAGNA

ADDITIVE MANUFACTURING: NiTi-BASED SYSTEM - 1/2

CHAIRPERSON: Mehrshad MEHRPOUYA

- 11:45** [ESOMAT_004] **Effect of laser powder bed fusion on the chemical composition and martensitic transformation temperatures of Ti-Ni alloys: Modeling and experimental validation**
D. Campion, A. Kreitchberg, V. Brailovski - École de technologie supérieure, Canada
- 12:00** [ESOMAT_079] **Laser powder bed fusion of NiTi-based antibacterial shape memory alloy**
J. Fiocchi, C. A. Biffi, C. Bregoli, A. Coda, A. Tuissi - National Research Council, Italy
M. Rancan, F. Sisto - Università di Padova, Italy
L. Armelao - DSCTM National Research Council, Italy
- 12:15** [ESOMAT_103] **On the thermomechanical behavior of direct aged NiTi produced by Laser powder bed fusion**
M. B. Abrami, M. Tocci, A. Pola - Università di Brescia, Italy
M. Cabibbo - Università Politecnica delle Marche, Italy
D. Brabazon - Dublin City University, Ireland
- 12:30** [ESOMAT_119] **Tensile shape memory behavior of NiTi-20Hf high-temperature shape memory alloys fabricated by laser powder bed fusion**
H. Ma - South China University of Technology, China and Institute of Physics of the CAS, Czech Republic
H. Lu, C. Yang - South China University of Technology, China
L. Heller, P. Šittner - Institute of Physics of the CAS, Czech Republic
- 13:00** **Lunch break**

ESOMAT 2024

10

Tuesday 27 August – room B1.1

FERROIC AND MAGNETIC ALLOYS: PROCESSING AND MICROSTRUCTURE - 1/2

CHAIRPERSON: Ruben SANTAMARTA

- 11:45** [ESOMAT_021] **Influence of flash lamp annealing on the martensitic microstructure of epitaxial Ni-Mn-Ga films**
Y. Ge - Helmholtz-Zentrum Dresden-Rossendorf, Germany and 2TU Dresden, Germany
S. Kar - Leibniz IFW Dresden, Germany and 2TU Dresden, Germany and Helmholtz-Zentrum Dresden-Rossendorf, Germany
F. Ganss, R. Hübner, T. Schumann, K. Lünser, L. Rebohle, S. Fähler - Helmholtz-Zentrum Dresden-Rossendorf, Germany
- 12:00** [ESOMAT_072] **Increased twinning stress in microfabricated single crystalline Ni-Mn-Ga magneto-mechanical systems**
D. Musijenko, J. Kopeček, O. Heczko - Czech Academy of Sciences, Czech Republic
R. H. Colman - Charles University, Czech Republic
K. Ullakko - LUT University, Finland
- 12:15** [ESOMAT_073] **Martensitic transformation behaviors in Ni₅₀Mn_{50-x}Ti_x alloys**
T. Miyakawa, S. Xu, X. Xu, T. Omori, R. Kainuma - Tohoku University, Japan
M. Tokunaga - The University of Tokyo, Japan
- 12:30** [ESOMAT_085] **Acoustic emission during approaching the critical point of martensitic transformation in Ni₄₈Fe₂₀Co₅Ga₂₇ (at.%) single crystal**
L. Daróczy, L.Z. Tóth, D.L. Beke - University of Debrecen, Hungary
S. M. Kamel - University of Debrecen, Hungary and Ain Shams University, Egypt
M. Tahara, H. Hosoda - Tokyo Institute of Technology, Japan
V. Chernenko - Tokyo Institute of Technology, Japan and University of Basque Country (UPV/EHU), Spain
- 12:45** [ESOMAT_172] **Extraordinary low stress and the faceted nature of type II deformation twinning in NiMnGa shape memory alloys**
A. Wójcik, W. Maziarz, A. Szewczyk, R. Chulist - Polish Academy of Sciences, Poland
- 13:00** **Lunch break**

Tuesday 27 August – room AULA MAGNA

ALLOYS DEVELOPMENT AND PROCESSING: STEEL AND OTHER SYSTEMS - 1/3

CHAIRPERSON: Stephane GODET

- 14:30** **INVITED (ONLINE) [ESOMAT_143] Unexpected functional behavior in shape memory alloys beyond shape memory and superelasticity**
L. Karaman - Texas A&M University, USA
- 15:00** **[ESOMAT_003] Diffusion welding of some equiatomic CoCrFeMnNi-based multi-component alloys to 316L austenitic stainless steel**
O.B. Nenuwa - Arts et Métiers Institute of Technology, France and Federal Polytechnic, Nigeria
L. Pettier, L. Thiercelin, F. Meraghni - Arts et Métiers Institute of Technology, France
E. Fleury, N. Siredey-Schwaller - Université de Lorraine, France
A. Benaarbia - Centrale Lille Institute, France
- 15:30** **[ESOMAT_009] Carbide-free tempered martensite in Fe–C steels**
Z. Xiong, X. Cheng - Beijing Institute of Technology, China and Tangshan Research Institute BIT, China
D. Yang, H. Zhang - Beijing Institute of Technology, China
- 15:45** **[ESOMAT_015] The evolution and role of isothermal martensite in a 12Cr-9Ni-4Mo stainless steel**
J-O. Nilsson - JON Materials Consulting, Sweden
- 16:00** **Coffee break**

ESOMAT 2024

12

Tuesday 27 August – room B1.1

ADDITIVE MANUFACTURING: OTHER SYSTEMS - 1/2

CHAIRPERSON: Jan FRENZEL

- 14:30** **INVITED [ESOMAT_191] Recent advances in additive manufacturing and constitutive modeling of shape memory polymers**
G. Scalet - Università di Pavia, Italy
- 15:00** **[ESOMAT_002] Control of density, grain structure and composition of laser powder bed-fused memory alloys: Simulation-driven process mapping conventional and shape**
V. Brailovski, A. Timercan, D. Champion, A. Kreitchberg - ATS Montreal, Canada
- 15:15** **[ESOMAT_055] Laser beam powder bed fusion of Ti-30Ta high-temperature shape memory alloy: microstructure and functional properties**
C. Lauhoff - University of Kassel, Germany and RMIT Centre for Additive Manufacturing, Australia
M. Nobach, T. Niendorf - University of Kassel, Germany
A. Medvedev, A. Molotnikov - RMIT Centre for Additive Manufacturing, Australia
M. Stenzel, M. Weinmann - TANIOBIS GmbH, Germany
W. Xu - Deakin University, Australia
- 15:30** **[ESOMAT_081] Laser additive manufacturing of Ni-Mn-Ga magnetic shape memory alloys**
V. Laitinen, K. Ullakko - Lappeenranta-Lahti University of Technology LUT, Finland
A. Milleret - University College London, United Kingdom and University of Birmingham, United Kingdom
M. M. Attallah - University of Birmingham, United Kingdom
- 15:45** **[ESOMAT_094] Mobility of twin boundaries in 3D printed magnetic shape memory alloy Ni-Mn-Ga**
A. Saren, V. Laitinen, M. Vinogradova, K. Ullakko - LUT University, Finland
- 16:00** **Coffee break**

Tuesday 27 August – room AULA MAGNA

FATIGUE AND FRACTURE – 1/2

CHAIRPERSON: Luca PATRIARCA

- 16:45** **INVITED [ESOMAT_197] Creep and functional fatigue behaviors of NiTiHf shape memory alloys for high temperature applications**
H. Onat Tugrul, O. Akgul, B. Kockar - Hacettepe University, Beytepe, Turkey
- 17:15** **[ESOMAT_045] Cyclic deformation and transformation behavior of high manganese TRIP steel in the high cycle fatigue regime**
S. Wolke, M. Smaga, T. Beck - RPTU Kaiserslautern-Landau, Germany
- 17:30** **[ESOMAT_046] Enhancing the functional fatigue properties of TiNbZrSn biocompatible shape memory alloy through femtosecond laser shock peening**
M. Asim, W. Abuzaid, F. Mustafa, A. Sami Alnaser - American University of Sharjah, United Arab Emirates
- 18:00** **[ESOMAT_080] Very high cycling fatigue testing of additively manufactured nitinol parts**
C. A. Biffi, J. Fiocchi, A. Tuissi - CNR ICMATE, Italy
A. P. Pagnoncelli, C. Boursier Niutta, A. Tridello, D. S. Paolino - Politecnico di Torino, Italy
- 19:00** **ESOMAT IAC Meeting**

ESOMAT 2024

14

Tuesday 27 August – room B1.1

FERROIC AND MAGNETIC ALLOYS: PROCESSING AND MICROSTRUCTURE - 2/2

CHAIRPERSON: Lajos DAROCZI

- 16:45** **INVITED [ESOMAT_121] Supermobility in modulated ferromagnetic martensite Ni-Mn-Ga**
O. Heczko - Czech Academy of Sciences, Czech Republic
- 17:15** **[ESOMAT_106] Effect of Bi doping on grain size and transformation temperature of Ni-Mn-Ga magnetic shape memory alloy**
M. Namvari, K. Ullakko - Lappeenranta-Lahti University of Technology LUT, Finland
- 17:30** **[ESOMAT_115] Effect of solidification rate and annealing on martensitic transformation behavior of Mn-Ni-Sn(Fe) metamagnetic shape memory ribbons**
D. Mérida Sanz, F. Plazaola - University of Basque Country (UPV/EHU), Spain
P. Lázpita, J. Gutiérrez, V. A. Chernenko - University of Basque Country (UPV/EHU), Spain and BCMaterials, UPV/EHU Science, Spain
D. Salazar, M. Ríos Naranjo - BCMaterials, UPV/EHU Science, Spain
- 17:45** **[ESOMAT_148] Effect of thermal treatments on the microstructure of All-d-Metal Ni-Co-Mn-Ti metamagnetic shape memory alloys**
W. Cho, S. Torun, D. Salas, I. Karaman - Texas A&M University, USA
R. Santamarta, J. Pons - Universitat de les Illes Balears, Spain
- 18:00** **[ESOMAT_161] Multicaloric Ni-Mn-Sn Heusler: Microstructure design and martensitic transition from single particles to fully processed parts using additive manufacturing**
F. Scheibel, J. Puy, D. Koch, O. Gutfleisch - Technical University of Darmstadt, Germany
C. Lauhoff, P. Krooß, T. Niendorf - University of Kassel, Germany
T. Gottschall - Helmholtz-Zentrum Dresden-Rossendorf, Germany
- 18:15** **[ESOMAT_202] Frustrated antiferromagnetism in modulated martensite states of Ni-Mn-based functional heusler alloys observed by neutron polarization analysis**
S. Aksoy - Istanbul Technical University, Turkey
M. Acet - Duisburg-Essen University, Germany
- 19:00** **ESOMAT IAC Meeting**

Wednesday 28 August – room AULA MAGNA

8:45 **Plenary Lecture [ESOMAT_005] Kwinks in NiTi – unraveling the plastic forming mechanism in B19' martensite**
H. Seiner, P. Sedlák, M. Frost, O. Molnárová, P. Šittner - Czech Academy of Sciences, Czech Republic

ADDITIVE MANUFACTURING: NiTi-BASED SYSTEM - 2/2

CHAIRPERSON: Carlo Alberto BIFFI

9:45 **INVITED [ESOMAT_017] Microstructure and mechanical properties of Ti-15Mo-xO wt% alloys manufactured by laser metal deposition**
E. Pereloma, E. Awanegbe, C. Murphy, H. Li, A. A. Gazder, M.J.B. Nancarrow, L. Smillie – University of Wollongong, Australia
T. Song, M. Qian - RMIT University, Australia
F. Niessen - Technical University of Denmark

10:15 **[ESOMAT_133] Additive manufacturing of Ni-Ti based shape memory alloys**
P. Krooß, C. Lauhoff, T. Niendorf - University of Kassel, Germany
T. Gustmann - Leibniz Institute for Solid State and Materials Research Dresden, Germany
J. Hufenbach - Leibniz Institute for Solid State and Materials Research Dresden, Germany and TU Bergakademie Freiberg, Germany

10:30 **[ESOMAT_152] 4D Printing of shape memory architected structures using laser metal deposition**
R. Schildkamp, C. Goulas, M. Mehrpouya - University of Twente, the Netherlands

10:45 **[ESOMAT_169] Correlation between texture and mechanical properties in additively manufactured NiTi**
P. Bassani, C.A. Biffi, A. Tuissi - CNR ICMATE, Italy
S. Vanaei, T. Cullaz, M. Elahinia - The University of Toledo, USA

11:00 **[ESOMAT_195] Establishing relationships between the thermal field in LPBF and the transformation behaviour of NiTi**
F. Paradiso, R. Casati, L. Patriarca, B. Previtali, A. Gokhan Demir - Politecnico di Milano, Italy

11:15 **Coffee break**

ESOMAT 2024

16

Wednesday 28 August – room B1.1

FATIGUE AND FRACTURE - 2/2

CHAIRPERSON: Benat KOCKAR

- 9:45** **INVITED [ESOMAT_145] Fatigue life assessment of Ni-Ti cardiovascular devices**
A. Brambilla, F. Berti, L. Patriarca, L. Petrini - Politecnico di Milano, Italy
- 10:15** **[ESOMAT_096] Transformation induced structural fatigue of NiTi shape memory alloys**
N. Stoetzel, J. Frenzel, G. Eggeler - Ruhr University Bochum, Germany
- 10:30** **[ESOMAT_124] Fatigue behavior of ALD coated NiTi wires**
D. Vokoun, O. Tyc - Czech Academy of Sciences, Czech Republic
Y. Yu, C. Kei - National Applied Research Laboratories, Taiwan
- 11:00** **[ESOMAT_181] Possible strategies for the improvement of the surface finish of NiTi-based SMA wires and ribbons for high cycle applications**
A. Paulsen, S. Wehrenfennig, B. Maaß - Inguls GmbH, Germany
- 11:15** **Coffee break**

Wednesday 28 August – room AULA MAGNA

ADDITIVE MANUFACTURING: OTHER SYSTEMS - 2/2

CHAIRPERSON: Vladimir BRAILOVSKI

- 11:45** [ESOMAT_113] **Enhanced shape memory effect and pseudo-elasticity in tantalum modified ternary FeMn-Si-based shape memory alloys fabricated by laser powder bed fusion**
Z. Li, J. J. Kruzic, M. Ferry, X. Li - The University of New South Wales, Australia
- 12:00** [ESOMAT_131] **A comparative study on the functional performance of additively manufactured Architected metamaterials: NiTi, Ti-6Al-4V, and 316L alloys**
H. Moutablaleh, E. S. Abdelhady, T. Vaneker, I. Gibson, M. Mehrpouya - University of Twente, The Netherlands
- 12:15** [ESOMAT_134] **Pseudoelasticity of FeMnAlNi alloy manufactured by conventional casting and LPBF process**
L. Patriarca, G. Carlucci, R. Casati - Politecnico di Milano, Italy
M. Coduri - Università di Pavia, Italy
W. Abuzaid - American University of Sharjah, United Arab Emirates
- 12:30** [ESOMAT_141] **Functionally graded shape memory alloys through additive manufacturing**
A. Elsayed, T. Guleria, H. Tian, K. C. Atli, A. Elwany, R. Arroyave, D. Lagoudas, I. Karaman - Texas A&M University, USA
- 13:00** **Lunch break**
- 14:30** **Conference tour**

ESOMAT 2024

18

Wednesday 28 August – room B1.1

ALLOYS DEVELOPMENT AND PROCESSING: STEEL AND OTHER SYSTEMS - 2/3

CHAIRPERSON: Nina PFEFFER

- 11:45** [ESOMAT_029] **Optimizing strength & ductility combination of medium-carbon TRIP steel via multi-stage work hardening**
Y.F. Shen, M.Y. He, N. Jia, P. K. Liaw, L. Zuo – Northeastern University, China
- 12:00** [ESOMAT_089] **Enhancing mechanical properties of a low-alloy, medium carbon steel through austenite deformation, interrupted martensite formation and austenite stabilization**
Z. Aalipour Hafshejani, S. Ghosh, J. Kömi, V. Javaheri - University of Oulu, Finland
- 12:15** [ESOMAT_095] **Effect of a manganese content on the kinetics of nanobainite formation in medium-Mn steels with retained austenite**
M. Morawiec, A. Grajcar - Silesian University of Technology, Poland
- 12:30** [ESOMAT_110] **Inverse design of high strength martensitic medium-Mn steel using genetic algorithm**
J.-Y. Lee, S.-H. Kim, Y.-K. Lee - Yonsei University, Korea
K. Lee, K. Cho - Kookmin University, Korea
- 13:00** **Lunch break**
- 14:30** **Conference tour**

Thursday 29 August – room AULA MAGNA

8:45 **Plenary Lecture [ESOMAT_140] A lattice heterogeneity strategy for designing shape memory alloys of extraordinary superelasticity**
Y. Liu - The University of Western Australia, Australia

MATERIAL DESIGN, MODELING AND SIMULATION: ALLOY DESIGN

CHAIRPERSON: Klara LÜSNER

9:45 **INVITED [ESOMAT_012] Structural design of high entropy shape memory alloys**
G. Firstov, V. Filatova, Yu. Koval, A. Timoshevskii, V. Odnosum - National Academy of Sciences of Ukraine, Ukraine
G. Gerstein, H.J. Maier - Leibniz Universität Hannover, Germany

10:15 **[ESOMAT_030] Slip and twinning in Bravais lattices**
J. Ball - Heriot-Watt University, United Kingdom

10:30 **[ESOMAT_038] Design of heterogeneous SMAs for desired shape memory effect and superelastic behavior**
Y. Wang - The Ohio State University, USA

10:45 **[ESOMAT_053] Do micro-scale concentration gradients in NiTi shape memory alloys matter?**
J. Frenzel, O. Oluwabi, G. Eggeler - Ruhr University Bochum, Germany

11:00 **[ESOMAT_097] Positive/zero/negative thermal expansion metallic materials**
M. Bönisch - KU Leuven, Belgium
H. Wang - Dongguan University of Technology, China

11:15 **Coffee break**

ESOMAT 2024

20

Thursday 29 August – room B1.1

DEVICES AND APPLICATIONS: MEDICAL APPLICATIONS

CHAIRPERSON: Lorenza PETRINI

- 9:45** **INVITED [ESOMAT_040] Martensitic transformation in NiTi/parylen composite dedicated to medical applications**
T. Goryczka - University of Silesia, Poland
H. Szymanowski, A. Nosal - Lodz University of Technology, Poland
B. Szaraniec - AGH University of Science and Technology, Poland
- 10:15** **[ESOMAT_027] Finite element analysis of the mechanical performance of self expanding endovascular stents made with new nickel-free superelastic β -titanium alloys and fatigue life prediction**
T. Jia, D. Guines, D. Laillé, L. Leotoing, T. Gloriant - University of Rennes - INSA, France
- 10:30** **[ESOMAT_125] Biomechanical evaluation of a nitinol patient-matched distractor for the treatment of unicoronal craniosynostosis**
C. Bregoli, J. Fiocchi, C. A. Biffi, A. Tuissi - CNR-ICMATE, Italy
A. Borghi - Durham University, United Kingdom and University College London, United Kingdom and Great Ormond Street Hospital, United Kingdom
S. Schievano, N. Ul Owase Jeelani, D. Dunaway - University College London, United Kingdom and Great Ormond Street Hospital, United Kingdom
- 10:45** **[ESOMAT_166] Heat-treating endodontic files – Thermal, structural and mechanical characterization**
F. M. Braz Fernandes - CENIMAT/I3N, Universidade Nova de Lisboa, Portugal
J. N. R. Martins - Universidade de Lisboa, Portugal
M. A. Versiani - Dental Specialty Center -Brazilian Military Police, Brazil
- 11:00** **[ESOMAT_193] A coupled numerical-experimental approach for the design and manufacturing of personalized Ni-Ti stents by laser powder bed fusion**
F. Berti, V. Finazzi, A. Gökhan Demir, G. Pennati, B. Prevital, L. Petrini - Politecnico di Milano, Italy
- 11:15** **Coffee break**

Thursday 29 August – room AULA MAGNA

ALLOYS DEVELOPMENT AND PROCESSING: SMA SYSTEMS - 2/2

CHAIRPERSON: Wael ABUZAID

- 11:45** [ESOMAT_162] **An investigation on the metallurgical and functional performance of NiTiCu ternary shape memory alloys**
E. S. Abdelhady - University of Twente, The Netherlands and Royal Melbourne Institute of Technology, Australia
A. Molotnikov - Royal Melbourne Institute of Technology, Australia
T. Vaneker, I. Gibson, M. Mehrpouya - University of Twente, The Netherlands
- 12:00** [ESOMAT_171] **Plastic strains generated by martensitic transformation proceeding under external stress in superelastic and shape memory NiTi wires**
E. Japarova, P. Sittner, L. Heller - Czech Academy of Sciences, Czech Republic
- 12:15** [ESOMAT_180] **Experimental investigation on the shape memory effect of NiTi ribbons during complete and partial transformation cycling**
A. Fortini, A. Suman, M. Graganini, G. Carrà - Università di Ferrara, Italy
- 12:30** [ESOMAT_183] **Deformation behavior, structure and properties of NiTi shape memory alloys subjected to severe torsion deformation**
V. Komarov - National University of Science and Technology MISIS, Russia and TU Bergakademie Freiberg, Germany
R. Karelin, V. Cherkasov, I. Khmelevskaya, S. Prokoshkin - National University of Science and Technology MISIS, Russia
V. Yusupov - Baikov Institute of Metallurgy and Materials Science, Russia
- 12:45** [ESOMAT_189] **Characterization and Mechanical Behaviour of NiTi/AISI301 laser welded joints of thin wires**
K. Gryn, A. Rygowska, B. Szaraniec - AGH University of Krakow, Poland
T. Goryczka - University of Silesia, Poland
- 13:00** **Lunch break**

ESOMAT 2024

22

Thursday 29 August – room B1.1

ALLOYS DEVELOPMENT AND PROCESSING: STEEL AND OTHER SYSTEMS - 3/3

CHAIRPERSON: Mateusz MORAWIEC

- 11:45** [ESOMAT_114] **On the role of martensite in Ti-6Al-4V α - α' -microstructures and the effect of its decomposition during annealing**
N. Pfeffer, O. Nagel, A. Bezold, J. Vollhüter, S. Neumeier, H.W. Höppel –
Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany
- 12:00** [ESOMAT_147] **Reorientation Induced Plasticity in the martensite of α + β titanium alloys: a new playground to achieve high strength and high work-hardening**
H. Rakotozafy - Université Libre de Bruxelles, Belgium and PSL Research University, France
L. Malet, S. Godet - Université Libre de Bruxelles, Belgium
F. Prima - PSL Research University, France
A. Lenain - Safran Aero Boosters, Belgium
- 12:15** [ESOMAT_173] **Superfast austenite-martensite surface transformation on AISI 316L induced by low-energy high-current electron beam treatment**
A. Lucchini Huspek, F. Rimoldi - Politecnico di Milano, Italy
Č. Donik, I. Paulin, M. Godec - Institute of Metals and Technology, Slovenia
M. Bestetti - Politecnico di Milano, Italy and Tomsk Polytechnic University, Russia
- 12:30** [ESOMAT_023] **Effect of mechanical stability of retained austenite on the strength and ductility balance in the metastable austenitic stainless steel produced by cold-rolling and C, N partitioning process**
Y. Matsumura - Tokushu Kinzoku Excel CO., LTD., Japan and Tohoku University, Japan
G. Miyamoto, Y. Zhang, T. Furuhashi - Tohoku University, Japan
- 12:45** [ESOMAT_186] **Intermartensitic transformation NiMnGa-based single crystals**
R. Chulist, A. Wójcik, A. Szewczyk, W. Maziarz - Polish Academy of Sciences, Poland
A Sozinov - LUT University, Finland
N. Schell - Helmholtz-Zentrum Geesthacht, Germany
W. Skrotzki - Technische Universität Dresden, Germany
T. Tokarski - AGH University of Science and Technology, Poland
- 13:00** **Lunch break**

ESOMAT 2024

23

Thursday 29 August – Poster session

[ESOMAT_010] Functional behavior peculiarities for high entropy shape memory alloys

V. Filatova, G. Firstov, Yu. Koval, V. Odnosum - National Academy of Sciences of Ukraine, Ukraine
G. Gerstein, H.J. Maier - Leibniz Universität Hannover, Germany

[ESOMAT_025] Micro pulling down approach for growing NiTi

T. Sieweke, A. Kunzmann - University of Duisburg-Essen, Germany and Research Center Future Energy Materials and Systems, Germany

C. Luther, L. Schnatmann, L. Bondzio, A. Hütten - Bielefeld University, Germany

L. Winkler - University of Duisburg-Essen, Germany

D. Piorunek, J. Frenzel - Ruhr-University Bochum, Germany

G. Schierning - University of Duisburg-Essen, Germany and Research Center Future Energy Materials and Systems, Germany and Center for Nanointegration Duisburg-Essen, Germany

[ESOMAT_026] Investigation of the martensitic phase transitions in Nickel Copper Titanium intermetallic phases

N. Libke, A. Kunzmann, T. Sieweke, L. Winkler, M. Mittendorff, G. Schierning - Universität Duisburg-Essen, Germany

D. Piorunek, J. Frenzel - Ruhr-Universität Bochum, Germany

[ESOMAT_032] On the strong composition dependence of the martensitic transformation temperature and heat

D. L. Beke - University of Debrecen, Hungary

A.A. Azim - University of Debrecen, Hungary and Ain Shams University, Egypt

[ESOMAT_033] Acoustic emission during Lüders-band type martensitic transformation in CrMnFeCoNi alloy

A.A. Azim - University of Debrecen, Hungary and Ain Shams University, Egypt

L. Daróczi, L. Z. Tóth, D. L. Beke - University of Debrecen, Hungary

I.V. Kireeva, Y.I. Chumlyakov - National Research Tomsk State University, Russia

[ESOMAT_034] The influences of orientation and operating temperature on superelasticity and elastocaloric effect of single-crystal Cu-Al-Mn-(Ni, Mo, Cr) shape memory alloys

N-H. Lu, T-W. Lin, T-C. Yeh, C-H. Chen - National Taiwan University, Taiwan

[ESOMAT_035] Nanoscale-precipitate-strengthened Ni-rich TiNiCu shape memory alloy with stable superelasticity and elastocaloric performance

Y-T. Hsu, C-T. Wu, C-H. Chen - National Taiwan University, Taiwan

ESOMAT 2024

24

Thursday 29 August – Poster session

[ESOMAT_039] Proposal of an experimental stress analysis method based on stress-induced martensitic transformation

J. Cortés-Pérez, S. Cabrera G., I Montiel R., F. N. García-Castillo, S. G. Torres-Cedillo - FES ARAGON-UNAM, Mexico

M. Jimenez-Martinez - Tecnológico de Monterrey, Mexico

[ESOMAT_043] The role of electrons during the martensitic phase transformation in NiTi-based shape memory alloys

A. Kunzmann, G. Schierning - University of Duisburg-Essen, Germany and Research Alliance Ruhr, Germany

J. Frenzel, D. Piorunek, G. Eggeler - Ruhr University of Bochum, Germany

U. Wolff, L. Giebeler, J. Scheiter, H. Reith, N. Perez - IFW-Dresden, Germany

J. W. Han, M. Mittendorf - University of Duisburg-Essen, Germany

K. Nielsch - IFW-Dresden, Germany and TU Dresden, Germany

[ESOMAT_047] Martensitic transformation in Ni-Mn-Ga-Cu microparticles produced by different methods

J. Torrens, C. Seguí, S. Kustov, R. Santamarta, J. Pons - Universitat de les Illes Balears, Spain

M. Ríos Naranjo - Basque Center for Materials, Spain

P. Lázpita, J. Gutiérrez - Universidad del País Vasco/Euskal Herriko Unibertsitatea, Spain

[ESOMAT_049] Actuation of a thin-wall origami NiTi structure fabricated through selective laser melting

A. Nespoli - CNR-ICMATE, Italy

T. Biasutti, G. Sala, B.M. Colosimo, A.M. Grande, P. Bettini - Politecnico di Milano, Italy

[ESOMAT_054] Overview on shape memory alloys with phase transition at cryogenic temperatures

A. Nespoli, F. Passaretti, C. Fanciulli - CNR-ICMATE, Italy

M. Pani, C. Artini - Università di Genova, Italy

[ESOMAT_056] Exploring supercompatibility in shape memory alloys

M. Tahseen, V. Dabade - Indian Institute of Science, India

[ESOMAT_057] High-strength Cu-Al-Mn superelastic alloys

Y. Tanikawa, S. Xu, T. Omori, R. Kainuma - Tohoku University, Japan

[ESOMAT_059] Martensitic transformation and superelasticity in Fe-Mn-Al-Si alloys

K. Edagawa, T. Hoshi, S. Xu, X. Xu, T. Omori, R. Kainuma - Tohoku University, Japan

ESOMAT 2024

25

Thursday 29 August –Poster session

[ESOMAT_065] Composition dependence of acoustic emission during superelastic deformation of NiFeGaCo: from regular martensitic transformation to strain glass behaviour

L. Z. Tóth, L. Daróczy, D. L. Beke - University of Debrecen, Hungary
E. Timofeeva, E. Panchenko, Y. Chumlyakov - Tomsk State University, Russia

[ESOMAT_068] Development of Ni₃Ta-based high-temperature shape memory alloys

C. A. Biffi, J. Flocchi, J. N. Lemke, A. Coda, A. Tuissi - CNR-ICMATE, Italy

[ESOMAT_069] Re-solidification of a Ni-Mn-Ga magnetic shape memory alloy in laser powder bed fusion

M. Norouzi-Inallu, V. Laitinen, M. Vinogradova, K. Ullakko - Lappeenranta-Lahti University of Technology LUT, Finland

[ESOMAT_076] Strain-induced martensite formation during punching of a medium manganese advanced high-strength steel

A. Kajjalainen, P. Kantanen, P. Plosila, V. Javaheri, S. Sadeghpour, J. Kömi - University of Oulu, Finland

[ESOMAT_077] Simulation model for quenching of ultra-thin precision strips

N. Rademacher, D. Büschgens, M. Eickhoff, H. Pfeifer, C. Wuppermann - RWTH Aachen University, Germany

[ESOMAT_082] Influence of transition metal substitution on magnetostructural transitions in Ni-Mn-Ga Heusler alloys

M. Rameš, V. Kopecký, P. Veřtát, M. Dušák, L. Straka, O. Heczko - Czech Academy of Sciences, Czech Republic
M. Varga - Technical University of Košice, Slovak Republic

[ESOMAT_083] On the stability of strain-induced martensite during reheating of a intercritically annealed and cold-rolled, medium manganese steel

R. SurkiA., S. Sadeghpour, J. Kömi, V. Javaheri - University of Oulu, Finland

[ESOMAT_084] Elastic properties of NiTiCuZr thin films characterized by laser-ultrasonics

J. Kušnír, P. Sedlák, P. Stoklasová, T. Grabec, D. Mareš, H. Seiner - Czech Academy of Sciences, Czech Republic
M.S.S. Stange, O.L. Løvvik, M.F. Sundling - SINTEF Industry, Norway

[ESOMAT_100] Effect of Ni concentrations on self-accommodation microstructure of thermoelastic martensite in Ti-Ni alloys

G. Hikosaka, T. Inamura - Tokyo Institute of Technology, Japan
Y. Soejima, H. Akamine, M. Nishida - Kyushu University, Japan
Y. Shinohara - The University of Electro-Communications, Japan

ESOMAT 2024

26

Thursday 29 August – Poster session

[ESOMAT_101] Factors affecting R-Phase transformation temperature in Ti-Ni-Fe alloys

J. Kim - Dong-A University, Korea

[ESOMAT_107] Intermartensitic transformation sequence in NiMnGa-based alloys

A. Szewczyk, A. Wójcik, W. Maziarz, R. Chulist - Polish Academy of Sciences, Poland

N. Schell - Helmholtz-Zentrum Geesthacht, Germany

[ESOMAT_112] Reverse $\epsilon \rightarrow \gamma$ transformations of temperature-induced and stress-induced martensites in functional Fe-Mn-Si shape memory alloys

B. Kustov - Universitat de les Illes Balears, Spain and Lappeenranta-Lahti University of Technology LUT, Finland

E. Lähderanta - Lappeenranta-Lahti University of Technology LUT, Finland

J. Van Humbeeck - University of Leuven, Belgium

J. Torrens-Serra - Universitat de les Illes Balears, Spain

[ESOMAT_122] Investigation of martensitic transformation in thin Ni-Mn-Ga epitaxial film by magneto-optical spectroscopic ellipsometry

M. Makeš - Charles University, Czech Republic and Czech Academy of Sciences, Czech Republic

J. Zázvorka, C. Verbeno, M. Veis - Charles University, Czech Republic

O. Heczko - Czech Academy of Sciences, Czech Republic

[ESOMAT_127] Detecting iron in vanadium carbide nanoprecipitates in microalloyed low-carbon steels

A. Sabet Ghorabaei, B. J. Kooi - University of Groningen, The Netherlands

[ESOMAT_130] Ti-Nb based alloys with bone-like elastic modulus and superelasticity

T-h. Nam - Gyeongsang National University, Korea

[ESOMAT_136] Shape memory nickel-free Ti-, Zr- and Hf-based alloys with Nb

S. Kedrovskiy, Y. Koval, V. Stepchenko, V. Slipchenko - The NAS of Ukraine, Ukraine

[ESOMAT_144] Shape memory alloy pipe couplers for particle accelerators: latest developments and implementation

F. Niccoli, C. Maletta - European Organization for Nuclear Research (CERN), Switzerland and Università della Calabria, Italy

C. Garion, P. Chiggiato - European Organization for Nuclear Research (CERN), Switzerland

[ESOMAT_146] Study of NiTi single crystal transformation through the evolution of elastic coefficients determined by ultrasonic methods

L. Bodnarova, P. Sedlak, T. Grabec, H. Seiner - Czech Academy of Sciences, Czech Republic

Thursday 29 August – Poster session

[ESOMAT_155] Development of 3D printed steels for application in zinc casting

K. Burdová, L. Kučerová, P. Fialova - RTI University of West Bohemia, Czech Republic

[ESOMAT_156] Lightweight Ti-Al-V superelastic alloys with B2-ordered structure

R. Hasegawa, Y. Song, S. Xu, X. Xu, T. Omori, R. Kainuma - Tohoku University, Japan

[ESOMAT_168] Effect of various surface modification techniques on the wettability properties of shape memory alloys

P. Bassani, C.A. Biffi, E. Bassani - CNR ICMATE, Italy

G. Rollo - CNR IPCB, Italy

L. Stendardo, D. Parlato, C. Antonini - Università di Milano-Bicocca, Italy

[ESOMAT_170] Martensitic transformation in deformed and Q&P treated medium-Mn steel intended for forgings

A. Skowronek, A. Kozłowska, K. Matus - Silesian University of Technology, Poland

[ESOMAT_174] Characterization of 11-mm Fe-SMA bars used as prestressing reinforcement in concrete structures

A. Mir, B. Kustov, J. G. Ruiz-Pinilla, R. Santamarta, J. Torrens-Serra, A. Cladera - Universitat de les Illes Balears, Spain

[ESOMAT_175] A preliminary feasibility study on the simultaneous coexistence of superelasticity and shape memory effect in Ni-Ti wires for biomedical applications

A. Nespoli - CNR-ICMATE, Italy

L. Petrini, G. Pennati, F. Berti - Politecnico di Milano, Italy

[ESOMAT_176] Stabilization of martensite in Fe-Mn-Si functional alloys with shape memory effect

B. Kustov - Universitat de les Illes Balears, Spain and Lappeenranta-Lahti University of Technology, Finland

E. Lähderanta - Lappeenranta-Lahti University of Technology, Finland

J. Van Humbeeck - University of Leuven, Belgium

J. Torrens-Serra - Universitat de les Illes Balears, Spain

[ESOMAT_177] Effect of heat treatment on microstructure, precipitation process and texture in FeNiCoAlTa melt spun ribbons

W. Maziarz, A. Wójcik, A. Szewczyk, R. Chulist - Polish Academy of Sciences, Poland

N. Poręba - AGH University of Science and Technology, Poland

ESOMAT 2024

28

Thursday 29 August – Poster session

[ESOMAT_184] Effect of beam shaping in laser welding on the microstructure and transformation temperatures of high temperature NiTi based shape memory alloys

C. A. Biffi, J. Fiocchi, A. Tuissi - CNR ICMATE, Italy
A. G. Demir, L. Caprio, B. Previtali - Politecnico di Milano, Italy

[ESOMAT_198] Characterization of vibration damping in nitinol samples manufactured through Selective Laser Melting

D. Scaccabarozzi, A.M. Ragab Mohamed Ahmed, M.G. Corti - Politecnico di Milano, Italy
C.A. Biffi, J. Fiocchi, A. Tuissi - CNR ICMATE, Italy
B. Saggin - Politecnico di Milano, Italy and Università di Padova, Italy

[ESOMAT_199] Ultrasonic characterization of intermartensitic transitions in NiMnGa(Fe) single crystal

J. Nejezchlebová, J. Olejňák, M. Ševčík, H. Seiner, L. Straka, O. Heczko - Czech Academy of Sciences, Czech Republic

[ESOMAT_207] Tool wear assessment when machining wrought and additively manufactured Nitinol

R. Bertolini, F. Tucci, A. Ghiotti, S. Bruschi – Università di Padova, Italy
I. S. Jawahir - University of Kentucky, USA

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Thursday 29 August – room AULA MAGNA

CALORIC MATERIALS

CHAIRPERSON: Oleg HECZKO

- 16:30** **INVITED [ESOMAT_108] Elastocaloric heat pump: design and performance**
J. Tušek, S. Dall'Olio, Ž. Ahčin, A. Žerovnik, J. Cerar, J. Klemenc, M. Brojan - University of Ljubljana, Slovenia
- 17:00** **[ESOMAT_031] Martensitic transformation in magnetic systems for refrigeration application**
C. Maji, S. Dewangan – BML Munjal University, India
S. Pal – Institute of Engineering & Management Kolkata, India
- 17:15** **[ESOMAT_066] Direct observation of cryogenic elastocaloric effect in a superelastic Cu-Al-Mn alloy**
S. Xu, Y. Song, X. Xu, T. Omori, R. Kainuma - Tohoku University, Japan
T. Ito, T. Kawasaki, S. Harjo, W. Gong - Japan Atomic Energy Agency, Japan
- 17:30** **[ESOMAT_092] Elastocaloric effect in NiMnTi cast alloy and melt-spun ribbons for solid-state cooling and heating applications**
F. Villa - CNR ICMATE, Lecco, Italy and Politecnico di Milano, Italy
E. Villa, N. Bennato, F. Passaretti - CNR ICMATE, Lecco, Italy
L. Righi - Università degli studi di Parma, Italy
D. Salazar - Basque Center for Materials, Spain
R. Casati - Politecnico di Milano, Italy
- 17:45** **[ESOMAT_163] Customization of NiTi(X,Y) shape memory alloys for elastocaloric applications**
B. Maass, C. Großmann, A. Kortmann, A. Paulsen - Ingpulz GmbH, Germany
- 18:00** **[ESOMAT_164] 3D-printable composites for magnetic refrigeration based on Ni-Mn-In-Co magnetic shape memory alloys**
V. Sánchez-Alarcos, D. L. R. Khanna, V. Recarte, J.I. Pérez-Landazábal - Universidad Pública de Navarra, Spain
P. La Roca - Centro Atómico Bariloche (CNEA), Argentina

ESOMAT 2024

30

Thursday 29 August – room B1.1

DEVICES AND APPLICATIONS: INDUSTRIAL APPLICATIONS

CHAIRPERSON: Emanuele SGAMBITERRA

- 16:30** **INVITED [ESOMAT_190] Bioinspired actuation and memory: artificial muscles and artificial synapses**
C. Lamuta - University of Iowa, USA
- 17:00** **[ESOMAT_022] Highly efficient harvesting of low-grade waste heat with a NiTi based thermoelastic generator**
B. Neumann - Helmholtz-Zentrum Dresden-Rossendorf, Germany and Technische Universität Dresden, Germany
S. Fähler - Helmholtz-Zentrum Dresden-Rossendorf, Germany
- 17:15** **[ESOMAT_158] Adaptive control strategy for SMA-based artificial muscles**
E. M. Curcio, E. Sgambitterra, C. Maletta, G. Carbone - Università della Calabria, Italy
T. H. Weerakkody, V. Cichella, C. Lamuta - University of Iowa, USA
- 17:30** **[ESOMAT_160] Morphable SMA-Polymer Composites for automotive application**
S. Rodino', E. M. Curcio, C. Maletta - Università della Calabria, Italy
- 17:45** **[ESOMAT_167] Improving soft robotic systems to enable hand mobility: integration of a pseudo-elastic bowden cable and digital twin-driven design**
G. Pisaneschi, N. Sancisi, M. Mele, A. Zucchelli - Università di Bologna, Italy
- 18:00** **[ESOMAT_187] CuZnAl shape memory alloys for thermal energy storage and management applications**
K.C. Atti, N. Hite, W. Trehern, I. Karaman - Texas A&M University, USA
D.J. Sharar, A.C. Leff - TauMat, USA
A.A. Wilson - U.S. Army Research Laboratory, USA
- 20:00** **Conference dinner**

Friday 30 August – room AULA MAGNA

ADVANCED CHARACTERIZATION AND TESTING

CHAIRPERSON: Nick SCHRYVERS

- 8:45** **INVITED [ESOMAT_116] Stress-induced martensitic transformations in single crystal Ni₂MnGa investigated by neutron diffraction**
F. Orlandi, R. Waite, P. Manuel, D. D. Khalyavin - ISIS Facility, Rutherford Appleton Laboratory, United Kingdom
A. Sozinov - LUT University, Finland
[L. Righi](#) - Università di Parma, Italy
- 9:15** **[ESOMAT_042] Lüders-type deformation of Ti-25Nb shape memory alloy in tension inspected by digital image correlation and infrared thermography**
[K. M. Golaśiński](#) - Cardinal Stefan Wyszyński University, Poland
M. Maj, E. A. Piecyska - Polish Academy of Sciences, Poland
W. Tasaki, H. Y. Kim - University of Tsukuba, Japan
- 9:30** **[ESOMAT_052] In-situ synchrotron X-ray diffraction study on the deformation mechanisms of a TWIP steel during tensile cyclic loading-unloading at cryogenic and high temperatures**
[X. Bian](#), B. Cai - University of Birmingham, United Kingdom
- 9:45** **[ESOMAT_074] Cubic symmetry preservation and homogeneity in elastic properties of $\beta+\omega$ and $\beta+\alpha$ Ti-alloys. An ultrasound-based study**
[M. Janovská](#), J. Olejňák, P. Sedlák, K. Repčák, P. Stoklasová, T. Grabec, H. Seiner - Czech Academy of Sciences, Czech Republic
J. Šmilauerová, P. Harcuba - Charles University, Czech Republic
- 10:00** **[ESOMAT_075] Laser-ultrasonic characterization of anisotropic elasticity of shape memory alloys utilizing surface acoustic waves**
[P. Stoklasová](#), T. Grabec, M. Ševčík, P. Sedlák, H. Seiner - Czech Academy of Sciences, Czech Republic
- 10:15** **[ESOMAT_118] Interactions between hydrogen and superelastic NiTi alloy investigated in-situ by synchrotron diffraction experiments**
A. Weiser, T. Zalezak, M. Jary, O. Zobac, [A. Dlouhy](#) - Institute of Physics of Materials ASCR, Czech Republic
J. Todt, J. Holcova, D. Holec – J. Keckes - Montanuniversität Leoben, Austria
J. Frenzel - Ruhr University, Germany

ESOMAT 2024

32

Friday 30 August – room B1.1

FERROIC AND MAGNETIC ALLOYS: FUNDAMENTAL ASPECTS - 2/2

CHAIRPERSON: Elena VILLA

- 8:45** **INVITED (ONLINE) [ESOMAT_041] Micro-magnetomechanical systems (MAMS) represent the 3rd generation of electromechanical devices**
K. Ullakko, A. Saren, V. Laitinen, A. Kumthekar, M. Norouzi-Inallu - LUT University, Finland
- 9:15** **[ESOMAT_037] Magneto-mechanical coupling in Ferromagnetic Shape Memory Alloys: mechanical experimental investigation under magnetic field**
E. Villa, F. Villa, E. Bassani, N. Bennato, C. Tomasi, F. Passaretti - CNR ICMATE Lecco Unit, Italy
- 9:30** **[ESOMAT_120] Spatially confined magnetic shape-memory Heuslers: implications for nanoscale devices**
M. Takhsha, L. Nasi, G. Trevisi, F. Casoli, F. Albertini - IMEM-CNR, Parma, Italy
M. Horký, J. A. Arregi - CEITEC Brno University of Technology, Czech Republic
A. Kosogor - NASU and MESU, Ukraine and University of Vienna, Austria
R. Brescia - Electron Microscopy Facility IIT, Italy
V. Uhlíř - Brno University of Technology, Czech Republic
- 9:45** **[ESOMAT_128] First-principles investigation of nanotwinned martensites in off-stoichiometric Ni-Mn-(In,Sn) Heusler compounds**
M. E. Gruner, O. N. Miroshkina - University of Duisburg-Essen and Center for Nanointegration, CENIDE, Germany
- 10:00** **[ESOMAT_088] Acoustic emission during anomalous stress strain curve along [011] in Ni₄₉Fe₁₈Ga₂₇Co₆ shape memory single crystal**
S. M. Kamel, N.M. Samy - University of Debrecen, Hungary and Ain Shams University, Egypt
L. Daróczi, L. Z. Tótha, D. L. Beke - University of Debrecen, Hungary
E. Panchenko, Y. I. Chumljakov - Tomsk State University, Russia

Friday 30 August – room AULA MAGNA

ADVANCED CHARACTERIZATION AND TESTING

CHAIRPERSON: Nick SCHRYVERS

- 10:30** [ESOMAT_151] **Effect of grain size on the athermal and deformation-induced martensitic transformation in metastable austenitic steels: a high-energy synchrotron XRD study**
C. Cai, G. Spartacus, P. Hedström - KTH Royal Institute of Technology, Sweden
W. Mu - Luleå University of Technology, Sweden
- 10:45** [ESOMAT_153] **Elasticity of epitaxial NiTi films characterized by laser-ultrasonics**
T. Grabec, D. Mareš, J. Kušnír, K. Repček, P. Stoklasová, P. Sedlák, H. Seiner - Czech Academy of Sciences, Prague, Czech Republic
K. Lünser, S. Fähler - Helmholtz-Zentrum Dresden-Rossendorf, Germany
- 11:15** **Closing / Coffee break**

ESOMAT 2024

34

Friday 30 August – room B1.1

FERROIC AND MAGNETIC ALLOYS: FUNDAMENTAL ASPECTS - 2/2

CHAIRPERSON: Elena VILLA

10:15 [ESOMAT_179] **All-d-Metal metamagnetic shape memory alloys with tunable transformation via microstructure control**

D. Salas, W. Cho, S. Torun, I. Karaman - Texas A&M University, USA
R. Santamarta, J. Pons - Universitat de les Illes Balears, Spain

10:30 [ESOMAT_135] **Shear instability in five-layer modulated Ni-Mn-Ga martensite**

P. Sedlák, H. Seiner, K. Repcek, P. Stoklasova, T. Grabec, P. Vertat, O. Heczko,
L. Straka - Czech Academy of Sciences, Czech Republic
A. Sozinov - Lappeenranta-Lahti University of Technology, Finland

11:15 **Closing / coffee break**

FINAL ESOMAT 2024 Program

(updated on September 5, 2024)

ESOMAT 2024

35

GENERAL INFORMATION

CONFERENCE VENUE

The Conference will be held in **Lecco Campus** - Polo territoriale di Lecco Politecnico di Milano - Via Gaetano Previati 1/c - 23900 – Lecco (Italy)

LANGUAGE

The official language of the Conference will be English. No simultaneous translation will be provided.

PROCEEDINGS

After the Conference, all presented contributions can be submitted for possible publication in the peer-reviewed and indexed journal *Materials* today: proceedings. Speakers can submit only one paper each for the proceedings.

INSURANCE

The ESOMAT 2024 Conference Secretariat cannot assume any responsibility for personal accidents, loss or damage to the private property of participants and accompanying persons, which may either occur during or arise from the Conference. Participants should therefore take whatever steps they consider necessary as regards insurance.

POLICY ON AUDIO AND VIDEO RECORDING OF TECHNICAL PAPER PRESENTATION/SESSIONS

Recording of sessions (audio, video and still photography, etc.) intended for personal use, distribution, publication, or copyright without the express written consent of AIM and the individual authors is strictly prohibited.

POLICY ON CELLULAR PHONE USAGE

In consideration of fellow event attendees and presenters, AIM kindly requests your cooperation in minimizing disturbances which may occur during technical sessions. We ask that cellular phones or other electronic devices be placed in “silent mode” while you are in the meeting rooms. Please step outside the meeting room if you need to have a conversation.

REGISTRATION

REGISTRATION FEES	New Early-Bird (before 20 th May 2024)	Standard (11 th May – 12 th July)	Late/Onsite (after 12 th July 2024)
Full Conference	€ 850	€ 960	€ 1.150
Full Conference (AIM Member)	€ 750	€ 860	€1.030
Student	€ 450	€ 560	€ 670
Accompanying Persons	€ 220	€ 250	€ 250

Full Conference Registration fee includes Admittance to technical sessions; Conference bag; Coffee breaks; Lunches; Welcome reception on August 26, 2024; Conference dinner on August 29, 2024 and Conference tour on August 28, 2024. For non-members the fee includes AIM Membership for the second half of 2024 and for the year 2025.

Student Conference Registration fee includes Admittance to technical sessions; Conference bag; Coffee breaks; Lunches and Welcome reception on August 26, 2024.

Accompanying persons fee includes Welcome reception on August 26, 2024; Conference tour on August 28, 2024 and Social dinner on August 29, 2024.

PAYMENT AND REMITTANCE

>> by credit card online (<https://www.aimnet.it/eng/pagamento.php>)

>> by bank transfer to the order of Associazione Italiana di Metallurgia - AIM at “CREDITO EMILIANO SpA”, Branch no. 052 Milano Sede – Via Andegari, 14 - 20121 Milano – Italy, account no. 010000480455–cod. ABI 03032–CAB 01600 - cin M IBAN: IT33M0303201600010000480455, swift code BACRIT22MIL. The transfer order must specify the name of the participant and ESOMAT 2024

CANCELLATION AND REFUND POLICY

A refund, less 20% deduction for administrative costs, will be issued for written cancellations received **by July 17, 2024**. For attendees who notify their cancellation **after July 17, 2024**, or will not attend the Conference, a charge of 100% of the Conference fee will be withheld

SOCIAL PROGRAMME

WELCOME RECEPTION ON 26 AUGUST 2024

A welcome reception will be offered to all attendees on August 26 at 19:00 at the Conference venue (Lecco Campus - Polo territoriale di Lecco Politecnico di Milano - Via Gaetano Previatei 1/c - 23900 – Lecco).

CONFERENCE TOUR ON 28 AUGUST 2024

In the afternoon of August 28, a Conference tour in Varenna and Villa Monastero will be offered to all attendees (students excluded).

A round trip transfer service will be provided, leaving from the Conference venue at 14:30 and coming back to Lecco at 19:00 approximately

Varenna, known as the Pearl of Lake Como, is one of its most beautiful towns. The Conference tour will include a visit to Villa Monastero and its botanical gardens on the shore of the lake. Originally a 12th century Cistercian convent, the villa underwent many restoration works from 1569 to 1862.



CONFERENCE DINNER ON 29 AUGUST 2024

The Conference dinner will be hosted at Griso Panorama restaurant in Malgrate (Via Provinciale, 51) at 20:00 on August 29.

The restaurant is at walking distance (20 minutes) from the Conference venue / Lecco city centre.

ESOMAT 2024

38

PROGRAMME AT A GLANCE

MONDAY, 26 AUGUST 2024					
13:00	Registration				
13:45	OPENING CEREMONY				
14:00	Plenary lecture by G. Schierming - University of Duisburg-Essen				
15:00	Plenary lecture by H. Sehitoglu - University of Illinois at Urbana-Champaign				
16:00	coffee break				
16:30	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">room AULA MAGNA</td> <td style="width: 50%; text-align: center;">room B1.1</td> </tr> <tr> <td>MATERIAL DESIGN, MODELING AND SIMULATION: MODELING</td> <td>ALLOYS DEVELOPMENT AND PROCESSING: SMA SYSTEMS - 1/2</td> </tr> </table>	room AULA MAGNA	room B1.1	MATERIAL DESIGN, MODELING AND SIMULATION: MODELING	ALLOYS DEVELOPMENT AND PROCESSING: SMA SYSTEMS - 1/2
room AULA MAGNA	room B1.1				
MATERIAL DESIGN, MODELING AND SIMULATION: MODELING	ALLOYS DEVELOPMENT AND PROCESSING: SMA SYSTEMS - 1/2				
19:00-21:30	WELCOME RECEPTION				
TUESDAY, 27 AUGUST 2024					
8:45	Plenary lecture by M. Elahinia - The University of Toledo				
9:45	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">room AULA MAGNA</td> <td style="width: 50%; text-align: center;">room B1.1</td> </tr> <tr> <td>MATERIAL DESIGN, MODELING AND SIMULATION: FUNDAMENTALS OF MARTENSITIC TRANSFORMATION</td> <td>FERROIC AND MAGNETIC ALLOYS: FUNDAMENTAL ASPECTS - 1/2</td> </tr> </table>	room AULA MAGNA	room B1.1	MATERIAL DESIGN, MODELING AND SIMULATION: FUNDAMENTALS OF MARTENSITIC TRANSFORMATION	FERROIC AND MAGNETIC ALLOYS: FUNDAMENTAL ASPECTS - 1/2
room AULA MAGNA	room B1.1				
MATERIAL DESIGN, MODELING AND SIMULATION: FUNDAMENTALS OF MARTENSITIC TRANSFORMATION	FERROIC AND MAGNETIC ALLOYS: FUNDAMENTAL ASPECTS - 1/2				
11:15	coffee break				
11:45	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">ADDITIVE MANUFACTURING: NiTi-BASED SYSTEM - 1/2</td> <td style="width: 50%;">FERROIC AND MAGNETIC ALLOYS: PROCESSING AND MICROSTRUCTURE - 1/2</td> </tr> </table>	ADDITIVE MANUFACTURING: NiTi-BASED SYSTEM - 1/2	FERROIC AND MAGNETIC ALLOYS: PROCESSING AND MICROSTRUCTURE - 1/2		
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13:00	Lunch break				
14:30	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">ALLOYS DEVELOPMENT AND PROCESSING: STEEL AND OTHER SYSTEMS - 1/3</td> <td style="width: 50%;">ADDITIVE MANUFACTURING: OTHER SYSTEMS - 1/2</td> </tr> </table>	ALLOYS DEVELOPMENT AND PROCESSING: STEEL AND OTHER SYSTEMS - 1/3	ADDITIVE MANUFACTURING: OTHER SYSTEMS - 1/2		
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16:45	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">FATIGUE AND FRACTURE - 1/2</td> <td style="width: 50%;">FERROIC AND MAGNETIC ALLOYS: PROCESSING AND MICROSTRUCTURE - 2/2</td> </tr> </table>	FATIGUE AND FRACTURE - 1/2	FERROIC AND MAGNETIC ALLOYS: PROCESSING AND MICROSTRUCTURE - 2/2		
FATIGUE AND FRACTURE - 1/2	FERROIC AND MAGNETIC ALLOYS: PROCESSING AND MICROSTRUCTURE - 2/2				
19:00	ESOMAT IAC Meeting				
WEDNESDAY, 28 AUGUST 2024					
8:45	Plenary lecture by H. Seiner - Czech Academy of Sciences				
9:45	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">room AULA MAGNA</td> <td style="width: 50%; text-align: center;">room B1.1</td> </tr> <tr> <td>ADDITIVE MANUFACTURING: NiTi-BASED SYSTEM - 2/2</td> <td>FATIGUE AND FRACTURE - 2/2</td> </tr> </table>	room AULA MAGNA	room B1.1	ADDITIVE MANUFACTURING: NiTi-BASED SYSTEM - 2/2	FATIGUE AND FRACTURE - 2/2
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13:00	Lunch break				
14:30	CONFERENCE TOUR				
THURSDAY, 29 AUGUST 2024					
8:45	Plenary lecture by Y. Liu - The University of Western Australia				
9:45	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">room AULA MAGNA</td> <td style="width: 50%; text-align: center;">room B1.1</td> </tr> <tr> <td>MATERIAL DESIGN, MODELING AND SIMULATION: ALLOY DESIGN</td> <td>DEVICES AND APPLICATIONS: MEDICAL APPLICATIONS</td> </tr> </table>	room AULA MAGNA	room B1.1	MATERIAL DESIGN, MODELING AND SIMULATION: ALLOY DESIGN	DEVICES AND APPLICATIONS: MEDICAL APPLICATIONS
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13:00	Lunch break				
14:30	POSTER SESSION - coffee break				
16:30	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">CALORIC MATERIALS</td> <td style="width: 50%;">DEVICES AND APPLICATIONS: INDUSTRIAL APPLICATIONS</td> </tr> </table>	CALORIC MATERIALS	DEVICES AND APPLICATIONS: INDUSTRIAL APPLICATIONS		
CALORIC MATERIALS	DEVICES AND APPLICATIONS: INDUSTRIAL APPLICATIONS				
20:00	CONFERENCE DINNER				
FRIDAY, 30 AUGUST 2024					
8:45	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">room AULA MAGNA</td> <td style="width: 50%; text-align: center;">room B1.1</td> </tr> <tr> <td>ADVANCED CHARACTERIZATION AND TESTING</td> <td>FERROIC AND MAGNETIC ALLOYS: FUNDAMENTAL ASPECTS - 2/2</td> </tr> </table>	room AULA MAGNA	room B1.1	ADVANCED CHARACTERIZATION AND TESTING	FERROIC AND MAGNETIC ALLOYS: FUNDAMENTAL ASPECTS - 2/2
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ADVANCED CHARACTERIZATION AND TESTING	FERROIC AND MAGNETIC ALLOYS: FUNDAMENTAL ASPECTS - 2/2				
11:15	CLOSING / COFFEE BREAK				

ESOMAT 2024

**13th European Symposium on
Martensitic Transformations**

26 - 30 August 2024

Lecco - Italy

Organising Secretariat



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METALLURGIA**

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